



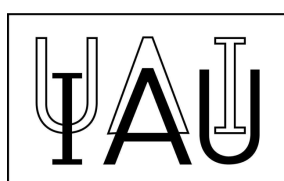
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IAU Office of Astronomy for Education

OAE Center Italy

Annual Report 2024





The IAU Office of Astronomy for Education Center Italy (I-OAE) is part of the IAU Office of Astronomy for Education (OAE).

I-OAE is a joint project of a consortium of Italian partners, led and represented by Istituto Nazionale di Astrofisica (INAF, National Institute for Astrophysics), the IAU and the IAU OAE.

The Italian consortium is constituted by: INAF, the Italian Astronomical Society (SIt) and the University of Rome Tor Vergata (ToV).

I-OAE Head Office is hosted by the INAF - Rome Astronomical Observatory, in Monte Porzio Catone.

Personnel is selected on a voluntary basis, according to their interests and skills, in agreement with the Institutes they work for.

Host Institution: INAF - Istituto Nazionale di Astrofisica, Osservatorio Astronomico di Roma

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EXECUTIVE SUMMARY

The IAU OAE Center Italy was established on the 3rd of March 2021, thanks to a Memorandum of Understanding signed by IAU, OAE and INAF. I-OAE is a joint project of a consortium of Italian partners led, represented and operated by INAF.

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Staff, organisation, and budget 2024 are described.. The approved 2025 projects are listed.

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1.1 Sabir - a residency project 13

Sabir Project IS a co-design project among Mediterranean NAECs aiming at fostering open and critical learning by producing fully co-designed IBL activities for high school students.

1.2 FRESCO (Florence RESidency and COdesign) 16

FRESCO (Florence RESidency and COdesign) is a spin-off of previous co-design initiatives in the Mediterranean, aimed at developing playful educational resources for children up to 12 years old worldwide.

1.3 Mediterranean STEAM Summer School in Istanbul 20

The Mediterranean Regional SHAW-IAU Workshop on ASTronomy for EDucation (MASTED) was held in person from 16 to 20 October 2024 in Istanbul, supported by OAE and I-OAE.

1.4 Research in Astronomy Education. Astrodid24 21

Astrodid24, the first National congress addressing the basic and key concepts of research in education of astronomy and astrophysics, was held in Napoli, Italy, in January 29-31, 2024, in collaboration with the University Federico II, Napoli.

2. Provide access to good resources 22

2.1 astroEDU 23

The International Editorial Board of AstroEDU continued meeting regularly once a week and the activities were focused on five major tasks: 1. Reorganisation of AstroEDU: 2. Technical improvements of AstroEDU platform: 3. Publication of new activities on the International editions and in other versions of AstroEDU.

2.2 OAE Multilingual Glossary

I-OAE contributed to the OAE initiative aimed at compiling an astronomical multilingual glossary and to share it on the OAE platform as an educational resource, published under a Creative Commons attribution license (CC-BY-4.0).

2.3 Universe World / EduINAF column 25

Universe World is a bi-monthly column in EduINAF, the online outreach and education magazine of INAF, featuring interviews with astronomy and science educators, communicators and researchers active in public engagement around the world.

2.4 Italian Teacher Program @ Canary Island, La Palma 26

The first edition of the Italian Teacher Programme@Canary Islands course was held in La Palma, sponsored by INAF and the Fundación Galileo Galilei (FGG-INAF), in collaboration with ITP CERN.

2.5 Accessible prints 27

OAE-I equipped itself with tactile printing systems, so as to produce tactile materials for educational and communication activities to offer another access channel to scientific information for all, and in particular for blind and visually-impaired users.

3. Promote astronomy in curricula 28

3.1 Teacher Training Program (TTP) 29

I-OAE collaborated with the organisation of the TTP launched by OAE, supporting both the Committee and the Jury. I-OAE also supported Primary school TTPs worldwide and Lower-secondary school TTPs in the Mediterranean Region.

3.2 School activities from astroEDU 29

A first step to monitor the use of IAU OAE open-access activities in classrooms in Italy and estimate their impact.

3.3 Points of view Festival within the “Time machines” exhibition 30

We designed and carried out educational and inclusive activities accompanying the *Time Machines* exhibition, also in the framework of the 2nd edition of the inclusive event “*Punti di Vista*” (*Points of View*), which the Educational Department of Palaexpo organised on 16-17 March 2024, to coincide with the INAF exhibition.

4. OAE networking 33

4.1 Erasmus +

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I-OAE partnered in the submission of the “In Space - Enhancing STEAM Education Through Astronomy - A Pathway to Climate Awareness and Inclusivity in Secondary Schools” Project, under the Erasmus+ call KA2.

4.2 Ramadan collaboration 34

As every year since 2019, I-OAE adheres to the project “From Islam to the Moon”: observations of the Hilal and meetings with the Islamic community in 2024 were organized in February, March and April on the occasion of Ramadan.

5. Spread the news 36

5.1 Time machines, an astronomy exhibition 37

The exhibition *Time Machines*, focused on astronomical cutting-edge research, started on 24

November 2023 and finished on 24 March 2024.

5.2 GA participation 38

I-OAE participated in the IAU General Assembly, which took place in August 2024 in Cape Town, with talks, posters, media-briefing and support to the GA Outreach and Education Committee.

5.3 International Day of Women and Girls in Science 38

On the occasion of the International Day of Women and Girls in Science, INAF OAS organised a screening event in collaboration with Cineteca di Bologna, under the patronage of I-OAE.

5.4 AMACA - Astronomy education with a Multisensory, Accessible, & Circular Approach 39

A learning path connecting astronomers with high-school students and teachers, and engaging PhD students in the preparation of the multi-sensory, hands-on activities showcased at the Astronomy festival *The Universe in all senses*.

5.5 Publications 42

A list of national and international publications and contributions, divided into categories: open-access archives; meetings & workshops; peer-reviewed research publications; news on newspapers, magazines, podcasts and so on - online or not.

ANNUAL REPORT 2024

Introduction

The IAU is the International astronomical organisation which brings together more than 12000 active professional astronomers from more than 100 countries worldwide. Its mission is to promote and safeguard astronomy in all its aspects, including research, communication, education, and development, through International cooperation. The IAU also embodies the internationally recognised authority for assigning names to celestial bodies and the surface features on them. Founded in 1919, the IAU is the world's largest professional body for astronomers.

In December 2019, the IAU established the Office of Astronomy for Education, also known as OAE, an office devoted to the use of Astronomy as a tool for growth and learning in several educational frameworks and contexts, located in Germany.

The IAU OAE Center Italy (hereinafter I-OAE) was established on the 3rd of March 2021, thanks to a Memorandum of Understanding (hereinafter OAE-MoU) signed by three parties: IAU, the Office of Astronomy for Education and INAF.

I-OAE is a joint project of a consortium of Italian partners, led and represented by INAF and of the IAU OAE, and is managed by INAF. The Italian partners are INAF, the Italian Astronomical Society (SAIt) and the University of Rome Tor Vergata (ToV).

INAF may change the roster of partners in coordination with the IAU OAE.

The I-OAE is formally located at INAF-Osservatorio Astronomico di Roma. It is part of the IAU OAE structure and contributes to the implementation of the IAU OAE mission. In 2024, the I-OAE structure was confirmed with small changes regarding FTE and personnel.

Staff

The members of I-OAE during 2023 are listed in table 1. Some of them were formally assigned to I-OAE by the Italian partners. Other volunteers joined I-OAE, under the supervision of the Head and the officers, with the approval of the whole staff. Ginevra Trinchieri and Lucio Angelo Antonelli (INAF) also support I-OAE with a formal contribution of 0 FTE.

Table 1: members, roles and FTEs in the I-OAE

Name	Role / main area	Position	FTE	Institution, city
Stefano Sandrelli	OAE Center Italy Manager	Staff	0.6	INAF, Milano
Sara Ricciardi	Officer: technology and innovation in education	Staff	0.5	INAF, Bologna
Stefania Varano	Officer: equal opportunity and access to culture	Staff	0.5	INAF, Bologna
Livia Giacomini	Officer: astroEDU implementation, consultancy	Staff	0.5	INAF, Roma
Giuliana Giobbi	Member, Multilingual Glossary Project	Staff	0.5	INAF, Monte Mario
Gianluigi Filippelli	web editor	Staff	0.2	INAF, Milano
Gloria Tirabassi	coordination, evaluation, documentation	Staff	0.5	INAF, Milano
Elisa Di Carlo	member	Staff	0.1	SAIt (INAF Teramo)
Roberto Buonanno	member	Staff	n.a.	SAIt
Rosa Valiante	member	Staff	0.1	INAF Roma
Giuseppe Bono	member	Staff	0.1	TOV, Roma
Administration	member	staff	0.2	INAF, various
Alessandra Zanazzi	member	Volunteer	0.2	INAF, Firenze
Anita Zanella	member	Volunteer	0.3	INAF, Padova
Claudia Mignone	member	Volunteer	0.1	INAF, Monte Mario
Riccardo Leoni	member	Volunteer	0.2	INAF Roma
Silvia Casu	member	Volunteer	0.1	INAF Cagliari
Caterina Boccato	member	Volunteer	0.1	INAF Padova
Adriana Basile	member	Volunteer	0.1	Planetario Reggio Calabria
Rachele Toniolo	member	Volunteer	0.2	INAF, University of Bologna

The total FTE was 5.1, but one member from SAIIt never communicated his formal contribution. If we assume it was the minimum requested (0.1), the total FTE can be estimated as 5.2, in agreement with the signed MoU. It is subdivided by the partners as follows:

- INAF: 4.8 FTE (92%)
- SAIIt: 0.2 FTE (4%)
- ToV: 0.1 FTE (2%)
- Other institutions: 0.1 FTE (2%)

Since the MoU foresaw 1.5 FTE of contribution as an aggregate result from SAIIt and ToV, we must conclude that the contribution of the partners was about 1.2 FTE less than the amount we agreed. On the contrary, INAF provided about 1.1 FTE more.

I-OAE internal and joint meetings

Online I-OAE members' meetings are scheduled weekly on the Google Meet platform, with a 1-hour duration:

- on Tuesday at 12:00 CET: Officers' meeting
- on Wednesday at 14.30 CET: General communication and discussions

Link: <https://meet.google.com/qgk-ubiz-vce>

Specific project meetings are scheduled by the involved Working Groups.

Online joint meetings among OAE, Centers and Nodes and among NAECs are scheduled according to OAE programmes.

Budget 2024

The IAU Office of Astronomy for Education Center Italy can rely on an annual budget defined by the MoU in 100 Keuro. The budget is managed by the administration of Roma Monte Porzio under the Fu.Ob. 1.05.01.23.16 IAU Office for Astronomy Education-OAE Center Italy (ref. Stefano Sandrelli).

The amount at the beginning of 2023 was about 47 Keuro. The annual budget for 2024 was 100 Keuro. The expenditures were:

- 13 Keuro to support the Sabir project (see 1.1) - direct transfer to Osservatorio astronomico di Brera (OAB)
- 12 Keuro to Kultur University Istanbul to support the FRESCO project (see 1.2)
- 5 Keuro to Kultur University Istanbul to support the MASTED project (see 1.3)
- 8 Keuro to IAU to support the TTP project (see 3.1)
- 6 Keuro to support the Amaca project (see 5.4) - direct transfer to Osservatorio astronomico di Padova (OAPd)
- 28 Keuro grant renewal (*Documentazione e valutazione di attività educative e di formazione dell'IAU Office for Astronomy Education Center Italy*).

The approved 2025 projects

In order to plan our activities for 2025 better, the project submission scheme adopted in 2023 was confirmed. The form is freely inspired by the UE document: *Horizon Europe Programme – Standard Application Form, version 6.0, 15/11/2022*. It is not to be considered an inflexible bureaucratic procedure, but rather an organisational tool to learn how to make the most of our energies and discover our weaknesses and strengths.

The projects we have decided to join and support so far are the following:

- TTP (coordinated by S. Varano, with S. Ricciardi, A. Zanazzi and S. Sandrelli as jury members)
- Astronomical Glossary (coordinated by G. Giobbi)
- IAU-Shaw Workshop (coordinated by C. Mignone)
- astroEDU (coordinated by L. Giacomini)
- The JEDI WG (coordinated by S. Varano)
- The *Sabir project follow-up*: to fully evaluate the IBL high-school activities (coordinated by S. Sandrelli, G. Tirabassi)
- The F.RES.CO project follow-up, to develop Game-Based Learning e Playful Learning for U12 students (coordinated by S. Casu, S. Ricciardi; A. Zanazzi, S. Varano);
- The AMACA (Astronomy education with a Multisensory, Accessible, and Circular Approach) Project, with the fifth edition of the Astronomy Festival and its educational path in the previous months (coordinated by A. Zanella)
- The Italian Teacher Programme@Canary Islands course 2nd edition, La Palma (coordinated by C. Boccato, L. Giacomini, S. Sandrelli)

Two more initiatives were approved by the I-OAE, with a budget:

- The SPRITZ initiative, a new teacher training program for Italian teachers, coordinated by the NAECs team Italy.
- Equal Day, coordinated by Jean-Pierre Saghbini

The OAE Working Group assignment scheme

As requested by the MoU, we assigned some I-OAE personnel to specific OAE WG as follows.

IAU OAE Organisation Support Team (OST)

There are 3 people at the moment, who can join the OST, each of them with a 0.1 FTE - total FTE = 0.3

- Federica Duras
- Stefania Varano
- Claudia Mignone, IAU Shaw Prize workshop
- Mariachiara Falco (part of the NAEC Team but not a member of the I-OAE), IAU Shaw Prize workshop

Infrastructure Working Groups (IWGs)

There are 5 people at the moment, who can join the IWG - total FTE = 0.8

- Livia Giacomini, astroEDU, 0.3 FTE
- Federica Duras, astroEDU, 0.2 FTE
- Sara Ricciardi, WG resources, 0.1 FTE

- Rosa Valiante, WG resources, 0.1 FTE
- Giuliana Giobbi, WG resources, 0.1 FTE
- Giannandrea Inchingolo (part of the NAEC Team but not a member of the I-OAE), WG NAECs.

The *JEDI WG* (working group for justice, equity, diversity and inclusion in the use of astronomy (JEDI) for education is under formation, led by Stefania Varano.

We also officially assigned some personnel to the Teacher Training Programme initiative:

- Stefania Varano - coordinator
- Sara Ricciardi - jury member primary
- Alessandra Zanazzi - jury member mid school
- Stefano Sandrelli - jury member high school

1. Professionalize astronomy education

1.1 Sabir - a residency project

Coordinators: Stefano Sandrelli, Gloria Tirabassi, Dunja Fabjan

For 2024, OAE Center Italy organized the Sabir Project, a co-design project among Mediterranean NAECs, built on our previous co-design experiences in the area. To underline the meaning of the collaboration, as a name we choose the word *Sabir*, which indicates the old Mediterranean contact language, which was used as a lingua franca in the Mediterranean Basin from the 11th to the 19th centuries. See:

https://en.wikipedia.org/wiki/Mediterranean_Lingua_Franca

Sabir involved partners from six collaborating countries: Italy, Lebanon, Morocco, Slovenia, Spain and Turkey. All the costs (travel from/to the NAEC Country to/from Milano, lodging, lunch etc. etc.) were covered by OAE Center Italy. Flights and accommodations were fully booked in March, in order to get the cheapest prices.

Sabir aimed at fostering open and critical learning by producing fully co-designed IBL activities for high school students, provided with a Student's Guide, Teacher's Guide and a common evaluation form. Our basic idea is to give birth to a collaborative process among peers with similar scientific competences and background, while the diversity among us is constituted mainly by our experiences and cultures. Moreover, we do not design activities from scratch, but we start from the field experiences of the participants: this means that the collection of the needs in each country relies on the NAECs' past experiences.

The general goals of the project are:

1. Sustaining the NAECs network in the Mediterranean;
2. Exchanging best practices;
3. Community building and reinforcement;
4. Co-design implementation process.

Our final goal was to have 4 education activities published on astroEDU. Moreover, we envisage to produce the translations of the full activities into Arabic, English, Italian, French, Spanish, Slovenian and Turkish.

The participating NAECs came from Lebanon, Morocco, Spain and Turkey, whereas the NAEC of Slovenia (D.F., see the table below) was invited to join the Office members as an

organizer. She and one of the two Office representatives (S.S.) acted as facilitators in the whole course: as such, they did not take part in the discussions themselves, apart from posing questions or suggesting reflections. Moreover, the other member of the Office (G.T.) acted as an evaluator: she observed the dynamics of the discussions and qualitatively recorded the ongoing process.

Table 1. NAECs participating to Sabir

Countries	Participants	Role		online	residency
Lebanon	Jean-Pierre Saghbini	co-designer	NAEC	x	x
	Marc Bou	co-designer	NAEC	x	
Spain	Nayra Rodríguez Eugenio	co-designer	NAEC	x	x
	Alejandra Goded	co-designer	NAEC	x	
	Irene Puerto	co-designer	NAEC	x	
Turkey	Aysegul Teker Yelkenci	co-designer	NAEC	x	x
Morocco	Hassane Darhmaoui	co-designer	former NAEC	x	x
	Zakaria Belhaj	co-designer	NAEC	x	
Slovenia	Dunja Fabian	facilitator	NAEC	x	x
Italy	Gloria Tirabassi	evaluator	I-OAE member	x	x
	Stefano Sandrelli	facilitator	I-OAE member	x	x

The pre-kick off meeting was held on February 15, while we met on March 22 for the kick-off meeting. During the kick-off meeting, we discussed the meaning of IBL and how we would like to design it in principle. We collected our own ideas and practices about this theme through a google form. Then we tried to rebuild our own framework / scheme of an IBL activity, which could help us in designing the activities.

We chose to work on the following activities, among those proposed by the NAECs of Lebanon, Morocco, Spain and Turkey:

- *Asteroids mining.* It's a challenge where the students are asked to develop a scientific plan for mining asteroids and extracting space resources. They must choose their own mission (looking for water or different minerals) and identify the most suitable asteroid through the analysis of orbital and spectral characteristics.
- *Exploring Exoplanets: The transit method.* Through hands-on activities, students simulate an exoplanet transit using basic materials. They model transit events, experimenting with different parameters of the exoplanets..
- *3,2,1... water rockets..* The students construct their own water rockets using everyday materials and launch them, experimenting with the principles of physics and engineering involved, with a special attention to the role of the fins, the trajectory of the rocket, and its initial speed. Which will be the best rocket which will save our two astronauts trapped on the ISS?
- *Our place in the universe.* The students must compare the scientific previsions of the Venus phases according to two different Solar System models: the geocentric model and the heliocentric one. Then they must compare their previsions with the real data and decide "to save or not" Galileo and his friend Copernicus.

In the following 4 meetings, we proceeded to transform the proposed activities into IBL ones: each NAEC presented the activity, and we discussed all together the main idea, the link to the national curricula, how to engage the students in the scientific challenge, what inquiries the students could choose to conduct, what would be the necessary materials/software/real data to foster an interdisciplinary approach and so on. Each NAEC changed the activities according to the discussion, then, we repeated twice more the whole process of presenting, discussing and proposing further developments, re-writing the activities.

During this online phase, our qualitative analysis of the discussions showed that - while preparing the educational activities - astronomers / physicists / researchers usually focus on the «contents area» (conceptualization, investigation), wondering: which contents have the students learnt? Which contents have they understood? Which contents will they remember?

In this phase the facilitator's role was mainly to help the participants to focus upon the

scientific points which could become objects of the inquiry, such as to reduce the number of physical parameters to investigate and to align them to the curricula of the ideal target students. The other effort was to turn the attention from the content to the skills.

The in-person phase consisted in a 1-week long residency, from Monday the Friday 2 to 6 2024, hosted by INAF-Osservatorio Astronomico di Brera, in Milano.

During the residency, the NAECs discussed the activities in pairs, with the help of a facilitator. In this phase, the main focus was about engaging the students and creating the conditions for them to discuss and express themselves in a comfortable, welcoming, stimulating environment. The facilitator's role was to help the sparring-partner NAEC and to raise questions, to discuss the IBL approach, and pinpoint the most relevant issues to be solved. Additionally, a qualitative evaluation was carried out during this phase. The presenting NAEC collected the suggestions and implemented the activity before the following bilateral meeting. At the end of the week, all the NAECs were requested to write down the final version of the activities. For the full programme of the residency, please refer to the Q3 Report. At the end of the week, all the NAECs were requested to write down the final version of the activity in the astroEDU format, with images and everything

needed.

See 2.1 for the Sabir publications on astroEDU, 5.6 and 5.7 for other publications and presentations at meetings and workshops.

1.2 FRESCO (Florence RESidency and COdesign)

Coordinators: Alessandra Zanazzi, Sara Ricciardi, Silvia Casu, Stefania Varano

FRESCO (Florence RESidency and COdesign) is a spin-off of previous co-design initiatives in the Mediterranean, aimed at developing playful educational resources for children up to 12 years old worldwide, with a particular focus on astronomy and astrophysics. The project has two main objectives: (1) expanding a network of practitioners dedicated to STEM and child-centered astronomy education and (2) designing and publishing educational resources, preferably in AstroEdu.

As an outcome of the call for NAECs (National Astronomy Education Coordinators) 10 teams were selected from Lebanon, Morocco, Greece, Portugal, Nigeria, Syria, Pakistan, Turkey, India, and Egypt. The teams work in online collaborative groups, engaging in a co-design process to create meaningful and playful learning activities. Prior to the kick-off in May, two preparatory seminars were held to introduce key concepts in Playful Learning (PL) and Game-Based Learning (GBL). The teams then split into those two groups with plenary sessions in between.

Table 1. NAECs participating to FResCO (we list the point of contact taking part in telecons, but more people

were involved)

Country	Participants	Role		online	residency
India	Samir Durde	co-designer	RAEC	x	x
Pakistan	Rayan Khan	co-designer	NAEC	x	x
	Ali M. Gajani	co-designer		x	
Turkey	Aysegul Teker Yelkenci	co-designer	NAEC	x	x
Morocco	Hassane Darhmaoui	co-designer		x	x
	Kawtar	co-designer		x	x
Egypt	Ola Ali	co-designer	NAEC	x	
Greece	Margareta Metaxa	co-designer		x	x
Lebanon	Marc Bou Zeid	co-designer	NAEC	x	x
Syria	Tareq Alkhateb	co-designer	NAEC	x	
	Sarah Bderah	co-designer	NAEC	x	
Nigeria	Olayinga Fagbemiro	co-designer	NAEC	x	
Portugal	Alvaro Folhas	co-designer	NAEC	x	x
Italy	Alessandra Zanazzi	facilitator	I-OAE member	x	cx
	Sara Ricciardi	facilitator	I-OAE member	x	x
	Stefania Varano	facilitator	I-OAE member	x	x
	Silvia Casu	facilitator	I-OAE member	x	x

The PL group is co-designing an activity on "Searching for Life in the Universe - Galactic

Habitable Zone," addressing concepts of galaxy structure, habitable zones, and exoplanets.

This activity is structured in 4 "stations", educational activities designed as part of a global educational path. Each activity could be performed as a single activity too, since they were planned to be self-consistent. All the activities will be produced in the AstroEdu template, in order to publish them on this platform. In particular:

- Activity 1 (Provisory title: " My Way galaxy"). It is an engaging, hands-on playful learning experience designed to introduce students to the fundamental concepts of galaxy types, and astronomical scales. Through a game-like approach, students work collaboratively in small teams to construct visual representations of galaxies by drawing or using art supplies with step-by-step guidance provided by carefully created flashcards.
- Activity 2 (Provisory title:"The Universe as a recycling machine"). This activity introduces students to the concept of nucleosynthesis and how the Universe recycles elements through stellar processes. Using playdough, students will simulate the formation of elements from protons and neutrons, mimicking the cosmic processes that create elements in stars and supernovae.
- Activity 3 (Provisory Title: "The Galactic Habitable Zone"). This activity introduces students to the concept of galactic habitable zone (GHZ). In particular, playing with flash cards, students can discover the different physical phenomena that affect the position and size of the GHZ.
- Activity 4 (provisory title:"Other habitats beyond Earth"). This activity is designed to discover the science beyond the study of habitable exoplanets. In particular, students will learn to recognize which stars are more likely to be discovered with an exoplanet system, to compare some exoplanet systems with our Solar System and identify the habitable exoplanets.

The GBL group through facilitated iterative design discussions is leading to the refinement of two board games centered on constellations:

- *Constellation Explorer*, which, through game mechanics, highlights different mythologies and cultural interpretations of constellations (with a card draw mechanism children have to collect constellations based on stories told by different people and place them on the sky map)

- *Sky Safari*, a game for getting acquainted with the night sky, in which players will collect observations in a real layout of the sky on the board, using different telescope tokens and going through constellations and various well-known sky objects.

Throughout the FRESCO project, evaluation was a fundamental element catching participants' perceptions and experiences.

In October 2024, the in-person FRESCO residency took place in Istanbul, where participants finalized the first prototypes and revised activities. These were later tested in laboratories at the Masted Workshop, receiving feedback from educators. Further online meetings followed, incorporating insights from testing. New prototypes and refined descriptions will be produced by NAECS for additional local testing with children and teachers before the final materials will be published and disseminated, thus producing resources and documentations for schools worldwide.

An in-depth evaluation of both the final resources that will be produced and the method of co-design will be carried out as part of next year's FRESCO follow-up activities.

1.3 Mediterranean STEAM Summer School in Istanbul (MASTED)

Coordinators: Alessandra Zanazzi, Stefania Varano, Silvia Casu, Stefano Sandrelli

We participated in the organisation of The Mediterranean Regional SHAW-IAU Workshop on ASTronomy for EDucation (MASTED), held in person from 16 to 20 October 2024 at Istanbul Kultur University in Istanbul, Turkey. After a call published on IAU Basecamps, we collected over 50 applications - not only from the Mediterranean area. The workshop focussed on the following topics:

- Best practices in astronomy education.
- Main challenges of astronomy education, specific needs of NAECs, teachers, science educators of each country in the Mediterranean basin.
- Programs, funding and International projects to enhance the knowledge, skills and expertise of NAECs, teachers, science educators focused on astronomy education.
- Innovative techniques for teaching astronomy in formal and informal education; Inquiry-based learning activities, game-based and playful-learning activities in astronomy.
- Codesign of educational resources on astronomy.

The Mediterranean Regional SHAW-IAU Workshop on Astronomy for Education (MASTED) is a continuation of The STEAM-Med Project, which was started by I-OAE to create a collaborative environment and a permanent community among the Mediterranean NAECs. MASTED was organised by the NAEC Türkiye Team, Turkish Astronomical Society and Istanbul Kultur University in collaboration with the IAU Office of Astronomy for Education (OAE) and The IAU Office of Astronomy for Education Center Italy (I-OAE), with fundings from OAE (15 Keuros) and I-OAE (5 keuro to cover general expenses plus 5 Keuro to cover travel costs of I-OAE staff.).

Because the FRESCO project in-person residency was originally foreseen in Florence (Italy) during the same period, we decided to move it to Istanbul, in the days just before the workshop, so as to join efforts: these resulted in the participation in MASTED of some NAECs outside the Mediterranean Countries (e.g. India, Pakistan).

Stefano Sandrelli, Sara Ricciardi, Stefania Varano, Silvia Casu, and Alessandra Zanazzi were part of the SOC, while Alessandra Zanazzi took part in the LOC too.

The web page of MASTED is <https://sites.google.com/view/masted/home?authuser=0>

1.4 Research in Astronomy Education. Astrodid24

Coordinator: Stefano Sandrelli

If the inaugural AstroEdu Conference in 2019 showed that there is a need for a dedicated event, which may bring together researchers and professionals in the fields of astronomy, astronomy education, general education and other communities; then the second AstroEdu Conference in 2022 (Toronto, Ca) showed even more clearly that these communities speak different languages and have different references and frameworks.

In collaboration with Italo Testa and Silvia Galano (University of Naples Federico II, Italy), we decided to organise a series of 6 online talks addressing the basic and key concepts of research in education. The online talks were held in October, November and December 2023 by Silvia Galano, Italo Testa, Olivia Levrini (University of Bologna) and Kristina Zuza (University of Basque Country, Spain).

Astrodid24, the first National congress was held in Naples in January 2024, from 29 to 31. Scientific Committee: Italo Testa, Silvia Galano, Stefano Sandrelli, Gloria Tirabassi, Stefania Varano.

Website: <https://indico.unina.it/event/73/overview>

2. Provide access to good resources

2.1 astroEDU

Coordinator: Livia Giacomini

The International Editorial Board of AstroEDU continued meeting regularly once a week and the activities were focused on five major tasks.

1. *Reorganisation of AstroEDU*: the organisation of the Italian and Spanish AstroEDU editorial boards continued and they started translating and publishing activities. Contacts were made to start new versions of AstroEDU in 2025 (a French version and others).

2. *Technical improvements of AstroEDU platform*:

Publication of "country" tag and type of educational activity.

Publication of DOIs was defined (with the support of the association Speak Science) and 30 DOI assigned for 2024.

3. *Publication of new activities in the International editions*

In the International edition, we published 1 activity per month and advertised them through all AstroEDU channels:

- January 2024, The sky at your fingertips | astroEDU (iau.org), in collaboration with I-OAE, STEAM-Med project (Lampedusa collection).
- February 2024, Chasing the Moon | astroEDU (iau.org), in collaboration with I-OAE, STEAM-Med project (Lampedusa collection).
- March 2024 - in collaboration with SKAO
- SKAO and the mysteries of invisible light | astroEDU (iau.org)
- May 2024, Discover Earth's climate with a balloon | astroEDU (iau.org)
- April 2024, The gravity battle | astroEDU (iau.org)
- June 2024, Find the hidden rainbows | astroEDU (iau.org), in collaboration with OAE
- July 2024, Cubic Planets
- September 2024, Touching the stars, in collaboration with the IAU Inclusive office
- September 2024, 3...2...1... Time for water rockets!, in collaboration with I-OAE, Sabir project
- October 2024, Measuring an exoplanet

- November 2024, Exoplanet in a box, in collaboration with I-OAE, Sabir project
- December 2024, Identikit of an alien

We completed the publication of activities that were codesigned in the Lampedusa Workshop organised by I-OAE (<https://astroedu.iau.org/en/collections/steam-med-project/>) and we started the publication of activities that were codesigned in the Sabir project by I-OAE to be completed in 2025 (<https://astroedu.iau.org/en/collections/sabir/>).

We are also in contact with other groups in OAE, IAU and outside, in order to promote the publication of new activities (OAE Astrophotography Contest, IAU Inclusive office subgroup and others).

4. Publication of activities in other versions of AstroEDU

The Spanish and Italian editorial boards of AstroEDU continued meeting in this period, reviewing, translating and publishing a total of 11 Spanish activities and 5 Italian activities.:

5. Thesis on AstroEDU

Ongoing activities for the thesis focused on AstroEDU of Antonella Corleone, a student of Università Roma Tre, currently undertaking a thesis for a Master's degree in Mathematics (Educational Outreach). A first Beta version of the AI assistant developed in

this thesis was presented and tested at the Shaw Workshop.

2.2 OAE Multilingual Glossary

Coordinator: Giuliana Giobbi

I-OAE contributed to the OAE initiative aimed at compiling an astronomical multilingual glossary and to share it on the OAE platform as an educational resource, published under a [Creative Commons attribution license](#) (CC-BY-4.0)

We formed a subgroup dealing with the Italian translation of the OAE Multilingual glossary. We have been asked to select reviewers with school experience in this case, therefore we informed our team of the different “perspective” of this area. Also, I-OAE members might intervene in case a review is more addressed to science than to school aims. We have asked and obtained the collaboration of INAF colleagues, most of them astronomers, for the translation and scientific revision of terms.

In December 2023, we were informed that the new captions of the winning photos of the 2023 edition of the Astrophotography Context were also available for translation and review, therefore we recently started working on these pages as well.

I-OAE contributed to the OAE initiative aimed at compiling an astronomical multilingual glossary and to share it on the OAE platform as an educational resource, published under a [Creative Commons attribution licence](#) (CC-BY-4.0)

Glossary terms have all been translated, and the search pages in the OAE website have also been translated into Italian. Within the I-OAE team, we are going to plan a communication campaign targeting secondary school teachers in particular, so as to advertise the Astronomical Glossary as a fundamental tool for teaching Astronomy at a higher level.

Recently, a certain number of diagrams have been introduced in the OAE website, and OAE planned to add the remaining constellation maps so as to complete them (88 diagrams). As a consequence, the translation managers of the various centres collaborating to the Glossary will provide the translation of these maps into their languages, and we asked once again to our team of voluntary researchers and teachers to add their reviews. Finally, a new Working Group on Educational Resources to be added to

the website is being composed, with representatives from the various Glossary

Translation teams.

2.3 Universe World

Coordinator: Claudia Mignone

Universe World is a bi-monthly column on EduINAF, the online magazine of INAF dedicated to public outreach and education. Every instance features an interview with a scientist, researcher, science communicator and/or educator from a different country around the world (many of them are members of the NAEC network), exploring a different topic each time, along with local and global challenges, best practices and lessons related to the work of astronomy and science communication, public outreach and education, mapping differences and similarities in this very broad and rapidly evolving field. It is published in Italian and English and promoted on the International OAE social media channels. A poster featuring the project was presented at the IAU GA 2024.

This year's interviews:

- January 2024: Catch them young: astronomy and STEM education in Nigeria
<https://edu.inaf.it/in-english/universe-world/olayinka-fagbemiro-stem-education-nigeria/>
- March 2024: Creating engaging science content, from social media to illustrated books (Slovakia) <https://edu.inaf.it/in-english/universe-world/petr-broz-social-media-illustrated-books/>
- May 2024: In between two countries – and two worlds (Slovenia/Italy)
<https://edu.inaf.it/in-english/universe-world/dunja-fabjan-two-worlds/>
- August 2024: Astronomy for All: in Japan and worldwide <https://edu.inaf.it/in-english/universe-world/hidehiko-agata-japan-worldwide>
- October 2024: Engaging, accessible and fun: astronomy on social media (Australia)
<https://edu.inaf.it/in-english/universe-world/kirsten-banks-astronomy-social-media>
- December 2024: Astronomy for development: it is about people, not the stars (South Africa/India) <https://edu.inaf.it/in-english/universe-world/astronomy-for-development/>

2.4 Italian Teacher Program @ Canary Island, La Palma

Coordinator: Caterina Boccato, Livia Giacomini, Stefano Sandrelli

From 3 to 8 November 2024, the first edition of the Italian Teacher Programme@Canary Islands course was held in La Palma, Canary Islands. It was a training course for 20 selected secondary school teachers, sponsored by INAF and the Fundación Galileo Galilei (FGG-INAf), in collaboration with ITP CERN.

Lessons on Black Holes, Cosmology, Cosmic Rays, Exoplanets and related technologies were given by INAF leading researchers, while the practical hands-on workshops were coordinated by OAE Center Italy, in collaboration with EduINAf. They are giving rise to collaborative projects that will lead to the publication of teaching sheets on EduINAf and AstroEDU.

Among the proposed activities: a workshop on how to carry out a simulation of an exoplanet transit in class, an activity on measuring the mass of the black hole at the centre of the galaxy by analysing astronomical images and simulating a real research activity, and the introduction and use of teaching activities, games and other proposals taken from EduINAf, Play INAF and other reliable sources.

For the full programme, please see <https://indico.cern.ch/event/1395310/>

As I-OAE, the evaluation is regarded as very positive: the ITP was confirmed as an I-OAE official project in 2025.

2.5 Accessible prints

Coordinator: Stefania Varano

OAE-I has decided to equip itself with tactile printing systems, so as to produce tactile materials to be used in educational and communication activities to offer another access channel to scientific information for all, and in particular for blind and visually-impaired users. The equipment consists of two printers, one using the relief-printing technique on A4 sheets starting from black and white prints, and the other for the production of small 3D-prints in resin. This second printer will also be used for prototyping, and for the feasibility study of larger 3D-prints.

The printers have been purchased, using local additional funds.

3. Promote astronomy in curricula

3.1 Teacher Training Program (TTP)

Coordinators: Sara Ricciardi, Stefano Sandrelli, Stefania Varano

I-OAE collaborated with the organisation of the *Teacher training program* launched by OAE under the coordination of Tshiamiso Makwela (OAE), supporting both the Committee and the Jury with a member of OAE Center Italy for each category (Sara Ricciardi for Primary school; Stefania Varano for lower secondary school; Stefano Sandrelli for upper secondary school). The OAE Center India also participated in TTP.

The OAE Center Italy contributed with an additional budget of 8 keuros, (6 keuros for primary school worldwide and 2 keuros for programs in the Mediterranean Region). The budget was transferred from I-OAE to IAU Hq, which was in charge of the distribution of the grants to the winners. This was intended to help increase teachers' knowledge at

primary-school level, and enlarge the network of astronomy teachers and NAECS within the region.

We hoped this budget could also help to consolidate and communicate the resources output of our co-design process. We hoped teachers in different countries could learn about and then remix the resources proposed by NAECS and, in turn, suggest new ones.

For the 2025, our contribution is confirmed, with the following addresses:

- 4 keuros for primary school worldwide
- 2 keuros for programs in the Mediterranean Region
- 2 keuros for programs in Italy

Further information available at <https://astro4edu.org/ttp/>

3.2 School activities from astroEDU

Coordination: Stefano Sandrelli

Last year we started to monitor the use of IAU OAE open-access activities in classrooms through our Office.

- *Measuring the mean speed of a comet*, doi:10.20371/inaf/astroedu/2020_0002

Starting from the published activity, we developed a fully IBL activity: students are free to explore the images with the software SalsaJ or astrolab (web-based software).

astrolab is part of the project The schools' observatory, provided by Liverpool John Moores University in partnership with the Dill Faulkes Educational Trust:

<https://www.schoolsobservatory.org/get-started/view-images/astrolab>

Lab activity in Brera: 8 lessons; about 170 students engaged

- *Estimating the mass of a dark centre of gravity in the nucleus of our Galaxy*

Starting from the published activity in EU-HOU, we developed a fully IBL activity: students are free to explore the images with the software SalsaJ or astrolab (web-based software). They can measure the linear speed of any star in the field and

share their findings with other students, to get a community understanding of the phenomenon.

Activity (in Italian) <http://edu.inaf.it/wp-content/uploads/2020/03/Stimare-la-massa-del-buco-nero-centrale-della-Via-Lattea.pdf>

Video: <https://edu.inaf.it/astrodidattica/bellezza-fisica-applicazioni-spazio/>

Lab activity in Brera: 15 labs; more than 300 students engaged

3.3 *Points of view* Festival within the "Time machines" exhibition and its assessment

Coordinator: Stefania Varano

Thanks to 30kE of I-OAE funding, we designed and carried out educational and inclusive activities accompanying the *Time Machines* exhibition, targeted at students and the general public, also in the framework of the second edition of the inclusive event "*Punti di Vista* (english translation: *Viewpoints*), that the Educational Department of Palaexpo organised on 16-17 March 2024, coinciding with the INAF exhibition.

I-OAE has set up a dedicated space hosting brand-new multi-sensory exhibits which were used during the festival: a set of tactile maps representing the lunar phases and a multi-sensory planetarium, offering a common perceptual and cognitive framework to all users, both sighted, deaf, and blind or visually impaired, concerning the experience of observing the sky. More than 100 people (including deaf, blind, and visually impaired people) have tested the planetarium and the Moon tactile models.

The planetarium consists of a plexiglass hemisphere on which stars from the first to the fourth magnitude are represented by metal bars. By touching these bars, you activate visual, haptic, and acoustic stimuli. The represented features for each star are the following: its apparent magnitude, mapped both on acoustic (notes at different volumes),

visual (LED at different brightness), and haptic (number of bolts) stimuli, and its distance from us, mapped on a vibration, faster/slower for smaller/greater distances.

The multi-sensory resources integrated into the exhibition, such as the sonification of an image through the software Herakoi and the audio descriptions of the spaces and contents of the exhibition were used during the two-day festival visits.

Three of these visits were led in the Sign-Language, with an interpreter supporting visitors not acquainted with such language, allowing them to appreciate its beauty, iconography, and connection with the scientific contents.

A round table about the connection between Italian Sign Language and Science and Arts was also organised, in which Stefania Varano participated on behalf of I-OAE.

The number of involved visitors/participants to these activities during the Festival is approx 350.

We also carried out an in-depth evaluation of the planetarium and the audio descriptions with interviews to 3 BVI users (one user tested them remotely).

As for the planetarium, which offers a common perceptual and cognitive framework to all users, our research question concerned the comprehensibility and usability of the sensory stimuli, besides their effectiveness: the answers highlighted that all the sound, vibrational and tactile stimuli were well orchestrated and did not create confusion.

As for the audio descriptions, the questions focused on the accessibility of the web platform hosting the audio content and, in parallel, on their ability to inspire mental images. All users expressed satisfaction regarding the cleanliness of the web platform, adding that the descriptions were effective in creating mental pictures, in particular of the enormous time scales involved in the history of the universe (one of the exhibition's key themes).

In general, all of them expressed great satisfaction, stating that it was an exciting experience because they appreciated the sensation of being either under a starry sky or

inside the exhibition, touching or experiencing something they cannot see in real life. This indicates the effectiveness of the resources' design.

We are exploiting these results to improve the resources for future public events and to design a full evaluation system.

4. OAE Networking

4.1 Erasmus+

Coordinator Alessandra Zanazzi

I-OAE partnered in the submission of the “In Space - Enhancing STEAM Education Through Astronomy - A Pathway to Climate Awareness and Inclusivity in Secondary Schools” Project, under the Erasmus + call “KA2 – Cooperation for innovation and the exchange of good practices. Cooperation partnerships in school education (KA220-SCH)”. This project, coordinated by Cyprus Space Exploration Organisation (CSEO), aims at leveraging Astronomy as a tool to make STEAM education more engaging and relevant, encouraging creative and innovative thinking, as well as cultural awareness. The project's aim is to provide a comprehensive resource (the Introductory Astronomy Methodological Guide) for teaching astronomy-related subjects at the secondary level, and provide educators with effective methods and techniques to make complex topics accessible and engaging, thereby fostering students' critical thinking and analytical skills; to support the establishment of Astronomy Labs in schools, offering hands-on activities like handicrafts and 3D modelling software. If the project were selected, we aimed at both strengthening the teachers' knowledge about astronomy contents - providing resources that could be ready to use or incorporated into their lessons and ideas for cross-curricular activities - and also encouraging them to use innovative methods and facilitation skills to engage in playful practices. The requested budget was 65 k€.

Even though the project was not selected for funding, it received high scores and good evaluation.

4.2 Ramadan collaboration

Coordinator: Caterina Boccato

This project, initiated in 2017, aims at fostering collaboration between astronomers and the Italian Islamic Community to develop a sustainable model of relational development through dialogue, culture, and science. Its primary objective is to enhance the scientific dissemination of astronomy within the Islamic community and to promote cultural and scientific engagement through educational and informational astronomy projects for schools and society. In 2020, this effort resulted in a Memorandum of Understanding

(MoU) between INAF and the Islamic Cultural Center of Italy, outlining shared objectives and aligning with some of those of the 2030 UN Agenda. Notably, this MoU between a scientific institution and a religious minority community, dedicated to fostering dialogue and disseminating modern astronomy and astrophysics fundamentals, is unique in the European landscape. Seven years since its inception, the project continues to evolve, with the creation of a community of astronomers and amateur astronomers focused on observing the Moon during critical periods such as the start of the month of Ramadan, providing scientific insights for the Islamic calendar. Additionally, efforts include workshops on astronomy fundamentals and lunar observations held at the Great Mosque of Rome, with plans for further activities and networking among astronomers nationwide and amateurs across Italy.

Observations of the Hilal and meetings with the Islamic community in 2024 were organized in the following dates:

- February 10th for the start of the month before Ramadan, Sha'ban 1445 AH (5 astronomical observatories connected)
- March 11th for the start of Ramadan
- April 3, 2024, a preparatory meeting for the observation of the Ramadan crescent moon took place, attended by around 30 Imams. The meeting focused on lunar phases and lunar visibility conditions.
- April 9th for the end of Ramadan [5 astronomical observatories connected]

The total number of presences in the 4 different meetings are about 200 imam, 20 astronomers and 10 amateur astronomers.

Additionally, this year marked a significant turning point, as we welcomed asylum-seeking youths to our observatory in Rome, in collaboration with the *Baobab* cooperative. Furthermore, plans are underway to organise a comprehensive course for the local Islamic community at our Cagliari Observatory, which could be replicated in terms of content, language, and methodology. The course program is currently under discussion.

5. Spread the news

5.1 Time machines, an astronomy exhibition

Coordinator: Caterina Boccato,

The “Macchine del Tempo” (Time Machines) exhibition is a 360-degree project engaging both scientists and the public. In addition to the exhibition—open, in Rome, from November 25, 2023, to March 24, 2024, six days a week—a rich schedule of events and workshops for

schools and families was developed, some in collaboration with Palazzo delle Esposizioni Roma's Educational Services.

The exhibition is fully translated into English and has been a testing ground for inclusivity initiatives, including guided tours in Italian Sign Language (LIS) and collaborations like the Punti di Vista Festival (March 16–17).

The project took over a year of planning, involving around 30 contributors and a total budget of €600,000. The exhibition has attracted more than 50,000 visitors.

Goals and Impact

The project had a dual objective:

- Create an engaging, accessible exhibition showcasing INAF, its researchers, and their work through images, sounds, and modern technology.
- Generate curiosity and awareness about astrophysics and INAF's research centers across Italy, using an '80s aesthetic blended with cutting-edge content and gamification to spark interest.

The exhibition has had significant social, communicative, and institutional impact. While a full Social Return on Investment (SROI) analysis is ongoing, early qualitative results show:

- Encouraging young audiences to explore STEAM fields, particularly astrophysics, as seen in the sold-out art workshops.
- Highlighting the excellence of Italian astrophysics, raising INAF's public and institutional visibility, and attracting media attention from Rai Cultura, Sky Arte, and others.
- Providing schools with a unique educational experience, merging science, technology, and history, with strong engagement from primary and secondary institutions.
- Fostering interdisciplinary connections, linking astrophysics with arts, theater, literature, and music through public events.

Following its success in Rome, "Macchine del Tempo" will open in Turin from March 14 to June 2, 2025, with plans for Palermo and Padua in the future.

5.2 GA participation

Coordinator: Claudia Mignone, Livia Giacomini

I-OAE participated in the IAU General Assembly, which took place in August 2024 in Cape Town. Its contribution consisted in the presence of three SOC members for the day-long session dedicated to OAE on 7 August, as well as materials and support for the IAU booth, shared by the various offices. The office contributed two talks to the OAE session: one about I-OAE activities (delivered by A. Zanazzi), focussed on the MIRTO STEAM-Med co-

design project, and another one about AstroEDU (delivered by L. Giacomini). Office members also contributed talks and posters to other sessions dedicated to outreach and public engagement. Besides, the activities of I-OAE were presented by C. Boccato as part of the media briefing announcing the next IAU GA, which will take place in Rome in 2027. The office also supported the IAU GA Outreach and Education Committee connecting them with INAF researchers and associates who participated remotely in the “Meet an astronomer” virtual sessions with schools in Africa (Mauritius, Ethiopia, Nigeria, South Africa).

5.3 International Day of Women and Girls in Science

Coordinator: Sara Ricciardi

On the occasion of the International Day of Women and Girls in Science, the INAF OAS Bologna organised a screening event in collaboration with Cineteca di Bologna and under the patronage of I-OAE.

The event, tailored for high-school students from Bologna, took place on February 12 at the Lumiere movie theatre. Following the screening of the documentary *Picture a Scientist* by Cheney and Shattuck (2020, 97 minutes), an engaging discussion was initiated among the students and researchers.

The conversation celebrated the experiences and contributions of female researchers who are currently pioneering new chapters in the history of science. We highlighted the paradigm of sexist discrimination within the scientific field as a general issue, alongside the mechanisms of unconscious bias. Furthermore, the discussion ventured into how science could advance through a greater contribution from female scientists, emphasising the importance of equity and diversity in driving scientific progress.

This gathering not only provided an educational experience but also aimed to inspire and motivate young students by showcasing the vital roles and challenges of women in science.

5.4 AMACA - Astronomy education with a Multisensory, Accessible, & Circular Approach

Coordinator: Anita Zanella

The course “Designing multisensory public engagement activities”, started at the beginning of February and continued until May. The course was attended by 11 PhD students from the University of Padova and University of Bologna (Astronomy Departments). The course

was led by Anita Zanella, with the participation and contribution of Andrea Cottinelli (astronomer and high-school teacher), Barbara Arfé (psychologist expert in education and disabilities), and Lorenzo Martini (president of the Association for the Blind and Visually Impaired). Students were presented with some public engagement techniques and resources (e.g., hands-on activities, sonification and tactile resources) and guided in designing, building, and testing their own activity. The theme of the activities was “time”; each activity lasted about 45 minutes, and they targeted different age groups (from 4 year-old children to teenagers and adults).

The annual Astronomy Festival “The Universe in all senses”, where the activities have been presented, took place on 7-8-9 June 2024 in Castellaro Lagusello (Italy). The theme of the Festival this year was “On the trail of time”. The Festival is organised by A. Zanella and R. Toniolo with contributions from S. Sandrelli, S. Ricciardi, G. Tirabassi, and G. Giobbi from OAE (plus A. Cottinelli, G. Liuzzi, F. Di Giacomo, M. Grassi, F. Zanella, who are not part of OAE).

About 4000 participants were present. The Festival was highly appreciated both by the participants and the high-school students involved as facilitators (appreciation investigated through questionnaires). We received several requests/proposals of collaboration for next year’s edition from the town halls of nearby cities, astronomy amateurs, and publishing houses.

From October to December 2024 we held a teacher training about the activities that were designed by the PhD students for the Festival. Eleven teachers from all school grades (3 kindergarten, 2 elementary school, 5 middle school, 1 high school) attended the course. They came from the schools of Mantova and nearby provinces. The first lesson was taught by the high-school students (about 45) who took part in the project. The other lessons held in the classrooms are taught by some of the PhD students and by the AMACA project coordinators. We are evaluating the effectiveness of the teacher-training programme.

We also wrote a paper, and submitted it to the PLOS-ONE journal (under review), about the first four years of the AMACA project, the evaluation of the activities and lessons learnt.

5.5 Collaboration with Moleskine®

Coordinator: Stefano Sandrelli

For several years, INAF has collaborated with Moleskine® in the annual Agenda production.

INAF, namely Osservatorio di Brera, provides the moon phases. Starting from 2027, the collaboration will be extended to IAU Office of Astronomy for Education Center Italy. A link to astro4edu.org will be added too.

5.6 Publications, conferences and proceedings

Open access archives

- *Astroedu Report 2023*: <http://hdl.handle.net/20.500.12386/35551>
- *IAU Office of Astronomy for Education, OAE Center Italy Annual Report 2023*
<http://hdl.handle.net/20.500.12386/34960>

News

- 16-01-2024 *Concorso AstroFotografia IAU-OAE 2023: ecco i vincitori!*
<https://edu.inaf.it/news/I-OAEItalia/concorso-astrofotografia-iau-oae-2023/>
- 29-01-2024 *Dove andiamo non c'è bisogno di strade*
<https://edu.inaf.it/news/per-la-scuola/dove-andiamo-non-ce-bisogno-di-strade/>
- 29-02-2024 *Un'estate tra le stelle della "Haus der Astronomie"*
<https://edu.inaf.it/news/I-OAEItalia/estate-stelle-haus-der-astronomie/>
- 12-03-2024 *Riparte il Teacher Training Program IAU*

- <https://edu.inaf.it/news/I-OAEItalia/iau-teacher-training-program-2024/>
- 11-02-2024, article in EduINAF *L'universo in tutti i sensi: Sulle tracce del tempo*
<https://edu.inaf.it/news/oea-italia/sotto-lo-stesso-sole/>
 - 08-07-2024 *Il clima terrestre con un palloncino*
<https://edu.inaf.it/news/per-la-scuola/astroedu-clima-terra-palloncino/>
 - 03-07-2024 *Quasi-luna, ma come ti chiamo?*
<https://edu.inaf.it/news/premi-e-concorsi/quasi-luna-ma-come-ti-chiamo/>
 - 29-07-2024 *The Mediterranean Regional SHAW-IAU Workshop on ASTronomy for EDucation 2024,*
<https://edu.inaf.it/in-english/the-mediterranean-regional-shaw-iau-workshop-on-astronomy-for-education-2024/>
 - 14-10-2024 *Accattivante, accessibile e divertente: l'astronomia sui social*
<https://edu.inaf.it/rubriche/universo-mondo/kirsten-banks-astronomia-social/> (Italian version)
<https://edu.inaf.it/in-english/universe-world/kirsten-banks-astronomy-social-media/> (English version)
 - 21-10-2024 *Sabir: gli studenti al centro dell'apprendimento*
<https://edu.inaf.it/news/oea-italia/sabir-2024-milano-studenti-apprendimento/>
 - 04-11-2024 *Al via l'Italian Teacher program in astrofisica*
<https://edu.inaf.it/news/per-la-scuola/italian-teacher-programme-in-astrofisica/>
 - 09-12-2024 *Astronomia per lo sviluppo: l'obiettivo sono le persone, non le stelle*
<https://edu.inaf.it/rubriche/universo-mondo/astrofisica-per-lo-sviluppo/> (in

english: <https://edu.inaf.it/in-english/universe-world/astronomy-for-development/>)

- 14-11-2024 *Sabir: students at the center of learning*, <https://astro4edu.org/news/so507Wq/>
- 17-12-2024 *Pensieri felici di fine anno 2024*, <https://edu.inaf.it/rubriche/oltre-orizzonte/pensieri-felici-di-fine-anno-2024/>

Scientific Publications

Inclusive activities and resources in Astrophysics: are they really meaningful and effective? The importance of assessment and evaluation, di S. Varano, C. Boccato, S. Casu, F. Di Giacomo, D. Guidetti, C. Mignone, E. C. Molinari, S. Ricciardi, S. Sandrelli, R. Toniolo, A. Zanazzi, and A. Zarella. (2024). in *The Hitchhiker's Guide To Astronomy Education, Public Outreach And Communication*. Mem. Sait, Vol. 95, n. 2, 2024 (C. Mignone et al. Eds)
<https://www.memsait.it/volumi/MemSAIT-vol95-n2-2024.php>

Participation to conferences and proceedings

National Meeting of the Italian Astronomical Society, 3-7 June, Napoli

- *L'Office of Astronomy for Education Center Italy, l'ufficio internazionale della IAU per l'education: che cosa è, che cosa fa*, invited talk
- *L'interdisciplinarietà dell'astronomia e le competenze trasversali*, Tavola rotonda condotta da M. Esposito, con Di Sorbo, D.; Sandrelli, S.; Testa, I.; Testa, V.
<https://indico.ict.inaf.it/event/2780/overview>

EPEC annual week, Padova

- 26-06-2024 *AstroEDU, the IAU platform for educational resources*, talk
<https://www.europlanet-society.org/epec-annual-week-2024/>

GIREP, Kraków, 26-30 August

- *Designing a Tinkering Workshop: Empowering Teachers Demystifying the Design Process*, Sara Ricciardi, Irene Giovanardi, Stefano Rini,
<https://indico.cern.ch/event/1162407/contributions/5950259/>

IAU General Assembly, 3-15 August, Cape Town, South Africa

- *Bridging Cultures through STEAM: The MIRTO /STEAM-Med Initiative for Primary Education in the Mediterranean*, Zanazzi, A.; Ricciardi, S.; Sandrelli, S.; Mignone, C.; Giacomini L., Varano, S.; Casu, S.; Tirabassi, G.

<https://virtual.oxfordabstracts.com/event/public/5099/submission/3169>

- *Let's learn with astroEDU!*, Giacomini, L., Casu, Gomez, E., Mazzolo, M. Sanderson, G., <https://virtual.oxfordabstracts.com/event/public/5099/submission/670>
- *Making astronomy outreach careers visible*, C. Mignone, poster <https://ui.adsabs.harvard.edu/abs/2024IAUGA..32P2869M/abstract>
- *Pixel and Cosmo Hunters: game-based activities research at INAF*, Zanazzi, A.; Inchingolo, G.; Toniolo, R.; Casu, S.; Ricciardi, S.; Varano, S.; La Parola, V.; Contino, G., poster, <https://ui.adsabs.harvard.edu/abs/2024IAUGA..32P2472Z/abstract>

Europlanet Science Congress 2024, Berlin, Germany, 8–13 Sep 2024

- *AstroEDU, the innovative platform to learn (with) astronomy*, Giacomini, L., Aloisi, F., Corleone, A., Gomez, E., Mazzolo, G., and Sanderson, G., EPSC2024-520, <https://doi.org/10.5194/epsc2024-520>

EAS2024, European Astronomical Society Annual Meeting, held 1-5 July, 2024 in Padova

- *From Islam to the Moon project: building bridges through sky and astronomy*, Boccato, C ; Aloisio, F. ; Casu, S. ; D'Alessio, F. ; Di Giacomo, F., Session LS7 : Under the same sky: engage the next generations through an effective science communication, ePoster,

<https://ui.adsabs.harvard.edu/abs/2024eas..conf..650B/abstract>

6th Shaw-IAU Workshop on Astronomy for Education

- *The Mediterranean co-design: the Sabir project. Towards co-designed IBL activities for high school*, D. Fabjan, S. Sandrelli, G. Tirabassi, N. Rodríguez Eugenio, A. Goded Merino, A. Yelkenci, J-P. Saghbini, H. Darhmaoui. Talk
- *Mediterranean co-design: Evaluating the project FRESCO (Florence RESidency COdesign)*, S. Varano, S. Casu, S. Ricciardi, A. Zanazzi, S. Bartlett. Talk
- *Multisensory planetarium. The Universe as you never sensed it*, F. Di Giacomo, C. Mignone, R. Toniolo, S. Varano. Poster

Masted, 16 - 20 October 2024 Istanbul Kultur University in Istanbul, Turkey

- *The Sabir Project Resources*, S. Sandrelli, D. Fabjan, G. Tirabassi, N. Rodríguez Eugenio, A. Goded Merino, A. Yelkenci, J-P. Saghbini, H. Darhmaoui. Talk.
- *The Fresco Project Resources*, A. Zanazzi, S. Varano, S. Casu, S. Ricciardi, S. Bartlett. Talk
- *Asteroid Miners*, Aysegul Yelkenci (NAEC Türkiye), Korhan Yelkenci, Ceren Can, Sabir project activity workshop 1
- *Exoplanets: Hands-On Transit Method*, Hassane Darhmaoui (NAEC Morocco), Sabir project activity workshop 2
- *FRESCO Game-Based Learning: two new board games: The "Constellation Explorer" and "Sky Safari"*, H.Darhmaoui (NAEC Morocco), S. Durde (NAEC India), G. Inchingolo (NAEC Italy), A. Gajani (NAEC Pakistan), K. Jalili, A. Folhas (NAEC Portugal). FRESCO activities workshop 1
- *FRESCO Playful Learning activities*, A. Yelkenci (NAEC Türkiye), J.P. Sagbini (NAEC Lebanon), M. Boud Zeid, M. Metaxa. FRESCO activities workshop 2

Convegno Nazionale UAI di Divulgazione dell'Astronomia, Frascati (Italy)

- *Le audioguide con testi alternativi per la mostra Macchine del Tempo*, C. Mignone, F. Di Giacomo, R. Toniolo, S. Varano. Talk, <https://www.uai.it/sito/cnuda24-logistica/>
- *Planetario multisensoriale – la volta celeste, con tutti i sensi*, S. Varano, F. Di Giacomo, C. Mignone, R. Toniolo. Talk, <https://www.uai.it/sito/cnuda24-logistica/>

