

# DIVISION C1 ASTRONOMY EDUCATION AND DEVELOPMENT Education et Développement de l'Astronomie

# Newsletter 87 – May 2018

Contributions to this newsletter are gratefully received at any time.

This newsletter is available at the following website <a href="http://iaucc1.frm.utn.edu.ar/wp-content/uploads/2012/11/IAUNL87.pdf">http://iaucc1.frm.utn.edu.ar/wp-content/uploads/2012/11/IAUNL87.pdf</a>

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#### A WELCOME FROM THE EDITORS WITH A NOTE ON EDITORIAL POLICY

Welcome to IAU Commission C1 Newsletter #87, the fifth to be published under the new divisional structure of the IAU established at the General Assembly XXIX in Honolulu, August, 2015. (We are continuing the numbering of the newsletter consecutive with the old C46 education newsletter.) This newsletter contains reports on several of our working groups, announcements of some upcoming meetings of interest, and we are pleased to continue the series of informative book reviews by Naomi Pasachoff.

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

For the November issue the deadline for submitting material is **Friday 5 October 2018**. If you can include photos or illustrations with any material, please do so in the manuscript. Feel free to encourage others to submit material – anything with an astronomy education or development aspect will be considered.

#### IAU C46 NEWSLETTER – GUIDANCE FOR CONTRIBUTORS

The editor is happy to accept articles on any aspect of astronomy education or development, including obituaries and other articles on people. 500-2000 words are the approximate upper and lower limits. Shorter contributions, up to a few hundred words, such as meeting announcements, meeting reports, and other news items, are also welcome.

Send contributions to me by email, at <u>marschal@gettysburg.edu</u>. or to Kathy Eastwood, secretary of CC1 and co-editor of the newsletter:<u>kathy.eastwood@gmail.com</u>. Please send manuscripts as a Microsoft Word attachment (much preferred) or include the text in the body of the email. **Illustrations should be sent as separate, individual files**, preferably as JPEGs or TIFFs no larger than about 3 Mbytes each. **Please include contact information for the author, including email and postal address, DO NOT SEND ANYTHING AS A PDF.** 

Do not send a preliminary draft unless it is clearly marked as such, but feel free to contact me with preliminary ideas for contributions.

We try to edit as lightly as possible, and we certainly don't care whether US English or British spelling conventions are used, so you may notice an inconsistency in style insofar as such conventions can vary from author to author with no loss of comprehensibility. We also leave local turns of phrase untouched unless the meaning is obscure. Clarity, conciseness, and being interesting or informative are what is needed. Only in rare cases is heavier editing necessary.

#### Notes on Resources and Methods for Education

I welcome short notes pointing readers to resources useful for education. Such notes can just point to a website, or can include a paragraph describing the nature and application of the resources available. You will find several examples of these notes in this edition. I also welcome longer articles detailing methods and techniques and reports on educational activities and summer schools, and well as studies regarding the impact and effectiveness of such techniques for astronomical learning.

#### **Book reviews**

We welcome book reviews. Reviews should generally be of books centered on astronomy education or development or of historical interest for educators. If there's such a book that you think is worth reviewing, please send your review to me.

#### The C1 websites

The "official" IAU CC1 website is at <u>http://iaucc1.frm.utn.edu.ar/</u> The IAU Office of Astronomy for Development (OAD) is at <u>http://www.astro4dev.org/</u> and the IAU Office of Astronomy Outreach (OAO) is at <u>https://www.iau.org/public/</u>

#### Back issues of the C46 Newsletter, our previous incarnation

Back issues are available at <u>http://iaucomm46.frm.utn.edu.ar/newsletters/</u>. Newsletter 49, October 1998, has been scanned from hard copy, so the quality of reproduction is only modest. This is also the case for earlier ones, edited by John Percy. These extend back to February 1992, but there are gaps.

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## **EDUCATIONAL REPORTS**

## NASE MEETS JAPANESE HIGH SCHOOL TEACHERS

#### Akihiko Tomita, Wakayama University, Faculty of Education

During the Astronomy Education Meeting in Kagoshima, held at Kagoshima University, Japan, on Friday 30 March, one of the satellite meetings of the CAP2018, participants enjoyed a small workshop of NASE (<u>http://www.wakayama-u.ac.jp/~atomita/Kagoshima/</u>). Beatriz Garcia prepared 45-minutes workshops of "Stars Simulators" and "Astronomy Beyond the Visible."



Beatriz Garcia explained about the materials.

Several Japanese high school teachers also joined the workshop. One of the teachers said that this workshop was very appealing to high school students and that the students were preparing their own workshop at school festival.



Japanese school teachers enjoyed making the stars simulator.

Japanese teachers also presented their own teaching materials, and they found their activities were similar to NASE activities.



Ms. Junko Inoue, a high school science teacher in Osaka, Japan, presented a small hand-made spectrograph. Image through the spectrograph.

Other participants also presented their materials. The meeting was a very nice place for all the participants to communicate the ideas and the examples of astronomy education, and the time, of course, was not enough.

We think that this was the first step to introduce the NASE program in Japan.

## **ASTRONOMY EDUCATION: WE SHOULD LISTEN**

Allyson Bieryla, Harvard University Science Center and Harvard-Smithsonian Center for Astrophysics Cambridge, MA

Allyson Bieryla is the manager of the astronomy lab and telescope at Harvard University's Science Center and an astronomer at the Harvard-Smithsonian Center for Astrophysics. She has been working to adapt the facilities at the Science Center to accommodate students with disabilities. Harvard is an old institution so the facilities often need to be updated to be accommodating. An electric ramp is being installed in the astronomy lab this summer to enable students in a wheelchair access to the solar observing deck. They also have a thermoform printer to assist in telescope observing. After an image is taken at the telescope, the CCD image is then run through the thermoform printer, which uses special heat sensitive paper, and the dark sections of the image are raised similar to braille. The whole process takes less than a minute. This allows students with a visual impairment to have access to the image at the same time as sighted students. Astronomy education has been lacking resources geared toward blind and visually impaired (B/VI) students. A key to learning is being able to interact with other students and having access to the data. This is the first step.

Allyson, along with collaborators Wanda Diaz-Merced (IAU Office for Astronomy for Development), Daniel Davis (Harvard University Demonstration Labs) and Rob Hart (Harvard University Physics), developed a tool last summer using Arduino technology to allow B/VI people to listen to the Great American Solar Eclipse. An Arduino is a small circuit board that can run a simple program. The tool is a small and inexpensive device that converts light to sound. The pitch corresponds to intensity so the dimmer the light the lower the pitch. The sound was streamed live on the Internet for people all over the world to experience the eclipse in realtime.

The eclipse further inspired the idea of using sound as a tool to teach about light. A second-generation Arduino has been developed and debuted at the IAU's Inspiring Stars bridging event in Vienna on April 16, 2018. The Arduino has a light sensor with a RGB color filter. Color is an important concept in astronomy and can be a tool for measuring temperature. The new Arduino converts the light to sound based on the wavelength of color. Bluer light has a higher pitch than the red light. Using a white light source and color filters in a lab setting, B/VI students can begin to train their ears to the sounds of color. A user can then use this device to determine the color of objects. The Arduino has two modes of observing: a mode that allows the sensor to detect emitted light and a mode that detects reflected light off of objects. The most exciting application of the device is that it is adapted to fit on a telescope eyepiece. This allows a B/VI student to observe the universe with sound. The Arduino has been used to observe the sun and moon and it is currently undergoing more testing to detect fainter objects such as stars. The goal is to have this tool be inexpensive and accessible. The tool costs less than \$50 to build and the design instructions and code will be available online for download this summer. This will be one of the many tools on display this summer at the IAU's Inspiring Stars exhibition at the General Assembly.



The Arduino "sound" device in the lab and mounted on a telescope

## ASTRONOMY FOR EVERYONE: AN INNOVATIVE COURSE TO PREPARE EDUCATORS TO TEACH ASTRONOMY FOR DISABLED STUDENTS

Santiago Vargas Domínguez, Ph.D. Research Coordinator Observatorio Astronómico Nacional de Colombia Bogota, Colombia

A cotton candy can become a "nebula" to touch and feel it, a globe with relief of artificial frost can be used to locate any place, knowing the coordinate of the meridian and the

parallel, and an umbrella becomes a representation of the night sky that one can touch to identify constellations.



These are some of the tools used in the course "Astronomy for everyone" offered by Universidad Nacional de Colombia (U.N.), being one of the exclusive official courses in astronomy in any academic institution around the world aimed at approaching blind people to the wonders of the universe.

Students learn, among other topics, about the celestial vault, the Sun, the Moon, the Earth, eclipses, constellations, galaxies, cosmology and elementary particles.



Many students in all the U.N. have different types of disabilities; in Bogotá, the main and campus of the university, we have around 30 people with some visual disability and the number increases every semester. Although there are some occasional options such as workshops of talks on astronomy, the fact that this course is registered in the curriculum of the university, represents an important milestone to promote inclusion, facilitating the incorporation of students with visual disabilities to the overall dynamics of the academic life.

In the classroom, the board and conventional presentations are replaced by Braille (a tactile reading and writing system designed for blind people), embossed material, polystyrene, balloons, wool, bedbugs, pins, cardboard and even a kit of geometry in Braille, so that students can touch and feel what is being explained to them.

Katherine Lorena Pechene, a student of Psychology at the U.N. and one of the participants that have taken the course, says that before she had not thought about studying something related to astronomy. She realized that this is not merely visual, but that the universe can be understood with other tools and, although the topics are not directly related to the studies in her undergraduate program, the course has helped empowering her and opening a whole new perspective of possibilities.

"It's been a process of discovering and learning things that I would not have paid attention to at another time. The size of the Sun, the order of the planets, our place in the world and in the universe. The teachers have done a very interesting job of adaptation, because in addition to the theory they also have produced materials that are very helpful and that landed the concepts," says Katherine.

The course was devised by professor Yuly Sánchez from the Department of Physics and included the participation of several professors from the Observatorio Astronómico Nacional de Colombia and external guests. Among them was the blind Puerto Rican astronomer Wanda Díaz, who spoke through a teleconference about listening the universe instead of seeing it, and how frequency differences can be perceived and used to interpret astrophysical phenomena, becoming a great inspiration form the participants of the course.

Nayibe Rodríguez, teacher at one district school in Bogotá, was also invited to be part of this project. She was previously involved in the development of a suitcase called "Astronomy with all the senses", especially designed for blind people of all ages, with a number of experiences to approach them to the knowledge to the cosmos by stimulating senses other than the visual one.

In addition, César Augusto Acosta, a student of the Master in Teaching of Exact Sciences, dedicated his research work to adapt materials for the teaching of astronomy. His creativity and ingenuity were a key ingredient for the adaptation of a large number of sensory experiences. Students' feedback was also essential to improve the adaptability of such experiences.



Another interesting aspect is that not all the students of the course have visual impairment: full-vision students can also participate wearing blinders that makes it impossible for them to see but stimulate sharpening their other senses. As the final activity we take participants on a trip to an Astronomy Festival at the country side where they can share with amateur astronomers and many people very passionate about the universe.

The idea of this course was born during the First Workshop on Astronomy Beyond the Common Senses for Accessibility and Inclusion held in Cartagena de Indias, Colombia (October 8th, 2016), a historic event where experts from all over the world came together to show their projects and initiatives, providing an opportunity to develop new strategies, work toward specific objectives, share experiences and discuss recent applications for audiences with disabilities. In summary the course has taught students, but also teachers, the importance of working towards inclusion at different levels at the University. Visually-impaired students have understood a way to explore the universe without having to see it, and teachers have learned not to underestimate them and how they can assimilate all different topics, but much more than this, that the knowledge does not have any kind of limitations. We are planning to extend this initiative to different fields of science such as biology, chemistry and physics, among others, to promote inclusion in various areas, a crucial aspect not to be underestimated when working towards the truly development of our society.

## **INSPIRING STARS – THE IAU INCLUSIVE WORLD EXHIBITION PROJECT REPORT**

Maria Rosaria D'Antonio, Wanda Diaz Merced and Lina Canas

#### Summary

"Inspiring Stars" is an itinerant international exhibition promoted by the International Astronomical Union (IAU) to disseminate world efforts on inclusive research, education and outreach activities in astronomy.

The exhibition by showcasing assistive research tools and best inclusive education and outreach practices intends to broaden the horizons of children, parents, teachers and astronomers inspiring the love for science in people's minds with the message everybody can become a scientist (astronomer).



Figure 1 -- "Inspiring Stars" is a collaborative experience where resources related to astronomy education, outreach, research and development, were collected from around the world and combined in a unique display. Experiencing colour (red, blue, yellow) through sound, was one of the resources showcased for the first time during the Inspiring Stars debut event, by Allyson Bieryla, Harvard University. (Photo Credit: IAU)

The IAU aims for this exhibit to become a joint effort by the community and for the community. Inclusive both in goals and practices, the exhibition will change and grow as it is displayed around the world: assimilating international best practices, incorporating and disseminating different local efforts.

The exhibition will premiere during the IAU General Assembly 2018 in Vienna, from 20-31 August, and is composed by two instances: an inception activity that occurred on the

April 16, where the team visited Vienna and contact local organization exchanging experiences; and the debut of the exhibition itself -- where all elements international and local are combined.

#### **Bridging Event in Austria**

On April 16, the project held a pre-event in Vienna that gathered 35 people from both the IAU and the Hilfsgemeinschaft, an Austrian non-profit-organisation in support of the blind and visually impaired. This first initiative in the local Austrian community served as incentive to the participation of the Austrian community in the main "Inspiring Stars" event that will occur during the IAU General Assembly.



Figure 2: The dialogue between astronomers, and Austrian educators and science enthusiasts focused on how to unite both groups. (Photo Credit: IAU)

The event focused on a dialogue with the local Austrian special needs educators and science enthusiasts, and members of the Executive Committee of the IAU, including the IAU General Secretary-Elect Teresa Lago and President-Elect Ewine van Dishoeck. Additionally, all participants were able to experience interactive displays showcasing resources from around the world, including tactile planets, books and posters (Spain & USA), multisensorial optical telescope (USA), tactile telescope model (Japan), sonification of hydrogen spectra (South Africa) and others.

#### Première Event during XXXth General Assembly

The debut of the exhibit itself where all elements international and local are combined will happen in August 2018. The main event will have three main components (1) interactive, inclusive resources from around the world utilized, mainly for communication and research accessibility; (2) panel exhibition with explanatory/descriptive best practices carried across the globe; (3) one-day event with the participation of invited speakers and activities for students.



*Figure 3: Inspiring Stars showcased educational, outreach and research resources from around the world to promote egalitarian participation in science. (Photo Credit: IAU)* 

Having the main goal to be an itinerant exhibition, the key actions carried vary, being tailored to the needs of the community is serving -- the project therefore adapts according to the local needs, target audience and designated area for the exhibition.

#### **IAU Collaboration**

The Inspiring Stars - IAU inclusive world exhibition is a joint venture by the IAU Secretariat, the IAU Office of Astronomy for Development and the IAU Office for Astronomy Outreach. By joining the three offices, the IAU intends a global mobilisation for inclusion. In alignment with the IAU new strategic plan, linking the three branches together: research, development and communication through the lens of inclusion. IAU members states will also be asked to actively participate and hosting an exhibition in their country. The Mini-Task Force also collaborates closely with other IAU scientific bodies as the IAU Equity and Inclusion Working Group. The IAU is also identifying key international partners, key agents in their communities or at a global level to support the project.

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## A CENTURY OF ASTRONOMY AND COMMUNICATION WITHOUT BOUNDARIES

#### Magda Stavinschi

Astronomical Institute of the Romanian Academy

The Astronomical International Union (IAU) appeared in 1919 at the end of the First World War. In a world ravaged by the years of countless battles, the worldwide astronomers embraced new challenges and joined their forces for the study of the sky and to open new roads in science. In a metaphorical way, they took action to bring the peace and harmony of the Universe down on Earth.

The history of the last century of astronomical research, the 20<sup>th</sup> Century, confirms the permanent cooperation between the astronomers of the world, crossing all boundaries and difficulties, such as the war, different religious backgrounds and political beliefs.

I will just remember few good examples in the history of the Romanian astronomers to underline this.

In 2014, we celebrate 140 years since the birth of Nicolae Donitch (Donici), a pioneer of the IAU and one of the founders of contemporary Romanian astronomical research. Born in a family of Romanian countryside nobles, he shared the same historical destiny together with all the Romanians of East Moldova (a historical Romanian speaking province also called Bessarabia) which entered during the 19<sup>th</sup> Century under the authority of the Russian Empire.

Donitch finished his studies in Odessa and then left for Saint Petersburg to serve the Tsar as he became a member of the Russian Academy. After the first revolution in Russia in February 1917, Nicolae Donitch returned to Odessa where he built his scientific laboratory. However, in 1920 the Bolsheviks entered Odessa and ruined this facility forcing him to take refuge to Bessarabia (united with Romania in 1918). Here, he operated for many years a private astronomical observatory which he built as early as 1908.

The bitterness of history hit him again in 1940 as Hitler and Stalin agreed that almost a quarter of the historical, sovereign territory of Romania to be annexed by the Soviet Union (the infamous Ribbentrop-Molotov Pact). Donitch decided to take refuge to what was left of Romania, in order to avoid being deported to Siberia (as he previously served the Tsar – the enemy of the Bolsheviks, he was a Romanian of a noble origin and also he faithfully served Romania, all being major "faults" in the eyes of the Soviet authorities). But at the end of World War Two, the Red Army occupied the whole of Romania and a ruthless communization process was imposed. Confronted with this new tragic reality, Donitch had no choice left but to immigrate to Germany and then to France.

During the time he worked in Romania, Donitch became an honorary member of the Romanian Academy and he was considered by the scientific community a great specialist in the physics of the Sun and of the total solar eclipses, making an important modernization of astronomical instruments and creating new research methods. Because of his energetic actions and activity, Romania became a member of the IAU.

After the moment he left Romania to live in the Western Europe, a big part of his biography remained unknown until recently.

Where did he go? What did he do? When and where did he die? All these questions would have remained a mystery and wouldn't have been solved without the help of our foreign friends, astronomers and historians.

At the beginning of my research which aimed to put together the puzzle of Donitch's pathway after emigration, I got a valuable help from a colleague working at Meudon Observatory in France, who is also a specialist in solar physics, exactly like Donitch himself was. He took me to the official address of Nicolae Donitch in France, as it was recorded in the documents of the IAU, at Fontenay aux Roses, near Meudon. But here my researches seemed to reach a dead end: at first we couldn't find the street (in the intervening years, the names of the streets had changed) but then we followed directions offered by the city hall and so we found it. However, there was no Donitch name in the building's records and yet, the old owner of the nearby cafeteria recognized the great astronomer in a photo I showed him. He told me the reason why the name Donitch wasn't in the records of the street: the lady who owned the flat he rented did not declare him as a tenant just to avoid paying the legal taxes!

Even if it seemed that my adventure in finding him reached the end of the road, I just felt I had to go on. Therefore, I returned back online looking for any unknown information about Donitch and one day I stumbled upon a photo, quite recently taken, of a lady called Maria Brunshwig. In this picture, she appeared to be standing on the steps of a church located in the village where Donitch had built and operated his astronomical observatory. The lady was from Argentina. I continued to look for other data about her on the Internet and found an announcement, that in three days she was going to attend the funeral ceremony for the burial of her husband in a certain cemetery. I checked the address of the cemetery and I saw it was in Buenos Aires.

This was obviously out of my reach, at least for that moment. But I remembered that I had a good colleague in Argentina, Beatriz Elena Garcia, who works at the Instituto de Tecnologías en Detección y Astropartículas (ITeDA). I knew that she wasn't living in the capital city of the country but still, she was the best chance I had to get closer to the subject as she could call the administrative headquarters of the cemetery and find details about the identity of the person who owns or uses that respective grave. I remember the phone call I received from her at 2 a.m. (because of the time difference between our countries) when she said to me with great satisfaction in her voice: *"She is the niece of Nicolae Donitch!"* I can't describe the emotion I felt when I heard this: A fortuitous chain of events and the international cooperation of the astronomical community led to this biographical discovery.

At this point I still wanted to know more about what happened to the great astronomer after he left Romania. Therefore, I wrote to CNRS in Paris and they gave me another pleasant surprise. A few days after they got my message, the Director of the CNRS archive told me they have a file of about 200 pages containing annual summaries, project details and personal notes of Nicolae Donitch. I had the pleasure of getting sent a copy of all of them to me in Bucharest. What else could I have wished for in my biographical search?

It remained, however, to discover place and date of his death. We knew that Donitch had died in a town near Nice in France. Jean Kovalevsky, an astronomer with the Côte d'Azur Observatory looked for his name in the records of the Orthodox Church in Nice hoping that his burial was recorded there. The bad state of these old records made it impossible to find anything useful. But another astronomer form France, Françoise Le Guet

Tully, gave me a helping hand on this. Following other tracks, she managed to get the death certificate of Nicolae Donitch and she sent me the photos of the graveyard where he was buried, in Puget-Thénier, a commune in the Alpes-Maritimes department of southeastern France.

Donitch was a pioneer of the IAU, an international association of professional astronomers which will celebrate soon 100 years of existence. In 2014, in Bucharest, the Romanian Academy organized an international meeting to celebrate his life and work. On that occasion, the General Secretary of the IAU at the time, Thierry Montmerle, asked me to write a book about this great Romanian astronomer. The book is called "Nicolae Donitch, a pioneer of the International Astronomical Union".

In this article, I have briefly described just one of the discoveries I have made, regarding the biography of a great scientific personality of Romania, the astronomer Nicolae Donitch. I would like bring up now another good example to prove once more the value of this special connection among astronomers all over the globe.

In 2018 we celebrate here in Romania, 125 years since the birth of Petre (Pierre) Sergescu, Secretary of the International Academy of the History of Science, where he received this position for eternity, Founder and General Secretary of the International Union for the History of Sciences and Director of the Archives Internationales d'Histoire des Sciences journal. His scholarly work was continued by a good friend of him, René Taton (1915-2004), a science historian and the author of the notorious History of Sciences. During a gathering held in his memory and organized by her daughter, Nicole Capitaine, who is also astronomer at Observatoire de Paris, she asked me to give a speech on Petre Sergescu, the predecessor of her father. At the time, I didn't know much on him but I took her invitation as a challenge to learn more, and soon found much about him.

Sergescu was for many years a Professor at Cluj University where he made many notable contributions to mathematics and organized many scientific seminars and congresses. He also showed a tremendous generosity as he funded the journal he managed and other scientific organizations through his own wages.

But in 1940, an infamous year in the history of Romanians, another tragic event in our history - the Vienna Diktat (also called the Second Vienna Award) imposed upon neutral Romania by Hitler and Mussolini, gave Hungary a big part of Transylvania. All the Romanians from Cluj University, regardless of whether they were professors, students or just employees, were forced to leave the city within few days, as the university was run out from there and relocated in the unoccupied part of Romania. A protest by the university's professors was organized and led by Petre Sergescu, a true patriot who showed great devotion to our country during the First World War as he always did. He exiled himself to Paris later on but never renounced to his Romanian citizenship as he wanted to give a positive example the young generation to keep alive the hope that Romania will see again better days.

Thanks again to impressive international cooperation with fellow astronomers, Beatriz Elena Garcia, who helped me locate Donitch's niece, found an important additional source of information at Biblioteca Central UNSAM. It was a remarkable article by Sergescu published in Argentina in the "Archeion" of the AIHS that described the shocking exile of the Cluj University. The article was sent to Argentina on the 24<sup>th</sup> of November 1941 but somehow reached the destination only in October next year.

My journeys on the footsteps of the great Romanian scholars I have memorialized in this article, are just few modest examples of how worldwide communication and cooperation between astronomers advances knowledge and understanding. Under the shining of the stars, we work together not only to solve the mysteries of the sky but also those of history as well, in a world where the spark of information knows no physical distance due to the ubiquitous environment of the internet.

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## **EPHEMERIDES: GAUSS, GOULD AND THE ARGENTINE NATIONAL OBSERVATORY**

Santiago Paolantonio Member National Outreach Contacts - Argentine Museo Observatorio Astronómico de Córdoba – Universidad Nacional de Córdoba. Associate Member Commission C1 Astronomy Education and Development Translation: Dr. David Merlo

Last April 30 [2018] it was 241 years since the birth of Johann Carl Friedrich Gauss, which occurred in 1777 in Brunswick, Lower Saxony, Germany (the ancient "Holy Roman Empire"). Gauss is famous for his numerous contributions to the sciences; as a mathematician he ventured into number theory, algebra, analysis, geometry, probability and error theory. He also carried out research in observational astronomy, celestial mechanics, geodesy, geomagnetism, electromagnetism and optics, among others. For their contributions, the magnetic field unit of the International System was named "Gauss", and a lunar crater and German mark notes carry their image. Gauss' remarkably rich scientific activity marks him as one of the greatest scientists of all time, for which he is widely recognized today.

What is little known is his relationship with the founding director of the first Argentine astronomical institution, Dr. Benjamin A. Gould, who was a disciple of Gauss.

Undoubtedly, one of the reasons that led President of Argentina,Domingo F. Sarmiento, to choose Dr. Gould to lead the Observatorio Nacional Argentino (Argentine National Observatory), founded in 1871 in the city of Córdoba, was his extensive relations with the most important scientists of the time.

Gould was born in Boston, Massachusetts, USA, on September 27, 1824, graduated from Harvard University in 1844. Determined to dedicate his life to astronomy, the year after he graduated, with 21 years old, he undertook a long study tour of Europe. In July 1845 he began the tour of Ireland, Scotland and England and he visited the Royal Observatory of Greenwich from London six times; there he established a relationship with his director, George Biddell Airy. Later he moved to France, where he met Francois Arago and Jean B. Biot at the Paris Observatory, staying four months.



*Left*: Benjamin A. Gould in 1856 (Partial painting by T. H. Matteson, Albany Institute of History & Art., Dudley Observatory). *Right*: Johann Carl Friedrich Gauss in 1840 (Painting by Christian A. Jensen. Archiv der Berli-Brandenburgischen Akademie der Wisswnschaften - http://archiv.bbaw.de/).

But without a doubt, where he achieved the greatest benefit was in Germany, at that time "a mecca of science" and in particular of world astronomy. It arrived in the spring of 1846 and remained at the Berlin Observatory until April 1847, with its director, the astronomer Johann Franz Encke (1791-1865). Encke, discoverer of the second known periodic comet and one of the divisions of Saturn's rings, was also a disciple of Gauss.

In Berlin he met Alexander von Humboldt (1769-1859), who was 77 years old, famous in his time and extremely influential. Gould established friendship with Humboldt, which was very useful, since it helped him to make a place in the scientific circle. Before being President, Sarmiento had interviewed the German scientist at the time of his trip to Europe in the late 1840s. This scientist also maintained a friendship with Dr. Germán Burmeister, first director of the Academia Nacional de Ciencias (National Academy of Sciences) founded in Cordoba at the same time as the Observatory.

During the period in which Gould remained in Berlin, an historical event happened, in September 1846 Johann Gottfried Galle (1812-1910) discovered Neptune on the basis of the calculations made by the Frenchman Urbain Jean Joseph Leverrier, at the behest of the aforementioned Arago. Gould made a friendship with Galle that lasted over time. The future director of the Argentine observatory also studied with Struve, Peters and Hansen and was related to the mathematician F. G. Eisenstein.

#### **Disciple of Gauss**

On March 23, 1847 Gould sent a letter requesting to be received as a student of Carl Friederich Gauss in Göttingen, who was 70 years old. The request was accepted thanks to his relationship with Humboldt, who recommended him especially. Gauss also consulted Heinrich Christian Schumacher (1780-1850), editor of the famous magazine Astronomische Nachrichten. The young Gould moved to that city where he remained between September 1847 and May 1848.

As a disciple of Gauss, he studied the problem of planetary movements, including the asteroid Flora -years later, in Córdoba, he would observe this asteroid again to determine the solar parallax-. In 1848 he received his doctorate with the work entitled: "Untersuchungen über die Gegenseitige Lage der Bahnen der zwischen Mars and Jupiter sich bewegende Planeten" on the orbits of the "planets" -asteroids- located between Mars and Jupiter. In this way he became the first American to obtain that degree in astronomy.

Later he visited the observatory of Altona and Gotha, where he stayed for a month. In Hamburg he worked for four months with Schumacher. At this time, probably germinated in Gould the idea of a scientific newspaper for his country, similar to the Astronomische Nachrichten, created by Schumacher in 1821, intended concrete on his return with The Astronomical Journal, a publication that still exists today. There are abundant references to Gould in the correspondence between Gauss and Schumacher.

It is important to highlight the fact that in this journey Gould knows in Bonn the astronomer Friedrich W. Argelander (1799-1875) who he considered his teacher and friend, and his teachings and work became the basis for programming the main activity that would develop in the Argentine observatory. The Uranometría Argentina and the later Córdoba Durchmusterung can be considered the austral extension of the main works carried out by this German scientist.

Finally, in September 1848 Gould returned home via Paris and London, arriving in North America in November. In the United States there was a precarious scientific reality, very different from the European one. He had serious difficulties to develop his scientific activity, dedicating himself mainly to the teaching of mathematics, French and German, with what he earned his livelihood. In this context, in September1851, a remarkable fact happens, Gauss offers Gould the position of Professor of Astronomy at the University of Göttingen, which shows his high valuation of the young American astronomer. Dr. Gould accepts in the first instance, but then declines the honor, despite pressure from some friends like Benjamin Peirce and Alexander Agassiz. It is a somewhat mysterious aspect, because it was a position coveted by many and that was ideal for Gould.

It is worth highlighting Gauss' various relations with the United States. He had more than 12 students of that nationality. One of these students was Edward Everett professor at Harvard and then pastor of the Unitarian Church, to which Gould also belonged. Everett was later governor of Massachusetts, time in which the son of Gauss was received in that state. Gauss was a member of the American Academy of Arts and Sciences in 1822, and his diploma was signed by the grandfather of Gould's future wife, the honorable J. Quincy. Alexander Bache, who would later be Gould's boss and with whom Gould maintained a fluid mail letter exchange.



Alexander von Humboldt (http://library.humboldt.edu/humco/images/AVonHumboldt.gif).



Humboldt in his Library 1856 (http://germanhistorydocs.ghidc.org/sub\_image.cfm?image\_id=266 © Bildarchiv Preußischer Kulturbesitz, Original: Staatliche Museen zu Berlin - Preußischer Kulturbesitz, Kunstbibliothek).



Observatorio de Göttingen a mediados del siglo XIX, época en la que lo visitó el Benjamin Gould (*Niedersächsische Staats und Universitätsbibliothek Göttingen* <u>http://webdoc.sub.gwdg.de/ebook/e/2005/gausscd/html/sternwarte\_hist\_tafel52.jpg</u>)</u>



Heinrich Christian Schumacher in 1853 (http://museen-sh.de/Objekt/DE-MUS-076111/lido/P4-S-22)

#### **NOTICES AND ANNOUNCEMENTS**

## IAU DIVISION C ASTRONOMY EDUCATION, OUTREACH AND HERITAGE : IAU GENERAL ASSEMBLY XXX VIENNA

# (Note: Commission 1 invites all the members to the Business Meeting, to be held on Aug 24th, 2018 between 15:30 and 18:15 hrs.)

Note: For multi-author papers, only the first author is listed. All authors can be acknowledged in the paper presentation at the GA.

### **Programme for Division C Division Days**

Oral Session	talks n advation	Date	Time	Venue Boom F2 (500 conts)
1 11111		24 Aug	10.30-12.00	Room F2 (500 seats)
10.30	John Hearnsha	aw (NZ)	IAU Division C: Educ review of the	cation, outreach and heritage – a division's activities 2015-18
10.45	Susana Deustu	ıa (USA)	Astronomy Education Next Trienniu	, Outreach and Heritage: The m
11.00	Jay Pasachoff	(USA)	Report of the IAU Wo	orking Group on Solar Eclipses
11.15	Eric Mamajek	(USA)	Working Group on St	ar Names (WGSN)
11.30	Poster papers:	all presenters of	of posters should be clo	ose to their posters and
	prepared to an	swer questions	from participants.	
12.00	Session end	1	1 1	
2 Com	mission C2	24 Aug	13.30-15.00	Room F2 (500 seats)
Comn	nunicating astr	onomy with th	ne public	
13.30	Pedro Russo (1	Netherlands)	The first 3 years of C.	C2
13.40	Sze-leung Che	ung (Japan)	The CAP journal	
13.50	Oana Sandu (O	Germany)	The CAP Conference	
14.00	<b>Rick Fienberg</b>	(USA)	Outreach & Profession	nalisation
14.10	Lars Lindberg (Germany)	Christensen	Public Outreach & Int	formation Management
14.20	Marta Entrada	S	Science Communicati	on Research & Science
	(Portugal)		Communication	
14.30	Jorge Rivero (	Netherlands)	IAU100: Communica	tion Strategy to Disseminate the
	-		IAU's 100th Annivers	ary Message Globally
14.40	Rick Fienberg	(USA)	Message by new C2 F	President
15.00	Session end			
3 Com	mission C1	24 Aug	15.30-18.30	Room F2 (500 seats)
Astro	nomy education	n and develop	ment	
15.30	Beatriz Garcia	(AR)	3 Years of Commission	on C1
15.40	Derek McNall	y(UK)	The value of practical	classes in Astronomy
			Education (I)	

15.50	Susana Deustua (USA)	Astronomy Education: an astronomer's view
16.00	Kevin Govender (S Africa)	The OAD and Commission C.C1
16.10	Jay Pasachoff (USA)	Eclipses in education
16.20	Sze-leung Cheung (Japan)	Updates from IAU Office for Astronomy Outreach
16.30	Francesca Primas (Germany)	Women in astronomy: challenges and actions
16.40	Debra Elmegreen (USA)	IAU Strategic Plan: the Office of Astronomy for
		Education (I)
16.50	Paulo Bretones (Brazil)	WG Research on Astronomy Education
16.55	Rosa Ros (Spain)	WG Network for Astronomy School Education
17.00	Amelia Ortiz-Gil (Spain)	WG Astronomy for Equity and Inclusion
17.05	Connie Walker(USA)	WG Achieving Sustainable Development within a
		Quality Lighting Framework
17.10	Muriel Gargaud (France)	WG Education and Training in Astrobiology
17.15	Chenzhou Cui (China)	WG Data Driven Astronomy Education and Public
		Outreach
17.20	Kathy Eastwood (USA)	Discussion of C.C1 Newsletter
17.25	Round table discussion and	Conclusions. (Chair: Chris Impey)

Main topics to discuss:

- 1. Involving more young educators in the Commission.
- 2. Ways to share instructional materials and best practices.
- 3. How to start an international journal on astronomy education (taking into account different languages)?
- 4. How to find AE researchers in many countries and join the community?
- 5. How to increase the surveys of publications in many countries and languages?
- 6. How to increase astronomy contents in the schools worldwide?
- 7. Our participation in the LP control at a Global scale.
- 8. The impact of the activities on Astronomy for equity and inclusion.
- 9. The integrated education in Astronomy, taking into account not only the discipline itself (Physics, Maths), but also Biology, Chemistry, History, Philosophy and Pedagogy.
- 10. The way to communicate our job to the professional astronomers, the Newsletter.
- 18.30 Session end

4 Gen	eral 27 Aug	10.30-12.00	Room F2 (500 seats)
10.30	Paul Olande Baki (Kenya)	Astronomy and In	ndigenous Technologies in Africa
10.40	Tsolmon Renchin (Mongolia)	Astronomical Ed astronomy in Mo	acation and outreach activities for ngolia
10.50	Deborah Kala Perkins (USA)	The Universe Isn with Life 2.0	't Silent: Electroacoustic Ensembles
11.00	Magda Stavinschi (Romania)	IAU - A century world	of science and spirituality around the
11.10	Vyjayanthi Mala Perumal (India)	STEM for wome	1
11.20	Ramesh Kapoor (India)	Astronomy from India in the early	Europe to the East: A passage through 17th century

11.30 Poster papers: all presenters of posters should be close to their posters and prepared to answer questions from participants.

12.00 Session end

5 Com	mission C3 27 Aug	13.30-15.00	Room F2 (500 seats)
Histor	y of Astronomy		
13.30	Guangchao Wang (China)	Chinese efforts to de the eighteenth centu <i>kaocheng</i> (I)	etermine the solar model in ry: the case of the <i>Lixiang</i>
13.50	Pritisha Shrestha (Nepal)	Sun, solstice and <i>Ma</i> significance in our c	akar Sankranti: an astronomical cultural practice
14.05 Lucia Marchetti (S Africa)		'Hemelliggaam Or t Now': an art-meets- the history of astron	he Attempt To Be Here science project inspired by nomy in South Africa
14.20	Ahmed abdel Hady (Egypt	t) Egyptian astronome observatories during	rs and astronomical the Fatimid and Ottoman eras
14.35	Susanne Hoffmann (Germany)	Analysing and visua of Babylonian astron	llising MUL.APIN – a witness metry
14.50	Steven Gullberg	Report from the WC Astronomy in Cultur	G for Archaeo-astronomy and re
15.05	Session end	·	
6 Com	mission C4 27 Aug	15.30-17.00	Room F2 (500 seats)
World	l Heritage and Astronomy		
15.30 World	Clive Ruggles (UK)	The AWHI comes o Heritage sites for 20	f age: three potential astronomical 019 (I)
15.50	Gudrun Wolfschmidt	Observatories 100 y	ears ago—UNESCO v. IAU list of

world		Heritage sites for 2019 (1)
15.50	Gudrun Wolfschmidt	Observatories 100 years ago-UNESCO v. IAU list of
	(Germany)	Outstanding Astronomical Heritage (I)
16.10	Juan Belmonte (Spain):	Land- and skyscape within the Astronomy and World
		Heritage Initiative: Spanish case studies (I)
16.20	Duane Hamacher	The future of UNESCO and intangible astronomical
		heritage (Australia) (I)
16.30	Mikhail Marov (Russia)	The heritage of space exploration (I)
16.40	Günther Wuchterl (Austria)	Starlight and World Heritage (I)

16.50 Alejandro López (Argentina) Astronomical heritage in danger (I)

17.00 Session end

## Poster papers at Division C Division Days

## Commission C1 posters

1.	Javier Sanchez(Colombia)	Astronomical Experience for Visually-Impaired People
2.	Temidayo Oniosun (Nigeria)	Impact Assessment of Space Club Futa in
		Promoting Astronomy in Nigeria
3.	Abd el Fady Morcos (Egypt)	Astronomy Education in Egypt through the last 3 years
4.	Jiwaji Noorali (Tanzania)	Progress of Astronomy in Tanzania
5.	Patrícia Figueiró Spinelli	GalileoMobile - 10 years of itinerant astronomy
	(Brazil)	

6.	Karino Shigeyuki (Japan)	Towards the standardized astronomy
		curriculum: Analysis of the astronomy syllabus
		in Japanese universities
7.	Mary Kay Hemenway (USA)	The Evolution of Teacher Professional Development
		Workshops at McDonald Observatory
8.	Sam Rametse (S Africa)	Astronomy Facilities Growing Education
9.	Babagana Abubakar	The Position of Space Sciences in Africa:
	(Nigeria)	Opportunities and Potentials
10	. Irina Voloshina (Russia)	Training at the telescope for students of Moscow State
		University
11	. Afrodita Liliana Boldea	Education and Science through Astronomy at
	(Romania)	the University of Craiova and Horia Hulubei
		National Institute for R&D in Physics and
		Nuclear Engineering
12	. Modou Mbaye (Senegal)	Astronomy education initiative in Senegal

## **Commission C2 posters**

1.	Babagana Abubakar	The Position of Space weather in Africa: Education and
	(Nigeria)	Outreach
2.	Sara Anjos (Portugal and	Youth Engagement with Astronomy
	Netherlands)	
3.	Magdalena Brunner	Herschel and the invisible end of the rainbow
	(Austria)	

## **Commission C3 posters**

	1.	Jay Pasachoff (USA)	The Historical Astronomy Division of the
			American Astronomical Society
	2.	Kim Sang Hyuk(S Korea)	A Study on the Heumgyeonggak-nu, the Original
			Model of An Armillary Clock
	3.	Lee Ki-Won (S Korea)	Analysis of Astronomical Almanacs of Manchukuo
	4.	Mihn Byeong-Hee (S Korea)	Study on the Korean Astrolabe of Ryu Geum
	5.	Seo Yoon Kyung (S Korea)	Development of a Web-based Testbed System
			for Korean Astronomical Records Service
	6.	Iryna Vavilova(Ukraine)	The oldest astronomical observatories at the
			territory of the modern Ukraine
	7.	Ericson Lopez (Ecuador)	The astronomical heritage of the Quito
		-	Astronomical Observatory
Ge	ner	al posters	
1.	Jo	rge Rivero Gonzalez	IAU100: Uniting our World to Explore the
	(N	letherlands)	Universe
2.	Al	hmed Osman (Kuwait)	Night sky brightness at Kottamia Observatory
			site using DMSP satellite images
3.	Ha	an-Earl Park (S Korea)	Measurements of Twilight Sky Brightness inKorea
4.	W	anda Diaz Merced (S Africa)	Effective and Simple Hand Held Multimodal
			Tool to Monitor Infrared Emissions

## NEW TRENDS IN TEACHING ASTRONOMY: ONE DAY WORKSHOP ON EDUCATION IN ASTRONOMY AND ASTROBIOLOGY – IAU GENERAL ASSEMBLY 2018

Sunday 2018-08-19, Kuffner-Observatory, Johann-Staud-Straie 10, 1160 Wien, Austria

SOC: Rosa Ros, Margarita Metaxa, Constance Walker, Rosie Cane, Jonas Souza, Muriel Gargau, Inge Loes ten Kate, Beatriz García

After the ISE2A (https://ise2a.uu.nl/) symposium organized on July 3rd-6th 2017, in Utrecht, we realized that a permanent action on Education in Astronomy and Astrobiology could be useful to:

- install this subject in both communities,
- start a discussion about good practices by teaching professors how to teach astronomy and astrobiology in the classroom
- invite professional astronomers to join us in this activity.

#### **One Day Workshop on Education in Astronomy and Astrobiology**

The XXX IAU-GA 2018, the Inter- Division B-C Commission Protection of Existing and Potential Observatory Sites, the C1- Education and development of Astronomy and the Inter-Commission C1-F2-F3-H2 WG Education and Training in Astrobiology, propose a meeting to develop different topics and resources ready to be used for educators.

We invite Secondary and High School faculty as well as IAU Colleagues to a One Day Workshop on Education (ODWE).

This second circular is also to call your attention to three poster sessions during the coffees where you can submit posters that to discuss the work that YOU are doing on topics related to this workshop. The three sessions are: Light Pollution; Education in Astronomy and Astrobiology. The format for the posters will be the standard, 0.90 x 1.20 m maximum.

Applications to the workshop have been open since December 29th. 2017. If you are interested in attending, please fill out the Workshop application form at: <u>https://bit.ly/2FZhvcS</u>

Abstract submissions open on March 1st, 2018 and the deadline will be on June 15th, 2018

#### Final Agenda

8:00-08:30 Opening remarks

8:30-11:00 - First session

#### Light Pollution and Quality Lighting Teaching Kit. Chairs/instructors: Connie Walker, Margarita Metaxa

- Introduction to the motivation for the project and how it benefits students (15 min)
- Light pollution issues relevant One Day Workshop on Education in Astronomy and Astrobiology students' lives and how the issues connect with the activities (15 min)
- Hands-on experiences with the six activities (20 min each for 5 activities; 30 min for one activity)
- Question and answer discussion period (20 min)
- Globe at Night project.

11:00- 11:30 Coffee/ poster session

#### 11:30 - 14:00 - Second Session

#### Network for Astronomy School Education (NASE). Chair: Rosa Ros, Beatriz García

- Introduction: NASE and ISO Quality Management (20 min)
- NASE activities about 10 minutes for each one (1.5 hour)
  - Local Horizon
  - Sun-Earth-Moon System
  - Instruments: quadrant, goniometer, celestial charts, sundial.
  - Electromagnetic Spectrum: the spectrometer and astronomy beyond the visible Cosmology
- Evaluation and Quality System (15 minutes)
- WEB contributions from Local Working Groups (15 minutes)
- Summary (10 minutes)

14:00-15:00 Lunch / poster session

#### 15:00 -17:30 - Third session

#### Astrobiology Workshop. Chair: Muriel Gargau, Rosie Cane

• Introduction to astrobiology (20 minute presentation)

-Overview of astrobiology, some of the most likely places we might be able to find life beyond Earth and how it can be used to introduce various other subjects to the science curriculum.

- Astrobiology-in-a-box activities (1 hour):
  - -Detection of Life Experiment (20 minutes).

-Experiment about the characteristics of life, how we can identify life and what the implications might be for the search for life elsewhere.

• Extremophiles and the Limits of Life (15 minutes)

Experiment looking at the limits of life, how the growth of life is influenced by its environment and what sorts of physical conditions might limit life.

• UV Radiation and Damage to Life Experiment (10 minutes)

-Experiment specifically focused on radiation as a damaging agent for life - links to radiation on Mars.

-Ultraviolet radiation in sunlight in particular can limit the ability of life to grow.

• Pressure and Limits of Life Experiment (15 minutes)

Experiment demonstrating that pressure can influence the boiling point of water and the availability of liquid water for life.

• Introduction to astrobiology lesson plan booklet and exoplanets Top Trump cards (1 hour)

Run through of the 'detecting life on exoplanets' activity from astrobiology lesson plan booklet and introducing educational Top Trumps card game.(lesson plan booklet available at

http://www.astrobiologyacademy.org/astrobiology-lesson-plans/)

• Summary (10 minutes)

17:30-18:00 Coffee/ poster session

#### 18:00 - 18:30Conclusions Closing session

For more information, contact Margarita Metaxa - <u>marmetaxa@gmail.com</u> Rosie Cane - <u>rosiecane93@gmail.com</u>

## THE FIRST E-LIGHT POLLUTION PHOTO-EXHIBITION: A SATELLITE EVENT WITHIN THE XXX IAU GENERAL ASSEMBLY 2018 TO SHOWCASE THE IMPACT OF LIGHT POLLUTION ON ASTRONOMICAL SITES

The Inter-Division B-C Commission Protection of Existing and Potential Observatory Sites and Commission C1- Astronomy Education and Development, and the Office for Astronomy Outreach (OAO) invite all countries and astronomers to send photos for the first e-Light Pollution photo-exhibition

#### **Organizers**

The International Astronomical Union (IAU) through its commissions

- The Inter-Division B-C Commission Protection of Existing and Potential Observatory Sites
- The Commission C1 Astronomy Education and Development

#### **Purpose**

We invite all countries and astronomers to contribute on raising the awareness on the serious environmental problem created by light pollution by creating and exhibiting a collection of photos of night-scapes of the world observatories sites, showing either (1) the beauty of the night sky at the site without light pollution or (2) how is the site affected by Light Pollution in this 1<sup>st</sup> e-LP exhibition.

#### **Motivation**

This is the first edition of the Light Pollution (LP) exhibition, we plan to continue this exhibition in each IAU General Assembly (GA) with different themes. In this first edition, we start from the astronomical dimension of the problem - observatories.

This global perspective motivates us to work for a better, more peaceful planet for all the world's inhabitants. The project aims to make global exposure during the GA. The resulting collection of night scape photography will be presented in a virtual exhibition during the GA 2018 and on the web. The sky is the common view that connects us across the world, creating understanding and friendship. When borders vanish, political and cultural differences become irrelevant. We all live under the same eternally peaceful sky.

## The exhibition

The material will be published by the following methods:

- Photo exhibitions, slide shows and seminars in many different countries, with initial emphasis on countries that contributed to the collection.
- A virtual exhibition on the web.

The material collected serves as an aid to astronomy education and popularization resources to visualize and illustrate the impact of sky-gazing and visual astronomy by light pollution.

This e-exhibition will be available and used for free for educational non-commercial uses under the creative commons licenses (<u>CC BY-NC-SA 4.0</u>) that with sole credit to the owner, photographer and the IAU.

#### Who can submit photos?

- Astronomical observatories (public or professional) please send us up to 3 photos taken in your astronomical site related to the theme below.
- IAU member and non-members please send us up to 3 photos. Please note that all photos submitted should be related to astronomical sites.

#### Photo Format

- The entries should be fresh (not old) images, taken since January 1st, 2018.
- They must be created showing both the Earth and the sky -- by combining elements of the night sky (e.g., stars, planets, the Moon or celestial events, animals etc.) in the backdrop of a landscape were light pollution is part or not of the image.
- Astronomical sites could be public or professional observatories, or cultural heritages that link to astronomy.
- Composition The entries are open to photo all techniques. Composite photo is allowed. The night sky is an essential part of our nature and nightscape imaging follows the rules of nature photography where presenting natural colors of nature is an important element of each photo. We encourage you to avoid over-cooked processing.

#### **Exhibition Theme and Categories**

The **exhibition theme** is "NIGHTSCAPES and sky, the loss of cultural human heritage" and has two categories

1. <u>The amazing starry sky</u> - either to impress people on how important and amazing the starry sky is;

2. <u>Impact of light pollution</u> - to impress people on how bad the problem of light pollution has become.

Both categories illustrate how light pollution affects our lives. Submissions can belong to either categories.

#### Submission Date

The submission begins from now and will end July 31<sup>st</sup>, 2018.

#### **Submission Instructions**

#### How to Submit

You can submit up to 3 images at <u>http://bit.do/lp-exhibit</u> and filling in the necessary information

- A single-exposure image or a photo-composite
- Category of choice: ("The amazing starry sky" or "Impact of Light Pollution")
- Technical details:
- Credit of the photo
- Suggested title for the photo:
- Date the photo was taken (year/month/day):
- The astronomical site taken at/from the photo
- Location and country of the astronomical site
- Latitude and longitude of the astronomical site

Describe what appears in the photo and why it is a valuable contest entry:

- Web site(s) relating to the foreground subject (if any):

#### **1- Size and format:**

- Only photographs in digital format may be submitted. Photographs taken using film must be digitized for submission. - All entries must be accompanied by a short caption.

- Photographs must be submitted as high-quality JPEG files (level 10–12). The preferred color spaces are Adobe RGB (1998) and sRGB.

- Submitted photographs should be larger than 2000 pixels across in their wide dimension so that they can be used for exhibition (extremely long panoramic should also be considered for a high resolution submissions that allow digital exhibition worldwide). File size should be no larger than about 100 Megabytes.

- the photos will be available for download on the website, please taken this into consideration for the resolution of the photo you provided.

#### 2- Number of submissions:

No more than 3 photographs may be submitted per person/institute

#### **3- Date of Photographs and Submissions:**

-. Images must be taken from January 1st 2018 to July 31st 2018

#### 4- Style and subject of the photos:

- Entries must combine night-scape elements of both Earth and Night Sky—i.e., landscape astrophotography.

- Entries must follow the exhibition theme of dark skies importance with displaying the beauties of starry skies or the problem of increasing light pollution.

- A pair or a series of comparing images to display the difference between dark and light polluted sky can be submitted as one entry. The comparing images can make strong public impression on importance of dark skies.

- Photographs may be taken through a telescope, but must combine Earth and Sky composed in the same photograph. Photographs taken through a telescope that show only the sky are ineligible.

#### 5- Copyright and legal notes:

- The entrant must be the copyright holder of the submitted photo.

- The Photographer retains complete copyright, but agrees to have his/her photograph published on exhibition website that allow people to download and on other online/print media in the reports about the exhibit.

- All the work will be licenses under Creative Commons <u>Attribution-NonCommercial-ShareAlike 4.0 International</u> license.

- Submitted photographs must not contain provocative, defamatory, sexually explicit or otherwise objectionable content.

NOTE: The exhibition will be digital. For this reason, we are arranging with the IAU and GA organizers for an exhibition room/dome where to project the slide-show or present it on TV screens.

## SIX ITEMS THAT MAY BE OF INTEREST FOR THOSE INVOLVED WITH ASTRONOMY EDUCATION OR OUTREACH:

- 1. ASP Conference on Astro Education/Outreach Sep. 10-13 near San Francisco
- 2. Eight New Resource Guides on Astronomical Topics
- 3. 90,000 Students Have Used Free Open Source Astro 101 Textbook
- 4. Director of Education Position Open at SETI Institute
- 5. Silicon Valley Astronomy Lectures Reach 2 Million Views (New Videos)
- 6. Need Your Advice: Top Three on-line Resources for Astro 101 Instructors

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1. ASP Conference on Astro Education/Outreach Sep. 10-13 near San Francisco

The ASP is resuming its three-day education and outreach conferences, this year in the Wine Country north of San Francisco. For more information, see: <u>https://www.astrosociety.org/about-us/asp-annual-meetings/asp-2018-annual-meeting/</u> Panels and discussions are being organized on a number of topics, such as using social media for outreach, diversity and the impostor syndrome, tools for teaching astronomy on-line, citizen science, and much more. Abstracts are now being accepted and registration for the meeting (and for discounted hotel rooms) is now open.

2. Eight New Resource Guides on Astronomical Topics

New or updated resource guides for instructors and students are available on the following topics: women in astronomy, Pluto and the Kuiper Belt, sources for the best astronomical images, free lab exercises on the Web, plays about astronomers, the Messier Catalog, and debunking astronomical pseudo-science. Go to: http://www.fraknoi.com/resource-guides-on-astronomy-education/ 3. 90,000 Students Have Used Free Open Source Astro 101 Textbook

In the last year, at least 90,000 students have used *Astronomy*, the free, open-source astronomy textbook published by OpenStax, a non-profit project at Rice University. (We say at least, since we only have information about registered adopters, and some people are using all or part of the book without the optional registration. Registered adopters get access to answers to the questions in the book and other materials for instructors.) For access to the book, which some 70 of your colleagues helped update and review, go to: <a href="https://openstax.org/details/astronomy">https://openstax.org/details/astronomy</a>

4. Director of Education Position Open at SETI Institute

The SETI Institute in Mountain View, California, is seeking a creative and visionary leader to serve as its Director of Education and to continue and expand its broad-based program in formal and informal education. The role requires close collaboration with Institute scientists, outside organizations, and with a range of funding agencies. For more information and to apply, please go to:

https://workforcenow.adp.com/mascsr/default/mdf/recruitment/recruitment.html?cid=00a1b6 5c-cc0d-4122-b885-a8f7012f8acf&jobId=77948

5. Silicon Valley Astronomy Lectures Reach 2 Million Views (New Videos)

This series of free popular lectures by noted astronomers is being professionally videotaped and edited, thanks to an anonymous donor. Its YouTube site has nearly 2 million views at: <u>http://www.youtube.com/SVAstronomyLectures</u> Recently added talks include Natalie Batalha on the latest exoplanet discoveries and statistics from Kepler, Jill Tarter on the future of SETI searches, Ashwin Vasavada (Curiosity Project Scientist) on 5 Years of Mars Exploration, and Eliot Quataert on gravitational waves from merging neutron stars and the production of heavy elements.

6. Need Your Advice: Top Three on-line Resources for Astro 101 Instructors

For a review paper in a forthcoming AAS book, I am working with Chris Impey on a listing of the most useful websites for those who teach introductory astronomy. I'd be most interested in hearing from instructors (whether in college, high-school or informal teaching situations) about the TOP THREE websites that you find useful in your teaching. We are NOT listing sites that help you (as the instructor) keep up with recent developments in our science, but are looking for sites that have tools, resources, or techniques for how best to convey astronomy to beginners. Please send your suggestions to: <u>fraknoi@fhda.edu</u>

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#### **BOOK REVIEWS**

#### THE STARGAZER'S SISTER: A NOVEL

Carrie Brown, *The Stargazer's Sister: A Novel* (New York: Pantheon Books, 2015). 332 pages, HB \$25.95. ISBN 978-0-8041-9793-9.

Among the books I reviewed during the half-dozen years I contributed a column to the IAU Commission 46 newsletter were Michael Hoskin's *Discoverers of the Universe: William and Caroline Herschel*, as well as Stuart Clark's trilogy of historical novels, *The Sky's Dark Labyrinth*, whose protagonists included Kepler, Newton, and Einstein. When one of my daughters presented me with the gift of *The Stargazer's Sister*, a historical novel based on the life of Caroline Herschel, I knew I wanted to follow up those previous reviews by sharing my reactions to the novel with readers of the IAU Commission C1 newsletter. While I am glad to say that I enjoyed many things about the novel, and can recommend it to readers who enjoy historical fiction, I do have some objections to the liberties the author took with the historical record.

Before I launch into my objections (to be followed by some of the book's virtues), however, perhaps a brief summary of the life and work of Caroline Herschel is in order. Twelve years the junior of her more famous brother, in 1772 Caroline, at the age of 22, was rescued from a life of drudgery at home in Hanover, Germany, when William brought her to Bath, England, to serve three roles: housekeeper; solo vocalist at the musical programs that William ran at the fashionable Octagon Chapel, where he served for many years as organist; and astronomical assistant, both as observer and as record-keeper. A decade later, she began making independent discoveries, including a nebula that did not appear in the Messier catalogue and, beginning in 1786, at least eight comets. She became the first woman astronomer to be paid for her work when in 1787 King George III granted her an annual salary of fifty pounds. William's marriage in 1788, as he neared the age of 50, came as a blow to her, but even after moving out of the home she and William had shared, she continued to collaborate with him, a partnership that included their improvement of Flamsteed's atlas. After William's death in 1822, she returned to Hanover, where she died in 1848, just shy of 98 years old.

As to my objections, in her Acknowledgments, award-winning author Carrie Brown notes that among the works on which she heavily relied was the very book by Michael Hoskin referred to above. Calling Hoskin "perhaps the foremost scholar of the Herschels' lives," she says, "It is my hope that should he ever read this novel, he would appreciate the story's deviations from the historical record and see in my changes to that record an altered but not unrecognizable truth." While I cannot, of course, speak for Hoskin, I found many of her "deviations…from the historical record" both unnecessary and lamentable. Each of the five parts into which the novel is divided, following a brief introduction, is marred, in my mind, by one or more such deviations, some more reprehensible than others.

The first part, *Hanover 1755-1772*, deals with Caroline's early life. I spent a lot of time rooting around online to find a partial solar eclipse that would have been visible in Hanover in 1758, only to discover that the eclipse described in the novel actually occurred in 1764 and that William was not present in Hanover at the time. The second, and longest, section, *England 1772-1776*, takes us from Caroline's arrival in England to the siblings' move from Bath to Datchet following William's appointment as King's Astronomer. In this

section Brown introduces as a friend of William one Sir Henry Spencer, identified in Brown's Acknowledgments as "an entirely invented character." As the narrative unrolls, we understand the role Brown created him to fill, which, so as not to be a spoiler for potential readers, I can describe as "almost a suitor" for Lina (the nickname by which Caroline is referred to throughout the novel, with perhaps two exceptions). I found unconvincing and even embarrassing the scene in which Spencer confesses his love, even while explaining his multifaceted inability to marry Lina. I also do not understand why Brown has Spencer promise to intervene on Lina's behalf with Queen Charlotte, who in the novel (but not as far as I can tell in real life) follows up on this entreaty by providing Lina with the fifty-pound stipend that really came from the king.

The third section, *England 1788-1822*, ushers in Caroline's career as an independent observer; describes William's pusillanimous and insensitive treatment of Lina as he enters into marriage with the young, wealthy widow Mary Baldwin Pitt; and concludes with William's death. A deviation from fact that I find merely annoying in this section is Brown's transposing the date of Caroline's discovery of her first comet from August 1, 1786, to the period of his honeymoon two years later, as if William's absence somehow unleashes a new level of astronomical capability in her. But the deviation from the record that I find perfectly egregious in this and the subsequent section is Brown's writing John Herschel out of history altogether. According to the novel, Mary Herschel suffers two miscarriages early in the marriage, thus not only denying William the son Mary knows he would have wished for but also depriving the world of a pioneering surveyor of the southern skies.

The final two sections, Lisbon 1823-1833 and Hanover 1833-1848, fulfill the novelist's dubious aspiration to allow the fictional Lina to experience what her historical counterpart never had: a combination of sexual satisfaction along with meaningful male companionship from a true admirer. Brown creates the character of Dr. Silva, a wealthy Portuguese widower, as the lover Lina never thought she would have. Having survived a serious case of typhus (although the disease is not identified in the novel) around the age of ten or eleven, Lina bears a pock-marked face (though, we are told, the disfigurement fades over the years of her long life) and also suffers from episodic migraines. Her beloved father worried within her earshot that she, being neither handsome nor rich, would never find a spouse. Her one good childhood friend entertained her with the thought that she might marry an old, blind, but wealthy man, with whom she could experience love. The fictional Dr. Silva, however, while wealthy, is not blind and is a year younger than Lina. He is also, and more importantly, an avid amateur astronomer, who truly loves and admires Lina, with whom he has corresponded from a distance during William's lifetime. Following William's death, he convinces her to continue her work as self-appointed archivist of her brother's accomplishments in his palatial villa in Lisbon. At first I wondered why Brown chose to locate the fictional love relationship in that Portuguese city. Surveying the scope of the novel, however, I remembered that the book's first chapter describes Lina's earliest memories of the effect on Hanover of the cataclysmic Lisbon earthquake of 1755. In that chapter, too, we watch 17-year-old William, clearly intuiting the precocious intelligence of his five-year-old sister, taking pains to describe at an appropriate level the scientific understanding of the day. By granting Lina a decade in Lisbon following William's death, Brown allows her to witness the coming to fruition of a prophecy her brother made all those years earlier: that Lisbon would recover from the devastation as an even more beautiful city. Is this deviation from history truly beneficial to the story? I rather think the opposite.

So what do I find admirable in the novel? One can think of *The Stargazer's Daughter* as a bildungsroman, the German name for a coming-of-age story that focuses on the psychological growth of the protagonist from youth through adulthood. Brown successfully portrays Lina's growth from a young woman completely dependent on the brother she views as her savior, for whom she is willing to undertake any task, to an independent and competent adult. We know from the novel's second section that Lina has read Milton's Paradise Lost on her own, and in describing her growth in the course of the narrative, I think of the famous line in that poem describing the creation of Adam and Eve: "He for God only, she for God in him." As she joins him in Bath, William is for astronomy only while she is for astronomy in him. By midway through the novel, she is doing truly useful work, though still only as an assistant. By the end of chapter 12 (of 19 in all), she is for astronomy of her own accord. As she "[stumbles] with fatigue into the house, because during the hours she has been gazing at the sky, time has had no hold over her," she concludes: "It is simply more engaging...to be the stargazer than to be the stargazer's assistant." Although the tendency to second-guess the value of her own work never entirely disappears (a tendency that still plagues many 21stcentury women), she recognizes not only the "abiding interest" that she takes in the work but also that she "does not want to abandon her own investigations, any more than she wants to abandon his."

The English Ph.D. in me could gladly go on for another several hundred words tracing a recurring motif throughout the novel (of the brown-eyed crew member who carries 22-year-old Lina to the Yarmouth shore when she and William first arrive in England in 1772 by ship). I will, however, leave the challenge of interpreting that motif—as well as of identifying other worthy attributes of the narrative—to readers of this review whose interest may have been sufficiently piqued to pick the novel up on their own. I do, indeed, recommend the book to readers who aren't likely to be bothered by the liberties the author takes with historical fact. I was interested to read in *The Washington Post* of November 20, 2016, that *The Stargazer's Sister* found a place in its list of fifty notable works of fiction to have been published during the year. If you know of someone who wants to understand the passion many people feel for the wonders of the universe, this is a book to recommend.

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