COMMISSION C1 Astronomy Education and Development

Education and Development

COMMISSION C1 WORKING GROUPS

Network for Astronomy School Education

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1. Introduction

NASE, Network for Astronomy School Education, has a main goal the training of teachers in didactic of the Astronomy. To reach the objectives, the WG cooperates with local institutions, i.e., Ministries of Education, Universities and/or Observatories, and Teacher Associations. The NASE courses are given in the language of the country, and all the material is translated with the important cooperation of the Local Group of teachers and astronomers in the country that host the course.

The workshops are mainly for high school, secondary and primary school teachers and professors, but in some cases the activity is performed at the university level.

One of the distinctive aspects of NASE is the creation of Local Working Groups (LWG) in each country; this LWG maintain all the NASE activities and mainly, the courses, which are repeated each year in each place where a LWG was founded. Of course, the LWG members are invited to cooperate with NASE in other courses in different countries and are responsible for the preparation of new materials, too.

2. NASE Courses: Characteristics

During the informed period, NASE organized the normal courses face to face before the pandemic, but at the beginning of this new situation, NASE introduced courses online with excellent results. It is important to mention that there are some problems in the virtually, but also there are several advantages. The NASE basic course expends 4 or 3 days face to face. In the online format, the facilitators decide to offer the full course or four courses focused in several monographic topics: Astronomy, Astrophysics, Astrobiology and "Astro-culture". Each one of these short courses can be developed in only 2 days.

In 2020 NASE introduced in the workshops new activities related to Exoplanets and Astrobiology (including a new monographic course on this topic).
At the moment of this report, NASE is preparing a new course about Astronomy and Culture: NASE has finished six courses, testing the final details about this particular issue. In particular, during the last March equinox NASE organized the first online meeting on cultural relationships.

The event titled ”Bridges between Cultures” involved more than 20 countries in 5 continents, such as Servia, Indonesia, Philippines, China, Japan, South Korea, Iran, USA, Mexico, Argentina, Egypt, Bulgaria, Romania, Spain, Poland, Austria, Greece, Kenya, Senegal and Australia.

3. Courses Organized in the Period 2018 - March 2021

NASE organized 110 courses in the period 2018 – March 2021.

We increased the worldwide activities; 19 new countries were included on the NASE map: Armenia, Ethiopia, Japan, Mongolia, Portugal, Puerto Rico, Russia, Senegal Tanzania, Thailand, Uganda and Zambia, Greece, South Korea, Philippines, Dominican Republic, Togo, Egypt and El Salvador, have now their own NASE Local. (see Fig.1).

The most important effort for NASE members during 2020 was to introduce the new courses online in a short period (less than 1 year).

The courses, with the detail of number, location and date, are:

214 Manila (Philippines) - March, 30-31, 2021
213 Sistan and Balouchestan (Iran) - March, 15-16, 2021
212 Managua (Nicaragua) - March, 13, 20, 27, 2021
211 Athens (Greece) - March, 11-12, 2021
210 Ciudad de Panamá (Panamá) - Feb 27 - March 20, 2021
209 Athens (Greece) - March, 11-12, 2021
208 Athens (Greece) - February, 25-26, 2021
207 Bushehr (Iran) - February, 23-24, 2021
206 Fars (Iran) - February, 17-18, 2021
205 Sistan and Balouchestan (Iran) - February, 8-9, 2021
204 Hormozgan (Iran) - January, 27-28, 2021
203 Busan (South Korea) - January, 8-9, 2021
202 Campo Mourao (Brasil) - December, 4-5, 2020
201 Manila (Philippines) - November, 29-30, 2020
200 Barcelona (Spain) - November, 25, 2020 - May, 12, 2020
199 Bogotá (Colombia) - November, 3 - December 10, 2020
198 Moscow (Russia) - November 2-3, 2020
197 Santiago (Dominican Republic) - October 24- November 15, 2020
196 Tena (Ecuador) - October 21-23, 2020
195 Chiang Mai (Thailand) - October 17-18, 2020
194 Yekaterinburg (Russia) - October 13-16, 2020
193 Yekaterinburg (Russia) - October 6-9, 2020
192 Guadalajara (Mexico) - October 3-10, 2020
191 Yekaterinburg (Russia) - September 29 - October 2, 2020
190 Yekaterinburg (Russia) - September 22-23, 2020
189 Lomé (Togo) - September 3-4, 2020
188 Bandung (Indonesia) - August 21-23, 2020
187 Tabriz (Iran) - August 17-18, 2020
186 Neuquen (Argentina) - August 14 - September 14, 2020
185 Guatemala City (Guatemala) - August 10-21, 2020
184 Dakar (Senegal) - August 5-6, 2020
183 Fernando de la Mora (Paraguay) - August 3-5, 2020
182 Quezon City (Philippines) - July 28-31, 2020
181 Lomé (Togo) - July 22-23, 2020
180 Panama City (Panama) - July 17 - August 7, 2020
179 Mendoza (Argentina) - June 25 - July 10, 2020
178 Busher (Iran) - June 25-26, 2020
177 Panama City (Panama) - June,12 - 26, 2020
176 Cairo (Egypt) - June, 16-17, 2020
175 Dar es Salaam (Tanzania) - June, 15, 2020
174 Cluj (Romania) - June, 2-4, 2020
173 Busher (Iran) - May 28-29, 2020
172 Wakayama (Japan) - May 22 - July, 10, 2020
171 Girona (Spain) - May 21 - June, 11, 2020
170 Tarragona (Spain) - May 20 - June 10, 2020
169 Granollers (Spain) - May 19 - June, 9, 2020
168 Lleida (Spain) - May 18 - June 15, 2020
167 Busher (Iran) - May 17-18, 2020
166 Busher (Iran) - December 5 – March 22, 2020
165 Ciudad de Rioverde (Mexico) - Feb 21, 22, 2020
164 Madrid (Spain) - February 1-2, 2020
163 Teustepe (Nicaragua) - January 20-21, Feb 2, 2020
162 City of Panama (Panama) - January 21-24, 2020
161 Meru (Kenya) - January 20-22, 2020
160 Der es-Salam (Tanzania) - December 16-18, 2019
159 Ciudad de Rioverde (México) - Dec 13-14, 2019
158 Turda (Rumania) - Dec 10, 2019-February 4, 2020
157 Lusaka (Zambia) - December 9-13, 2019
In summary, NASE preformed 110 new courses. Some of them were done by the Local Working Groups without the support of NASE’s visitors or teach by themselves. In other cases, we (NASE instructors) provide the capacitación with the support of the LWG, mainly in America.

The courses marked in bold was performed completely synchronous online. America is a particular place, in other continents the situation is different. Only, some countries can teach by themselves without the support of NASE visitors. That is, in Asia: China, Indonesia, Japan and Iran, and in Europe: Portugal, Romania and Spain, and finally in Africa, Ethiopia and Senegal can teach without support. For the other countries they need, in their courses, NASE’s visitors or NASE members online. In this sense, there were many members of NASE that visited other countries or teach online in order to help LWG to prepare news courses (for a full list of courses see NASE website).

NASE also organized seven courses in cooperation: two workshops in Spain, two in Panama and three in Argentina between November 2019 and December 2020 (see Fig. 2).

Figure 2. NASE courses in red and courses in cooperation in yellow

4. UNESCO International Day of the Light and NASE Projects

In 2018, we begin a relationship with UNESCO, proposing the NASE participants and teachers a special project, part of the the NASE courses, but developed with the students in a long period of time. The purpose was to facilitate an specific activity that they could present to their students and email to us their results. Taking into account this new vision of NASE experiments, the “Hershel Experience” was proposed as part of the International Day of light in 2018. We received contributions of 50 groups in 8 different NASE countries. As we know, this experiment reproduces the Hershel's proposal, and permits to detect the infrared.
In 2019, the NASE project was included in the IAU-100 Years Under One Sky celebration. The project titled “Power of the Sun” was based in the use of the Bunsen photometer (the oil spot photometer) in order to determine the power or luminosity of the Sun. We received 482 measurements from 16 countries, from autumn to spring equinoxes. We prepared also a setup, which permits to make the experience using the face of the participant instead to detect (or not) visually the oil spot. This approach permitted the inclusion of blind people. The Spanish organization ONCE Foundation (https://www.fundaciononce.es/) was part of the proposal, and the results were spectacular if we compare with the other ones. The final event was a public exhibition of 10 countries in Spain, at the end of 2019.

In 2020, the "Parallel Earth Project" was the NASE proposal to celebrate the International Day of light, the activity was developed between the March equinox an September equinox. During half a year, 90 groups in 21 different NASE countries carried out this project. With a simple terrestrial globe, a compass and some small stick, this activity offers the opportunity to visualize the changes of the planet illumination along the seasons in a very simple way. Finally, we prepare a detailed summary including all the participant teams and several uses of the Parallel Erath not very common for all the teachers. The Closing event of this project took place online in October 2nd, 2020, with 21 speakers from Japan, South Korea, Indonesia, Philippines, Greece, Iran, Tanzania, Uganda, Serbia, Finland, Romania, Italy, Germany, Andorra, Spain, Senegal, Bulgaria, Portugal, Paraguay and USA. The link to see this special session is https://www.youtube.com/watch?v=YBlMF5ThFtA

In 2021, NASE is working again in a new proposal for the International Day of Light with a new project: “Herschel experiment - A family of astronomers”. The project will be developed between March and September equinoxes. With a box, a prism and 4 thermometers it is possible to observe that the Sun spectra presents different temperatures, but one the thermometer, the installed beyond the red, presents a higher temperature than the thermometer in the shadow, in all the cases. In this way, the infrared was detected in 1800 by William Herschel, and can be detected in present times. The Opening event of this project was integrated in the “Bridges between Cultures” mentioned before. This project is in cooperation with Herschel Space of the Institute for Astrophysics of Vienna University.

In these special projects, NASE works in cooperation with:

- Spanish National Research Council, CSIC,
- Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina, CONICET,
- Beijing Planetarium,
- La Cité des Sciences of Tunisia,
- Ethiopian Space Science and Technology Institute (ESSTI),
- Pusat Studi Astronomy of Ahmad Dahlan University in Indonesia (UAD),
- National Astronomical Research Institute of Thailand (NARIT),
- Iranian Teacher Astronomy Union (ITAU),
- Student’s International Network for Astronomy (SINA) and
- European Association for Astronomy Education (EAAE)
5. Published Books

An important work carried out by NASE has been the edition and publication of several books related to the courses and projects organized by the WG, most of them are in English and Spanish:

- R. M. Ros, B. García, A. Costa, *The Power of the Sun and How to Measure it*, 2019, (Ed. by Albedo, Spain, in Spanish and English)
- 14 pas vers l’Univers 2019, Ed. Rosa M. Ros and Beatriz García, (Ed. by Albedo, Spain, in Portuguese)
- 14 pas vers l’Univers 2020, Ed. Rosa M. Ros and Beatriz García, (Ed. by Albedo, Spain, in French)
- 14 steps to the Universe 2020 Ed. Rosa M. Ros and Beatriz García, Persian, (Ed. by Albedo, Spain, in Persian)
- R. M. Ros, N. Lanciano, C. Alemany, E. Esteban, *Observing the Parallel Earth from Different Locations on our Planet*, 2020, (Ed. by Albedo, Spain, in Spanish and English)
- R. Moreno, R.M. Ros, *NASE Video Clips Online, 100 Astronomy, Astrophysics and Astrobiology Activities*, (Ed. by Albedo, Spain, in Spanish and English)

All these books are available free of change in the NASE website.

6. NASE Newsletter

Every year NASE distributes 2 Newsletters (in English and Spanish) to the participants in all the courses from the beginning of the program, in 2000. This publication includes news about astronomy, NASE courses, new projects, evidences of use of NASE materials, between other topics. Last December 2020, it was published the NASE newsletter focused in the first 10 years of NASE existence and the first 200 courses organized in that time.
(see: http://sac.csic.es/astrosecundaria/es/newsletter/Lista.php)

7. NASE Website

NASE educational resources and courses materials are available at the NASE website (www.naseprogram.org).

The website is mainly in English and Spanish but:

- (a) The complete set of materials of the course is in English, Spanish, Portuguese, Chinese Mandarin, Romanian, Indonesian, French, Russian, Japanese, Mongolian, Armenian, Catalanian and Persian.
- (b) Part of the materials of the course are translated in: Mongol, Kiswahili, Thailand, Korean, Greek, Bulgarian and Hungarian

In total, there are 20 languages present in the NASE website.

To have the material in the local languages, NASE has a group of volunteers in each county with LWG. The translation work is only possible with the help of them.
8. NASE Videos

At the beginning of NASE courses online (as consequence of the COVID-19) appeared the necessity of a substitute for the face-to-face practical activities outside the classroom, in the countryside observing the Sun, the Moon or the stars. Also, the practical activities with light in dark laboratories or classrooms, were impossible to be performed in front of the screen of the computer, because the light of this device disturbs the observation of the phenomena. All these situations pushed NASE to produce a collection of videos (around 100 videos at the moment) in order to use this tool during the virtual classes. The videos are very short (normally between 2 and 5 minutes) and silent, in order that the instructors can teach in their own languages according with the courses.


9. Evidences of Use

The teachers who participated in NASE courses are invited to emailed a simple report about some activities that they develop with their students beyond the NASE workshops. There are more than 600 files classified in the website, devoted to present this "collection", organized by country.

(see: https://issuu.com/nase.networkastronomyschooledu/stacks)

10. Conclusion and future plans

During the first decade of NASE, we organized more than 200 courses in 50 countries and we have a group of 800 volunteers teaching astronomy courses for teachers and professors in many places, but there are countries where we did not arrived yet. Our objective is continue working in the same countries where we are working now and to add the new countries that manifested interest in our project. At present, we are preparing new courses for Sweden, Algeria, Hungary, Bulgaria, Canada, Australia and India.

Another point of interest, is to maintain the quality of the materials generated by NASE. In particular, during this decade, we prepared practical activities about astronomy, astrophysics and astrobiology and we present new activities according with the new situation of the human knowledge of the Universe. We are working strongly in the relationships between astronomy and culture, to show the teachers that in their countries normally there is an ancient culture that take into account astronomy for its life. It is important that teachers know this information and promote that they students feel pride about it. Astronomy is not a new science, is part of the history of humanity and it is important to show in the schools the most new astronomy but without forget their old roots.

Always using the NASE approach: learning by doing.

Further information is available at http://www.naseprogram.org.
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