

The background features a light blue gradient with several concentric dashed blue circles. Scattered throughout are small grey dots representing stars, a solid blue sphere, and a blue ringed planet (resembling Saturn) on the right side.

Proceedings for the
4th Shaw-IAU Workshop
on Astronomy for Education

**Leveraging the potential of
astronomy in formal education**

15 – 17 November, 2022



Compiled & Edited by:

Asmita Bhandare, Eduardo Pentead, Rebecca Sanderson, Tshiamiso Makwela, Niall Deacon, Moupiya Maji, Emmanuel Rollinde, Francesca Cresta, and Aniket Sule.

The following is a collection of summaries from the 4th Shaw-IAU workshop on Astronomy for Education held 15 – 17 November, 2022 as a virtual event. The workshop was organised by the IAU Office of Astronomy for Education. More details can be found on: <https://astro4edu.org/shaw-iau/4th-shaw-iau-workshop/>.

The IAU Office of Astronomy for Education (OAE) is hosted at Haus der Astronomie (HdA), managed by the Max Planck Institute for Astronomy. The OAE's mission is to support and coordinate astronomy education by astronomy researchers and educators, aimed at primary or secondary schools worldwide. HdA's hosting the OAE was made possible through the support of the German foundations Klaus Tschira Stiftung and Carl-Zeiss-Stiftung. The Shaw-IAU Workshops on Astronomy for Education are funded by the Shaw Prize Foundation.

The OAE is supported by a growing network of OAE Centers and OAE Nodes, collaborating to lead global projects developed within the network. The OAE Centers and Nodes are: the OAE Center China–Nanjing, hosted by the Beijing Planetarium (BJP); the OAE Center Cyprus, hosted by Cyprus Space Exploration Organization (CSEO); the OAE Center Egypt, hosted by the National Research Institute of Astronomy and Geophysics (NRIAG); the OAE Center India, hosted by the Inter-University Centre for Astronomy and Astrophysics (IUCAA); the OAE Center Italy, hosted by the National Institute for Astrophysics (INAF); the OAE Node Republic of Korea, hosted by the Korean Astronomical Society (KAS); OAE Node France at CY Cergy Paris University hosted by CY Cergy Paris University; and the OAE Node Nepal, hosted by the Nepal Astronomical Society (NASO).



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4th Shaw-IAU Workshop on Astronomy for Education

What would you need to know to be able to strengthen the role of astronomy in schools? You might want to look at how curricula are created in the first place, and you will want to profit from the experiences of those who have already been successful in including astronomy in their countries' curricula. You would likely be interested in the various roles that astronomy can play in practice, in both primary and secondary schools. You might turn to astronomy education research for answers to questions about what fosters student interest in the STEM subjects science, technology, engineering and mathematics — and since at least part of the answer appears to be that cutting-edge results, such as those involving black hole shadows or exoplanets, are of particular interest to numerous students, you might want to look into including those topics in school teaching. Last but not least, you might look for synergies between astronomy and raising awareness for one of the most pressing challenges of our time: climate change.

That, at least, were our assumptions when we considered which sessions to include in this year's Shaw-IAU Workshop, and from the feedback received so far, we seem to have hit the mark. The workshop itself was truly global, with 600 participants from more than 90 countries. We particularly salute those participants who had to make special efforts to attend, circumventing state-imposed restrictions on international communication. With these proceedings, as well as the videos and posters from the workshop that are available online, we make the various contributions available beyond the confines of the workshop itself.

Although the total count is only up to four, the Shaw-IAU Workshops have already become something of an institution. Their genesis, of course, is directly linked to the International Astronomical Union's establishment of its Office of Astronomy for Education in late 2019, hosted at Haus der Astronomie and the Max Planck Institute for Astronomy in Heidelberg, Germany, and the evolution of the Shaw-IAU Workshops has paralleled the building of the OAE as a whole. The online format started out in 2020 as a pandemic necessity. But we soon realised that the kind of online meeting the Workshops provided was a highly accessible format that would allow us to make these workshops truly global, and to set the threshold for participation as low as possible. We acknowledge that there still *is* a threshold – since internet access with sufficient bandwidth is required – and we will continue to look for ways of increasing accessibility even further. Perhaps the hybrid format pioneered by the OAE Center China-Nanjing this year, which combined the virtual and international Shaw-IAU Workshop with an in-person teacher workshop (as well as a nation-wide online workshop) is a model for the future?

On the part of the Office of Astronomy for Education, we hope that these proceedings will help you to make better and more effective use of astronomy in support of primary and secondary school education. It's a big universe out there — let's encourage students to explore it!

Markus Pössel
Director, IAU Office of Astronomy for Education
Heidelberg, December 2022

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Organising Committees

Local Organising Committee:

Asmita Bhandare, Ankit Bhandari, Sigrid Brummer, Niall Deacon, Natalie Fischer, Esther Kolar, Anna Ladu, Tshiamiso Makwela, Carmen Müllerthann, Eduardo Penteadó, Markus Pössel, Bhavesh Rajpoot, Saeed Salimpour, Gwen Sanderson, Rebecca Sanderson, Anna Sippel, Tilen Zupan.

Scientific Advisory Committee:

Mohamad Alassiry, Ali Al-Edhari, Mashhoor Al-Wardat, Asmita Bhandare, Suresh Bhattarai, Estelle Blanquet, Silvia Casu, Ahmed Chaalan, Merryn Cole, Hassane Darhmaoui, Niall Deacon, Rosan Doran, Federica Duras, Livia Giacomini, Edward Gomez, Violette Impellizzeri, Jacob Tolno Israel, Li Jian, Cui Jie, Awni M. Khasawneh, Colm Larkin, Hamid El Naimiy, Tshiamiso Makwela, Giulio Mazzolo, Farseem Mohammedy, Magda Moheb, El-Fady Morcos, Surhud More, Thomson Mucavela, Assia Nechache, Li Peng, Eduardo Penteadó, Frederic Pitout, Markus Pössel, Gilles Remy, Sara Ricciardi, Emmanuel Rollinde, Somaya Saad, Gwen Sanderson, Stefano Sandrelli, Hyunjin Shim, Anna Sippel, Jungjoo Sohn, Abdelhafidh Teyehi, Alessandra Zanazzi, Jin Zhu.

In addition to the efforts from the OAE office in Heidelberg, Germany, the following OAE Centers and Nodes made key contributions to organising this event:



French-Speaking Community Discussion

Session organisers: Hassane Darhmaoui (NAEC Maroc), Jacob Tolno Israel (NAEC Guinée), Frederic Pitout (NAEC France), Gilles Remy (OAE Node France), Emmanuel Rollinde (OAE Node France), and Abdelhafidh Teyehi (NAEC Tunisie)

DISCUSSION SUMMARY

The francophone session was the occasion to gather together francophone NAEC. It was chaired by Emmanuel Rollinde and Estelle Blanquet. We shared each other's actions and needs, and discussed the 2023 edition of the workshop "Astronomie pour l'Education dans l'espace Francophone".

Five countries were represented by their NAEC. F. Pitout (France), Abdoukarim Aliou (Mali), Julie Bolduc-Duval (Quebec/Canada), Gloria Raharimbolamena (Madagascar) and Nadeem Oozeer (Île Maurice). The situations are diverse, depending on whether astronomy is already in the curricula and on the link with the community of astronomers (observatory or research institutions) and with museums. Julie Bolduc mentioned the work of Pierre Chastenay about reasons given by teachers who are not teaching astronomy (<https://clutejournals.com/index.php/JAES/E/article/view/10221/10291>).

We all agreed on the importance of the localisation of educational resources. Translations of English resources need to account for the educational specificities of each country. Beyond this, educational resources need to account for geographical and cultural specificities. The case of the southern hemisphere is emblematic since stars and constellations are not the same. Francophone countries are being spread around the world, and cooperation in sharing observations would be of great value.

The role of the newly created OAE Francophone Node at CYU (oaenf.cyu.fr) was presented. Every francophone actor is invited to register to the "annuaire des acteurs". The OAENF-CY node will specifically organize the second edition of the francophone workshop (astroedu-fr) that will be held in November 2023 in Tunis. The scientific committee involves (as of November 2022) the NAEC of Tunisia, Morocco, France, and Guinea, members of OAENF-CY, and members of astronomy education associations. We discussed the organization and possibility of funding so that we have at least one or two representatives of each francophone country where an NAEC has been designed. We came to the idea of different workshops where small groups do the activity and then create a resource that accounts for curricula, astronomy and STEM knowledge, learning and teaching difficulties, and implementation details. Those will be proposed as AstroEdu resources! More to come in January 2023 after the next meeting of the scientific committee of the workshop.



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