



- EDITORIAL
- ASTRONOMICAL NEWS
- LAST NASE COURSES
- TEACHING MATERIALS

## EDITORIAL

With the pandemic, we have not stopped organizing NASE courses, usually online, for which the YouTube channel Nase-Virtual has been created, where about 100 video clips are available for the courses. The distribution and description of the videos can be seen in [this book](#) on the web.

On the other hand, NASE usually recognizes each year the work of a Local Group that has done a remarkable job with its courses that year. In 2019, the Local Group of Panama completed three courses, which were held in Panama City, Santiago and Chiriquí, with the participation of teachers who work in indigenous areas and who usually do not have training courses due to their isolation. Special members are Eduardo Chung, Professor of Physics at the Faculty of Natural Sciences, Exact Sciences and Technology, of the University of Panama, who has been a member of the Local Group since the beginning, and Madelaine Rojas, representative of SENACYT and organizer of the courses outside Panama City. It also promotes and prepares videos related to the activities for NASE online courses. For the aforementioned reasons, the 2019 NASE award has been awarded to the Local Group of Panama.

In 2020, the Tanzania Local Group started translating NASE course materials into Kiswahili and giving courses in Kiswahili, with the difficulties of lacking scientific vocabulary. This language is spoken in other countries besides Tanzania, such as Kenya, Zambia, Uganda, Democratic Republic of Congo, Mozambique, Rwanda, Burundi and Somalia. About 100 million people speak this language in Africa. It should be mentioned that Noorali Jiwaji, a professor at the Open University of Tanzania, in addition to leading the Local Group and the group of translators, collaborates in the generation of cultural astronomy materials. For the above mentioned, the NASE 2020 award has been awarded to the Local Group of Tanzania. Congratulations to those groups, and we'll see who stands out in 2021.



# NEWS

## **IAU 367 Symposium: Education and Heritage in the Age of Big Data in Astronomy, December 9-14, 2020 in Bariloche, Argentina**

In the Newsletter nº 11 we reported about this Symposium, which due to the sanitary circumstances was finally held online. NASE participated with two sessions that were open to the public, which included a mini workshop on eclipses and another on gravitational lenses. They were given in two sessions, one in English for Europe, Africa, Asia and Oceania, and one in Spanish for Europe and Latin America. The sessions are videotaped and can be viewed at:

Session in Spanish: <https://youtu.be/C9XIEpPRVJk>

English session: <https://youtu.be/sEKWIE9FGZo>

## **NASE-IAU Project on the occasion of the 2021 International Day of Light: The Herschel Experiment**

NASE's proposal is part of the International Day of Light, which commemorates the day when a human-made laser beam was first lit. This year we propose to repeat the experiment with which William Herschel showed that there was invisible radiation next to the red, which is called infrared. The experiment can be performed any day between March 21 and September 23, 2021, according to the [instructions on the NASE website](#), and fill in the data indicated in the "material to be sent". Music composed and performed by the Herschel brothers, Carolina and William is also available for download.



## **Cultural Astronomy: Light in the Mayan Ruins of Copán**

In NASE courses, an important subject is Cultural Astronomy. We encourage you to watch the [Webinar: The Role of Light in the Orientation of the Mayan Trails in Copán Ruinas](#), taught by our teacher María Cristina Pineda de Carias.

# COURSES



## **201 NASE Course in Manila (Philippines), November 29-30, 2020**

In cooperation with Philippine Normal University and College of Graduate Studies and Teacher Education Research.

Some comments: Thank you so much! You are very generous with these info and resources. These can help us a lot! Wonderful activities. Thanks a lot very much. Very clear explanations.



## **202 NASE Course in Campo Mourao (Brazil), December 4-5, 2020**

In cooperation with the Universidade Tecnológica Federal do Paraná.

Many participants said they were very keen to take the course in person, as the exchanges are richer, and the participants are less ashamed to talk, but are grateful for the opportunity to have this option.

They acknowledge that in the virtual format, the course was very good, and add that if it were on-site it would be perfect.



## **203 NASE Course in Busan (South Korea), January 8-9, 2021**

In cooperation with Korea Science Academy of KAIST and National Organizing Committee for IAUGA2022 Busan.

Some comments: Thank you very much for the workshop and for the organizer. Specially, translation in Korean was helpful to understand the workshop. It was very impressive to see the original shadows and half shadows of the solar eclipse created on the Earth model by more than 2 meters away. I think foreign countries are different in that they place importance more on student activities than lectures compared to Korea. It has been an opportunity for me to reflect on the practice of lecture-based teaching of difficult, advanced content in class.



## 204 NASE Course in Hormozgan (Iran), January 8-9, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU, and Mehr Observatory.

Thank you all teachers for this perfect course. This course reminded us to pay more attention to our world, come to Shahab city in Hormozgan province and hold more courses for us. Hold an astronomy course for our students. My family and I, especially my children enjoyed attending the course and learned a lot. Thank you for holding this useful course for us.



## 205 Curso NASE in Sistan and Balouchestan (Irán), February 8-9, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

I am interested in teaching my students the tools I learned in the NASE workshop. The workshop was very useful because we made the tools and we used them, then we realized the importance of tools.



## 206 Curso NASE in Frás (Irán), February 17-18, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

This course changed my view of astronomy, and I now look carefully at the sky and even at historical structures.

Practical workshops help students learn astronomy, and the important thing is that students can make tools at a very low cost. NASE is my favorite because it takes a fresh look at astronomy education.



## 207 NASE Course in Panama City (Panama), February 18-19, 2021

In cooperation with PNUD, MEDUCA and SENACYT.

Teachers indicated that astronomy contents are not developed as explicitly as in workshops, so the course is an excellent opportunity to delve into these topics. They also indicated that they find it a good dynamic to replicate the workshops with their students because it offers them a broader picture to continue learning about the realization of the workshops.



## 208 NASE Course in Bushehr (Iran), February 23-24, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

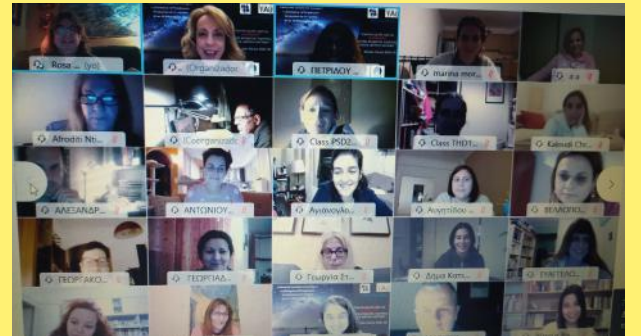
The course was excellent and the instructors were fluent. Increase the practical parts because we learn better when we make tools ourselves. I am a teacher and I have participated in most of NASE courses and I have learned new and useful things every time.



## 209 NASE course in Athens (Greece), 25-26 February, 2021

In cooperation with the Philekpaideftiki Etaireia, the National Astronomical Committee, the Hellenic Astronomical Society, the Institute for Astronomy Astrophysics, Space Applications and Remote Sensing of the National Observatory of Athens, and the Institute of Astrophysics of the Foundation for Research and Technology - Hellas.

The models and the experiments are made with cheap materials and they are simple to build or make too. They are suitable for use at any level in schools



## 210 NASE Course in Panama City (Panama) February 27- March 20, 2021

In cooperation with UNDP, MEDUCA and SENACYT.

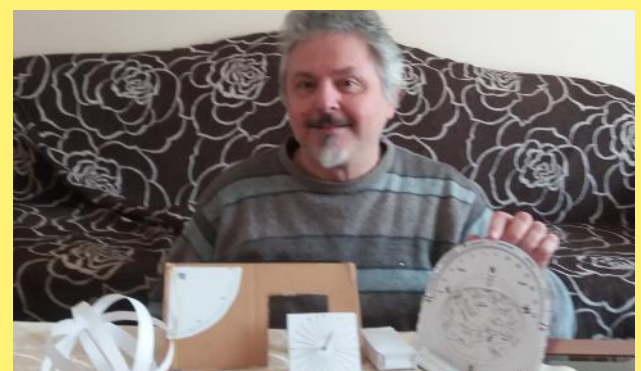
Participants were satisfied with the material and the pedagogical organisation. In the event that it is carried out again in a virtual way, the possibility of making observations with a solar telescope and transmitting it live was raised.



## 211 NASE Course in Athens (Greece), 11-12 March, 2021

In cooperation with The National Astronomical Committee, the Hellenic Astronomical Society, National Observatory of Athens and the Institute of Astrophysics in Crete.

They want more experiments with astrophysics because these are very interesting. They followed these workshops because they learned many very simple experiments for their students they put many questions about the spectrometer and about Herschel Experiment. They liked the experiments with infrared and UV sources.



## 212 NASE Course in Managua (Nicaragua), March 13-27, 2021

In cooperation with National Autonomous University of Nicaragua. It was held at the Rubén Darío University Campus, UNAN-Managua.

It was attended by teachers from the Ministry of Education (MINED) and students from the Faculties of Science and Engineering and Education Sciences of UNAN-Managua.



## 213 NASE Course in Sistan and Balouchestan (Iran), March 15-16, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

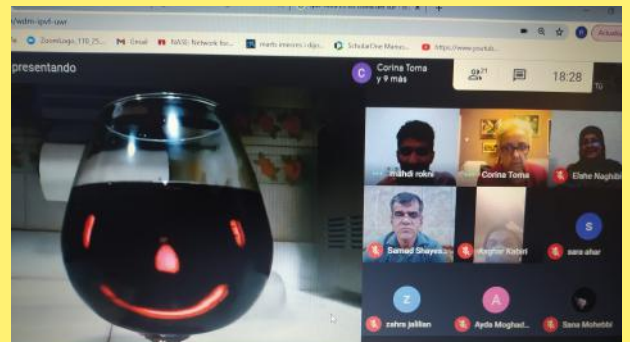
I am an astronomy teacher and I have been teaching children all these years it was difficult for me to teach some astronomical concepts to my students and also my students did not learn well and I did not know what method to use for teaching. Until I have got to know your professional team. I learned in NASE workshops to make difficult astronomical concepts easy for my students using simple tools and experiments.



## 214 NASE Course in Manila (Philippines), March 30-31, 2021

In cooperation with Philippine Normal University and College of Graduate Studies and Teacher Education Research.

The culture of astronomy and how the concepts in astronomy be applied with simple tools. It is my first time to attend astro culture. I value the learning materials and new ideas I can integrate in my science class.

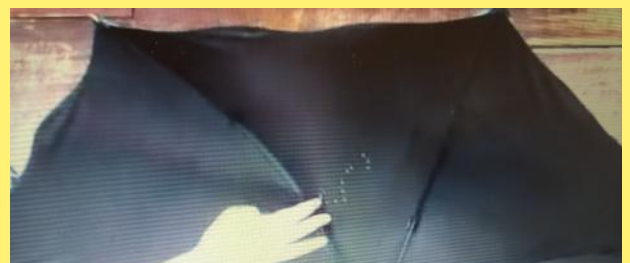


## 215 NASE Course in Qom (Iran), April 5-6, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

The topic of courses is very attractive. All instructor teaches with enthusiasm and I enjoy it. The content of course is very useful and practical. The tools that I made in NASE workshop are simple but very informative.

I have attended all the courses and it is always interesting for me.



## 216 NASE Course in San Diego (United States), April 10-11, 2021

Most of the teachers had students over 12 years old. One of the teachers had younger students. The subjects taught by the teachers were physics, astronomy, natural sciences, chemistry and biology.

Only one of the teachers didn't have previous contact with astronomy. The rest, were teachers that learned something about astronomy in university, as an amateur and/or self-taught.



## 217 NASE Course in Gilan (Iran), April 19-20, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

I learned some concepts here for the first time and it made me very happy. I will definitely participate in the next courses.

Some concepts of physics were new to me and I try to consolidate my learning by reading NASE books and participating in later courses. Thank you!



## 218 NASE Course in Tehran (Iran), April 26-27, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

I'm from Afghanistan and educating in Iran. I enjoyed NASE course, so when I come back to my country, I start to teach this tools to students, so they are really useful to everyone.

My mother tongue is Turkish, so I can help you to translate NASE book to Turkish. In addition to, I know Uzbek language, and I can help for translating the NASE book.



## 219 NASE Course in Khorasan (Iran), May 19-20, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

I will teach this tools to my students. Please increase this tools something like demonstrators.

Astronomy in the city is really exciting workshop because until before this course, I didn't know the CHAHARTAGHI which is an astronomical building.



## 220 NASE Course in Lorestan (Iran) May 19-20, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

Thanks a lot for attention to different province and give a chance to students for knowing sky in best way. Simple experiment with deep output, it is very amazing. Two days with interesting topic, it was so useful for me. If I want to say a word about course that is teamwork. You were like a brother and sister. Fantastic night, I see for first time surface of Moon. Live observation was very cute and I enjoyed it a lot.



## 221 NASE Course in Dakar (Senegal) May 20-21, 2021

In cooperation with Iranian Teacher Astronomy Union, ITAU.

The course gives us so many possibilities to teach the astrophysics and astrobiology in the classroom. The quality of presentations impressed me. I want to work more with the instructors group. Astronomy is very important for the high school. Thank you for this course.

I will set up an astronomy club in my school and I want to change our experience with NASE group.



## 222 NASE Course in San Diego (United States) May 22-23, 2021

This Astrophysics module within the NASE course was carried out during the weekend. It was online and San Diego State University provided ZOOM. The participants were all high school teachers from different states of the United States.



## 223 NASE Course in Delhi (India) May 28-29, 2021

In cooperation with Spaceport India Foundation.

The course is very well explained and there were many simple activities. I would like the course to be translated in our languages. All activities were very interactive. It's a very good course online in these conditions of lockdown. I'd like to attempt the next NASE course - Astrobiology and of course it's very interested to follow a special Astroculture course with Indian Astronomy Heritage topics.





## 224 NASE Course in Guatemala City (Guatemala) June 7-11, 2021

In cooperation with the School of Physical and Mathematical Sciences of the University of San Carlos de Guatemala.

The participation was great: 67 teachers. The advantage that we have noticed in these online courses is that there are a greater number of participants who come from outside of Guatemala City. We had participation from Alta Verapaz, Jutiapa, Quetzaltenango, Chimaltenango, San Marcos, Totonicapán, Sacatepéquez, Sololá and Guatemala City.



## 225 NASE Course in Porto (Portugal) June, 8, 2021

In cooperation with Institute of Astrophysics and Space Sciences and the Planetarium of Porto – Centro Ciência Viva (PP-CCV)

The materials needed for the activities, but, above all, because it allows reaching environments that are usually farther away from science centers, the NASE Online: Astrobiology course will contribute to the PP-CCV's commitment to the Sustainable Development Goals (UN-SDS).



## 226 NASE Course in Porto-Novo (Benín) June 10-17, 2021

The courses were so interesting for us and I liked very much the manner of teaching because you combined the theory with many intuitive experiments, made with so simple materials.

We will definitely apply the experiments in our classes in the next school year.



## 227 NASE Course in Santo Domingo (Dominican Republic) June 12 - July 4, 2021

In cooperation with the Astrodome, the Santiago Astronomical Club and NOC-Dominican Republic.

The course was organized by Generaciones, a non-profit foundation for education in the Dominican Republic, and by the Dominican NAEC (National Astronomy Education Coordination) team. It had the collaboration of the NOC and 2 important astronomical societies and clubs: Dominican Astronomical Society and the Astronomical Club of Santiago.



The 4 NASE, Astronomy, Astrophysics, Astrobiology and Astronomy modules were worked on in the city and cultural, spread over 4 weekends.

This was the second NASE course in the country and therefore had the participation of local professors for the first time: 5 professors from the first NASE course were instructors in this course.

## 228 NASE Course in Tegucigalpa (Honduras) June 14-21, 2021

In cooperation with the Francisco Morazán National Pedagogical University and the Astronomical Observatory of the National Autonomous University of Honduras.

On this occasion, the local group NASE-Honduras established an alliance with the Francisco Morazán National Pedagogical University (UPNFM) offering the course to students close to graduating from basic education, mathematics, social sciences and natural sciences careers. There was an enrollment of 162 participants.

## 229 NASE Course in Porto (Portugal) June 18, 2021

In cooperation with Planetario do Porto.

The course will be yet another means to continue the PP-CCV communication methodology with schools, favoring direct teacher-teacher contact.

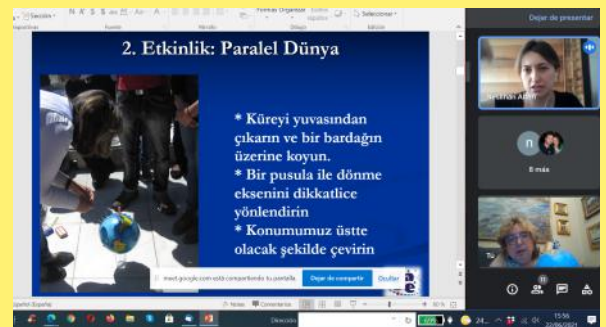
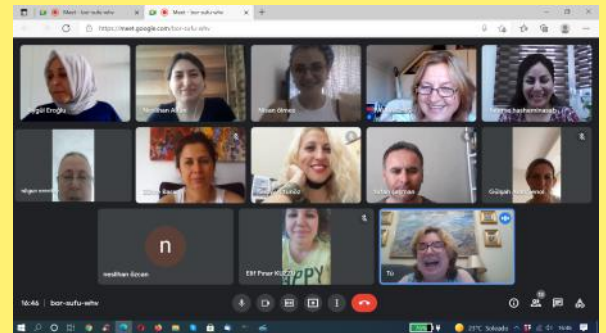
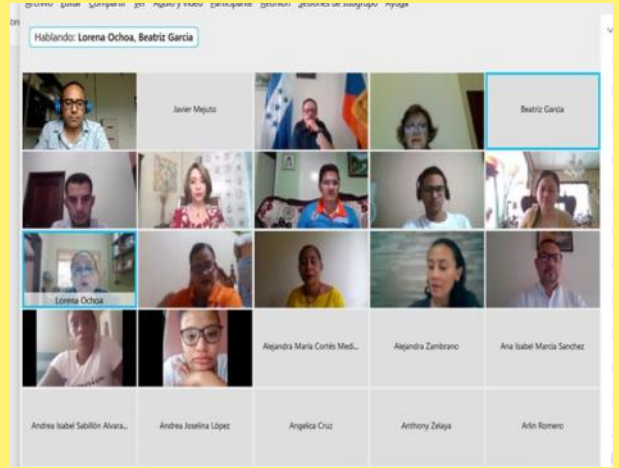
On the other hand, it will make it possible to structure and implement new strategies and resources that help schools in their Action Plans for Digital Development (an initiative of the Government of Portugal), specifically in collaborative work, professional development and pedagogical practices.

## 230 NASE Course in Istanbul (Turkey) June, 22-24, 2021

In cooperation with ERENTAY EĞİTİM DANIŞMANLIK.

The materials are accessible and it is easy to find them in Istanbul. I enjoy the very simple experiments, very practical amusing and mixing science with entertainment in the best way.

For primary and secondary school teachers are useful activities in each workshops



# MATERIAL



## THE HERSCHEL EXPERIMENT

In 1800, the famous astronomer William Herschel demonstrated with this experiment that there was an invisible form of radiation, beyond red.

To reproduce the experiment, we will need a glass prism, some thermometers (at least two), adhesive tape, a cardboard box and a white sheet, if possible, of insulating material.

The prism is placed on the top edge of the box, so that it is on the side of the Sun. The inside of the box should be in shadow. The prism is rotated carefully until the widest possible visible spectrum appears on the inside of the box. After taping the prism in place, we placed a thermometer in each of the colors: one in the blue region, one in the yellow region, and the third just beyond the visible red region. A fourth thermometer is placed aside to measure the ambient temperature in the shade. After a few minutes, the thermometers in the blue, in the yellow and in the one that is close to red should show temperatures somewhat higher than in the environment, so it is logical to deduce that even beyond red some type reaches radiation from the Sun, invisible to our sight.



They can be used instead of thermometers, some black metal plates and measure their temperature from a distance with a digital thermometer, which by the way uses infrared radiation. You have to allow a few minutes for them to warm up. The box can be installed on an equatorial mount, if possible with a tracking motor, to compensate for the earth's rotational movement, which becomes very noticeable and, if not compensated, causes the color spectrum to shift quite a bit in a very short time. .



The montages are seen in this [video](#) and in this [one](#).



Other activities like this on the [NASE website](#).

