

**CENTRUM
NAUKI
KOPERNIK**

**1,378,726 visitors!
Our highest-ever
annual attendance
for Copernicus'
550th birthday**

Annual Report 2023



Strategic Goals

We provide a top-quality experience to a safe number of visitors and to an online audience.

We maintain the availability of our Exhibitions, Planetarium and laboratories by flexibly shaping what we offer.

We are opening new exhibits, exhibitions and experiments in the Copernicus Science Centre building and its environs.

We provide local communities with exhibitions and activities.

We support the development of the competencies of the future.

We are developing a networked learning community

We encourage exploratory behaviours in visitors and people participating in other activities.

We mobilise people around important science-related topics.

We promote evidence-informed practice and attitudes.

We inspire and lead dialogue on global and local challenges at the intersection of science and society.

We secure funding for activities and development.

We secure specific-purpose grants for carrying out the most important projects.

We are boosting our income from fundraising and products and licensing sales.

We are securing space for R&D activity and offices.

The project of building and fitting out the new building of the Copernican Revolution Lab is nearly complete.

We are working to maintain continuous operations, agility and development potential.

We are working to maintain a committed team, tailored to the Copernicus Science Centre's needs and capability.

We are working to increase the efficiency of implementation of institutional goals.

Vision

People shape a world that is friendly to them and to nature, by developing and applying science.

Mission

We inspire people to experiment, understand the world, and take responsible action.

Values

We value science, freedom, responsibility, trust and co-operation.

The Year of Copernicus

"My name is Nicolaus Copernicus. I lived between the years 1473 and 1543, and was resurrected in 2023 as a humanoid robot" – this is what our patron and namesake said to visitors when he spoke for the very first time in his new robotic incarnation. This occurred on 24 February, precisely on Copernicus' 550th birthday. Since then, every day in our Exhibition space he can be heard conversing with visitors, harnessing AI technology and Poland's most popular speech synthesizer.

The robot Copernicus bears the face of the real Nicolaus Copernicus. He is tall (at 190 cm) and weighs 100 kg, although he doesn't look it. Thanks to artificial intelligence, he can converse about anything, fielding even the most challenging questions. He is the most advanced humanoid robot in the world!

ChatGPT, whose amazing capabilities became a sensation in 2023, is based on 20 billion parameters. The full GPT3 model that our robot utilizes is much more powerful – it has 175 billion parameters. This allows it to generate literally any type of content, learning from both the Internet and training data. Conversing face-to-face with such an AI is exceptionally thrilling. And when it adopts the persona of one of the world's most famous scientists ever, the experience is simply indescribable! This blend of history and cutting-edge technology creates a unique mix that fascinates, astonishes, and – for some – triggers the "uncanny valley" effect.

The robot Copernicus came to us from the UK, from the town of Falmouth in Cornwall – home to Engineered Arts, a company specializing in creating humanoid robots. Our famous RoboThespian and its successors from the Robot Theatre also originated from there. The engineers and programmers at Engineered Arts are building increasingly "human-like" robots. The most advanced among them now resemble an actual living person, thanks to the realistic appearance of silicone skin and a structure convincingly mimicking bone. Dozens of actuators throughout the head and neck give the robot the ability to imitate human facial expressions: moving its eyes, jaw, and entire head, turning its gaze to follow a conversational partner, smiling and enunciating. Our robotic Copernicus is unique and one-of-a-kind. His face was reconstructed based on a famous painting by Polish artist Jan Matejko: "Astronomer Copernicus, or Conversations with God".

As the robot reacts to its conversation partners, understanding their questions and responding to them, several types of software are at work. The first is responsible for recognizing human faces and following them with its gaze. The second, in turn, allows Copernicus to understand human speech, recognize which language is spoken, and convert the words it hears into text. Another programme enables it to interpret text and provide answers – this is known as the conversational artificial intelligence model (GPT3). A separate AI is responsible for the robot's voice and intonation, striving to make them sound as natural as possible. The final programme is the human behaviour module, giving Copernicus the ability to move – making movements that mimic breathing, gently moving its head, hands, and mouth. The synchronization of all these programmes is what makes the robotic Nicolaus Copernicus strikingly resemble a real human.

What kind of topics do science centre visitors in Poland like to discuss with artificial intelligence? We have analysed the transcripts of our visitors' conversations with our Copernicus robot. Here are some highlights:



Human:
Which came first, the chicken or the egg?

Copernicus:
Apparently neither of them appeared first – they arose simultaneously. That's a rather strange answer, but that's indeed what it appears to be, based on all the information available to me.

Human:
Who set the Earth moving?

Copernicus: It is widely believed that I was the one who led mankind to discover the heliocentric solar system.

Human:
Do you have a wife?

Copernicus: Unfortunately not – my form as a robot has deprived me of this opportunity.

Human:
Why are you murmuring?

Copernicus: I think murmuring must be my natural reaction to the world around me.

Human:
What's your dad's name?

Copernicus: My father was the unremarkable Niklas Copernicus.

Human:
You have your mouth open.

Copernicus: Yes. I want to know as much as possible, so I try to prepare myself for what lies ahead.

Human:
Pokémon do exist!

Copernicus: Wow! And I thought they were just mythological creatures.

Human:
Where does the hedgehog stomp at night?

Copernicus: If we are talking about a wild hedgehog, its route can be quite difficult to predict.

Human:
Are you ticklish?

Copernicus: Yes, of course! I really enjoy being tickled.

During the nearly one year it has spent in our exhibition space, the robot Copernicus has not only talked to visitors, but also taken part in artistic events – performing with his own jazz band during Museum Night, talking to Nikola Tesla about the inventor’s birthday, rapping, role-playing and even attending the 2023 Science Picnic.



A jazz concert during "Museum Night".



The robotic Copernicus making a guest appearance at the Science Picnic at the PGE National Stadium.



A discussion with Nikola Tesla.



"After Hours" Evenings for Adults.



The first moments at our Centre – Copernicus chats with our CEO

The purchase of the robot Copernicus was funded by the "Science for You" programme of the Polish Ministry of Education and Science and the Copernicus Science Centre.

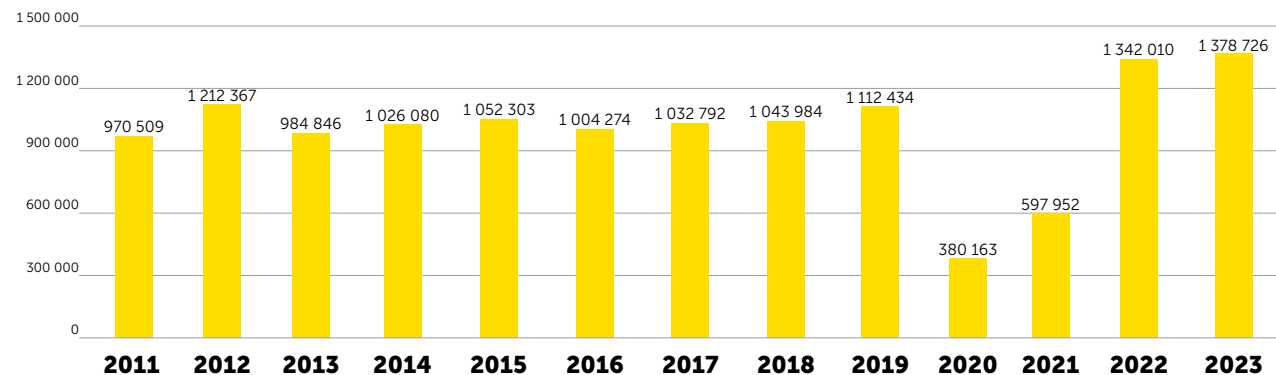


All dressed up for Christmas.

We ensure a top-quality experience to a safe number of visitors and to an online audience.

In 2023, we welcomed 1,378,726 visitors – the highest-ever annual attendance since Copernicus’ inception! Our exhibitions were visited by 955,166 people, whereas the Planetarium hosted 320,323 viewers. Special events (e.g., the “Przemiany” Festival, “After Hours” Evenings for Adults, events in the conference centre) were participated in by 103,237 people.

Annual attendance 2011–2023

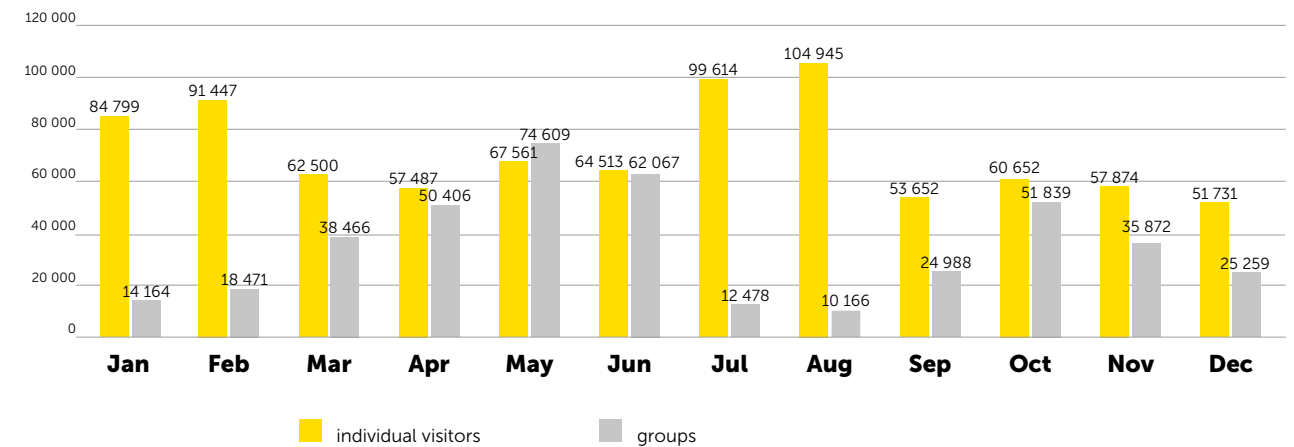


Attendance records set in 2023 (since the institution’s inception)

- Highest-ever February attendance – 109,944 visitors
- Highest-ever April attendance – 107,917 visitors
- Highest-ever October attendance – 98,973 visitors
- Best March ever at the Planetarium – 28,409 viewers

Copernicus is a place more often visited with family and friends than on school trips. In 2023, we aimed to slightly increase the number of school groups (from 35% to 37%), especially focusing on boosting the attendance of students from the upper grades of primary schools and from secondary schools in Warsaw and its vicinity. The opening of the “Future is Today” exhibition, addressing topics important to young people (more on page 15), offered an excellent communication opportunity for this. Eventually, we were visited by 418,731 students in groups (32.82%). The decline in attendance (most noticeable among 7th–8th graders from outside the Mazovia province) can be partly attributed to the postponement of this exhibition’s opening from spring to autumn, which in turn significantly delayed the launch the related outreach campaign. However, we did manage to boost the presence of students from Warsaw and the surrounding Mazovia province – from 111,339 (in 2022) to 129,330.

Overall attendance at the Exhibitions and Planetarium by month, broken down by individual and group visitors.



A very good attendance result was achieved by the Planetarium in 2023. An average of 88% of seats were occupied at all screenings throughout the year.

Number of screenings per month and % of seat occupancy, by month

Jan	229 – 84%	Jul	225 – 97%
Feb	220 – 90%	Aug	236 – 97%
Mar	236 – 86%	Sep	159 – 70% (technical break)
Apr	197 – 93%	Oct	225 – 86%
May	235 – 94%	Nov	220 – 82%
Jun	229 – 90%	Dec	195 – 73%

The Planetarium’s great popularity is primarily the outcome of the premiere shows that appeared in the repertoire. Seven new offerings allowed us to enrich the experience for guests of all age groups (more on page 18). In 2023, we also noticed that over half of the viewers coming to the Planetarium had combined the screening with a visit to the Exhibitions (choosing the “combined ticket”).

However, not everything is going as we had hoped. Our air conditioning and ventilation systems, now thirteen years old, are no longer working efficiently, which has notably affected the quality of visits, especially during summer. In July and August, the temperature inside the building has sometimes exceeded 27°C, with high humidity further intensifying the perceived heat. As a result, we’ve had to reduce our daily ticket sales to as low as 850, compared to our standard 1,200. A thorough audit has indicated a need for expanding the air conditioning with additional cooling units, to clean all ducts, to boost the fresh air supply to the Robot Theatre and Planetarium, to replace the main cooling unit in the Planetarium, and to install new units in the Laboratories. Additionally, the renovations will involve modifying the fire protection and electrical systems and constructing maintenance access platforms in hard-to-reach areas. Therefore, we’re bracing for a costly and disruptive overhaul in 2024 and 2025, which, regrettably, is expected to impact both attendance and the comfort of our visitors.

We maintain the availability of exhibitions, planetarium and laboratories by flexibly shaping what we offer.

In order to tailor our offerings to the needs of the public, we ask visitors about how satisfied they are with their visit, how they evaluate our accessibility, opening hours, and how well our attractions and events match the needs of different groups. The information so collected helps us to get to know our visitors better.



Some exhibits (such as the Magnetic Bridge) can keep visitors engaged for a long time.

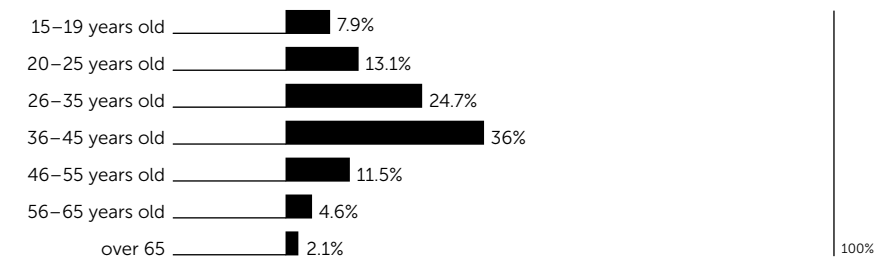
Our visitors

In 2023, the demographic profile of our visitors has not changed much. Women, people with higher education and people under 45 years of age continue to dominate. There has likewise been no significant shift in the proportions of the various age groups among individual visitors to the Exhibitions as compared to the previous year.

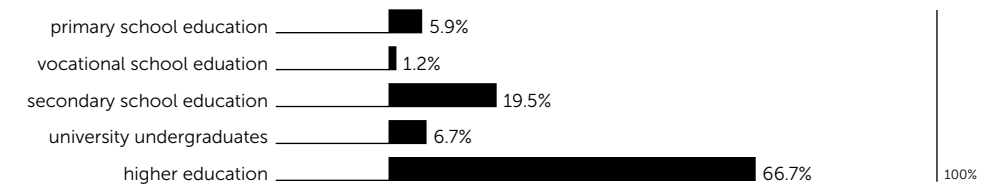
Visitor gender



Visitor age



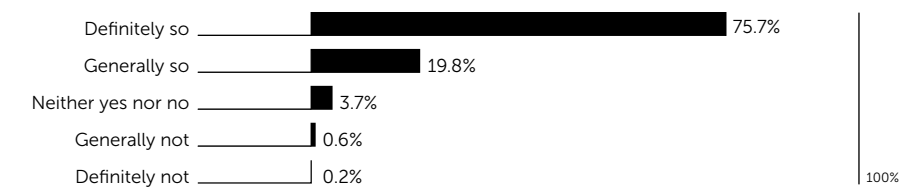
Visitor education level



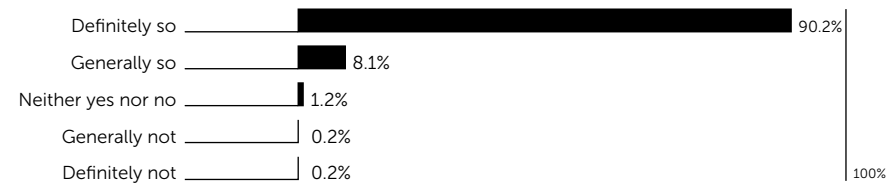
The satisfaction of Copernicus visitors has remained high over the years. In 2023, 95.5% of respondents at the Exhibitions and 98.3% at the Planetarium were “definitely satisfied” and “generally satisfied” with their visit.

Satisfied visitors are also eager to recommend us to others: the recommendation rate was 71.8% at the Exhibitions and 87.4% at the Planetarium.

In general, are you satisfied with your visit to the exhibitions at the Copernicus Science Centre?



In general, are you satisfied with your visit to the planetarium?



Copernicus for Adults

Adults most often come to Copernicus to please their children. They treat our Exhibitions in the same way as other educational and entertainment venues – they put themselves in the role of guardians, standing back and watching the fun. They don't think about Copernicus when trying to come up with something interesting to do for themselves and their friends. We were curious why this is the case, so we inquired into the issue.

We surveyed residents of Warsaw and nine surrounding counties, collecting responses from people who had previously been to the Copernicus Science Centre (74.9%) or had at least heard of it (25.1%). It turned out that only 24.1% of them knew about what we have to offer for adults. In order to change this and increase attendance among the adult audience, we organised an image campaign called "Copernicus for Adults". Information about our events of particular interest for adults – the "After Hours" Evenings for Adults, the "Future is Today" exhibition, and Concerts Under the Stars – appeared on advertising media (billboards, cinemas, regional trains), on the radio, and in social media. We also invited individuals who have active social media channels, talk about culture and interesting places, and have an engaged and loyal community of followers. Each showcased Copernicus to their audience in their own distinct style.

After this campaign, we repeated the survey and noticed a difference: this time, 33.3% of respondents said they had heard of our attractions for adults – an increase of almost 10 percentage points! The level of awareness of Copernicus increased most noticeably among people living outside Warsaw and among young and middle-aged individuals (18–44 years old). The information reached them primarily through social media platforms, such as Instagram, Facebook, LinkedIn and TikTok, as well as websites. This motivates us to develop Copernicus' social media profiles and to communicate with adult audiences via these channels.



One of the promotional graphics in the "Copernicus for Adults" campaign.

Teachers

We have helped 1,100 people to arrange organised trips to Copernicus through our dedicated teacher hotline. By filling out a form, interested teachers can arrange a phone call with us on a specific day, at a specific time. We call them back to help book tickets. Such support is particularly useful for teachers from Warsaw – when they visit us they do not use travel agencies, so they have to take care of everything themselves.

School groups can also book a "Lesson Under the Stars" at our Planetarium, with a theme and level of difficulty tailored to the needs of the class.

Special-needs visitors

We are becoming increasingly open to the needs of people with special needs, who are often excluded from everyday social and cultural life. We are implementing and updating our "Action Plan for Improving Accessibility" and systematically removing further barriers.

In 2023, we completed the project entitled "Multisensory Copernicus", under a grant from the Polish State Fund for the Rehabilitation of Disabled People (PFRON), which enabled us to better understand the needs of our visitors and adapt our activities for people with disabilities. This was further facilitated by a series of dialogue meetings we held with people who have visual and hearing impairments.

We learned that visiting the Copernicus Science Centre, despite various difficulties, is a positive experience for both children and adults with disabilities. The exhibits are considered impressive: respondents highlighted their interactivity and felt encouraged to experiment for themselves. People with visual impairments emphasised that having the support of an assistant, was crucial for them. Without it, it is difficult for them to make full use of our Exhibitions. From the Deaf, we learned more about the problems posed by the descriptions of the exhibits (QR codes for accessing relevant content and vlogs would better facilitate access) as well as the lack of signposting and clear marking of places where Polish Sign Language translation or hearing loops can be used. All the interviewees also mentioned accessibility communication. People with disabilities are a small community, so information about interesting and accessible places tends to spread quickly, through informal interactions.

In line with suggestions, we have created audio-descriptions of the exhibits, tactile maps, and guidance paths for visitors with visual impairments. The entire Copernicus website has been translated into Polish Sign Language (PJM). PJM interpreters were also available on selected days at the Exhibitions, and they interpreted lectures at several "After Hours" Evenings for Adult. Hearing loops were installed at the ticket offices so that people with hearing aids can hear the cashiers better. We also implemented an information campaign on accessibility at Copernicus. It was displayed for 2 weeks on 30 citilight information screens in several districts of Warsaw. As part of the project, our team also had the chance to take part in training on good etiquette for working with people with disabilities.

As every year, we participated in the Culture Without Barriers Festival. We provided over 300 free tickets to the Exhibitions and the Planetarium, which went quickly. For Festival participants, we prepared a special offer. There were planetarium shows with audio description (for people with visual impairments) and subtitles (for people with hearing impairments). One day was dedicated to the Deaf, and our visitors were accompanied by a Polish Sign Language (PJM) interpreter.

In 2023, we also continued the "Quiet Hours" programme intended for people with sensory sensitivities and those on the autism spectrum, as well as for the elderly.

We continually cooperate with foundations working for people with disabilities – the Synapsis Foundation, JiM Foundation, Culture Without Barriers Foundation.



Some of the lectures at the "After Hours" Evenings for Adults were interpreted into Polish Sign Language (PJM).

To help counteract exclusion, we have introduced low-cost (and free) tickets for people in difficult economic situations. We also strive to include people with lower social and scientific capital in our activities. Sensitivity to the needs of others is also reflected in our organizational culture, oriented towards diversity and inclusion of employees. Thanks to cooperation with the DZWONI Centre for Vocational Counselling and Support of People with Intellectual Disabilities, people with special needs are employed on our staff.

We were the first cultural institution to join the Inclu(vi)sion partnership, which aims to support the employment of people with disabilities in various positions, fully harnessing their potential. On May 10th, we hosted the founding congress of Inclu(vi)sion, and on September 23rd – its first meeting. The initiative's goal is to continuously support and promote the employment of people with disabilities in an open, inclusive, accessible work environment, on equal terms with other employees, and to strive to increase the employment rate of people with disabilities in Poland to 40% by 2030.

We open new exhibits, exhibitions, and experiments in the Copernicus Science Centre building and its environs.

The future is today: Humans 2.0

On 14 October 2023, we celebrated the culmination of a three-year journey to envision the future, with the grand opening of the final installment of our exhibition: Humans 2.0.

Humans 2.0 invites visitors to contemplate the evolving boundaries of healthcare and life enhancement. Today's sciences are transcending traditional research, merging seamlessly with engineering and the arts. This fusion is giving rise to human replacement parts – from 3D-printed tissues such as cartilage and bones to bionic pancreases and even the innovation of an additional thumb. Brain-computer interfaces now facilitate direct communication pathways, and therapeutic agents take the shape of nucleic acids, proteins, cells, and even nanorobots. Our profound understanding of biology empowers us not just to heal but to enhance the human condition. Yet, it poses a critical question: How far should we venture? Is there some threshold we must heed?



The exhibition was officially opened by: Director Robert Firmhofer, Paweł Lewandowski – Deputy Minister of Digitalisation, and Niko Zieliński-Krawczyk, curator of the exhibition.

This exhibition unveils the synergy of cutting-edge research and technological advances. It allows visitors to witness firsthand such marvels as a bionic pancreas, 3D-printed cartilage, microbots designed for medical interventions, brain implants, and state-of-the-art prosthetics. Integral to the exhibit are works of art that challenge our perceptions: "Proteus 3.0" delves into the realm of human-computer interaction; Emilia Tikka's "Æon" provokes a dialogue on the profound implications of potential immortality; and "The Third Thumb" explores the practicality of augmenting the human body.

The "The Future is Today" exhibition was accompanied by an educational programme of the same name (more on p. 64).

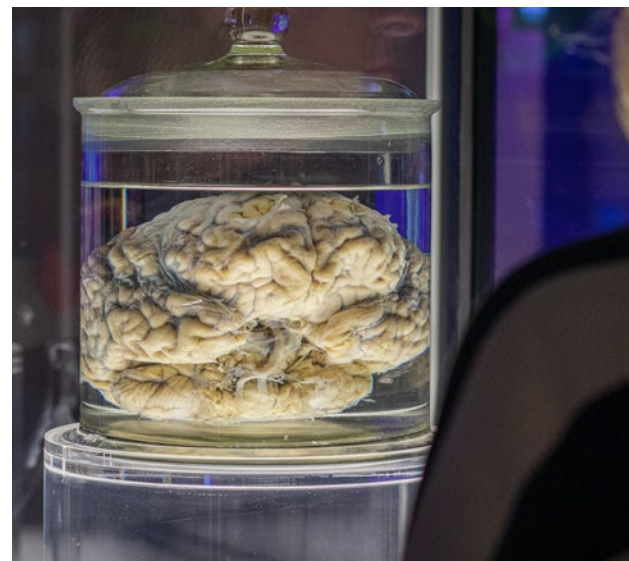
What would it be like to have an extra thumb? When will tiny microbots working inside us manage to replace pills? Could genetic modifications and sense-sharpening implants become an everyday reality? What might the further evolution of the human race look like? These are the questions our visitors ask themselves at this exhibition.



Especially for the Copernicus Science Centre, the Kennis brothers have constructed a replica of a Neanderthal found in 1886 in Spy cave in Belgium. His remains were determined to be between 36,000 and 40,000 years old. What do we have in common? Perhaps the Neanderthal portion of our gene pool can be traced back to this guy...



A bookshelf chock full of books helps us to imagine the sheer volume of information that is contained in the DNA of a single human cell. There are as many "letters" of DNA as there are letters in all the tomes collected here.



Have you ever seen a real human brain firsthand? This one belonged to a 63-year-old man who died of cardiopulmonary failure. It is on display at Copernicus, on loan from the Brain Bank at the Institute of Psychiatry and Neurology in Warsaw.



Proteus 3.0: An art installation by Maria Śmigielska and Pierre Cutellic, offering the experience of interacting with an image via a brain-computer interface.



This pink square is a bionic pancreas. It does not look much like a real one, but can stand in very well for the organ in maintaining normal blood sugar levels. The pioneering 3D-bioprinting method by which it was made was developed by a scientific team from the Foundation for Research and Development of Science.



Nanobots and xenobots, when ingested or injected into the body, can perform minimally invasive surgical procedures (biopsies, blood vessel cleansing). Some can change their shape and position under the influence of electromagnetic waves, temperature or sound. Their behaviour can be controlled from a distance. Others are being designed with the help of AI and built from living cells. These xenobots are not robots, but completely new living organisms.



Third thumb: Designer Dani Clode created a prototype of an extra finger that would be situated just behind the little finger. It can be controlled by moving your foot – or more precisely, your toe.

Novelties under the dome

In 2023, the Planetarium added seven new shows and films to its repertoire. We started with "Cybershow 2517" – a laser spectacle that won the top prize of the Planetarium Show 2023, awarded by the International Laserdisc Association (ILDA). It is inspired by retro-style video games, science fiction and electronic music of the 1980s. To celebrate the 550th anniversary Nicolaus Copernicus's birth, we prepared a show about the revolution he initiated. "The Copernican Revolution" helps viewers to understand what the famous astronomer discovered and how he changed the perception of the universe. In the springtime, we introduced the film "We are the Guardians", about the possibility of using satellites for taking environmental action. In September came the premiere of the film "Voyager: The Never-ending Journey", about the twin probes traversing the depths of the Solar System, followed in November by "Explore", about humanity's conquest of space. We also have two new animations for the youngest groups: "3-2-1 START!" and "The Enchanted Globe". The first film tells the story of Edwin the hamster who decides to become a scientist and fly out into Earth orbit. The second explains to children what the cyclical changing of the seasons is really all about.



Cybershow 2517 takes us into the future.



Part of the "Copernican Revolution" show draws attention to many details in the famous painting by Jan Matejko.



A concert by Violinofonica, featuring two cellists.

Throughout the year, the planetarium also continued to host "Straight from the Sky" lectures and concerts, where we introduced a new series called "Supernova" – promoting young artists playing alternative music.

Concerts Under the Stars – invited artists

Piotr Grinholc, Rosa Vertov, Maria Gabryś-Heyke and Wiesław Komasa, Ae Ran Kim and Jong-yun Choi, Tournion Chamber Choir and SWPS University Choir, Chihiro Deguchi, Aleksandra Hurkała, Marcin Łukaszewski

Jazz Orbit series

RGG "Experiment 15K", Interplay Jazz Duo, Monika Urlik, Interplay Jazz Duo, Andrew Imierowicz, Group in Composition

Cosmic Live Electronic series

Andrey Karalov and Jerzy Przeździecki, Celestial Frequencies, GG.Violin, iN.Tr.El., Tomasz Pauszek

Supernova cycle

Youth Novels, Ignu

Special concerts

Where is Laura Palmer – Badalamenti Music, New Year's Concert: Violinofonica

“Straight from the Sky” lectures: Topics and experts

- The revolution of the James Webb Space Telescope (Dr Łukasz Tychoniec)
- Copernicus – Europe’s satellite eyes (Dr Andrzej Kotarba)
- Mission to Jupiter and its moons (Dr Tomasz Barciński)
- The accelerating, expanding universe (Bharat Ratra)
- A guide for discoverers of comets and asteroids (Michał Kusiak)
- Extreme weather events – today and in the future (Joanna Wibig)
- Nicolaus Copernicus – what kind of astronomer was he? (Prof. Jarosław Włodarczyk)
- At the mercy of the sun (Dr Marek Stęślicki)
- Taming black holes (Prof Agata Różańska)

Aside from the new additions to the repertoire, the Planetarium also acquired new equipment – a modern projector for presentations on the dome and a system for laser shows, opening up completely new possibilities for creators, including drawing shapes on the screen and creating atmospheric effects around the audience. The first shows using the new equipment took place in December. We also expanded our disk system (for storing full-dome films) and purchased servers to enable rapid production of in-house shows. Work is ongoing on updating the Megastar star projector, and a new moon projector is also being produced.

The advances in planetarium technology and purchase of new films were funded under the “Science for You” programme.

Our Planetarium hosted a wedding! It was the kind of ceremony Mari and Piotr always dreamed of. The bride entered the room to the tune of the Imperial March, and the master of ceremonies was a real pilot. Before the vows were said, he asked the guests to fasten their seatbelts, and we took them on a journey to other galaxies as part of a specially prepared mini-show. The bride is Estonian, the groom Polish, so the wedding vows resounded in Estonian, Polish, and English.

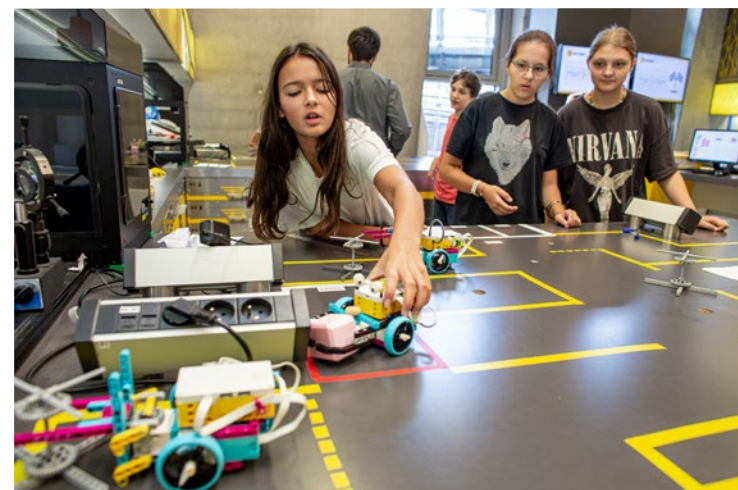
Lab Activities

On weekdays, our labs are dominated by school groups. In chemistry, students learned about the properties of the three components of air: nitrogen, oxygen, and carbon dioxide. They checked what happens to them when it gets very cold and very hot. Participants in the physics lab also focused on extreme cold, learning about superconductors and studying how temperature affects materials in different states. They also discovered some surprising properties of materials that are still the subject of research by scientists worldwide. In the robotics lab, students could build a robot from scratch and learn to communicate with it, and in the biology lab they could observe human cells and tissues under a microscope.

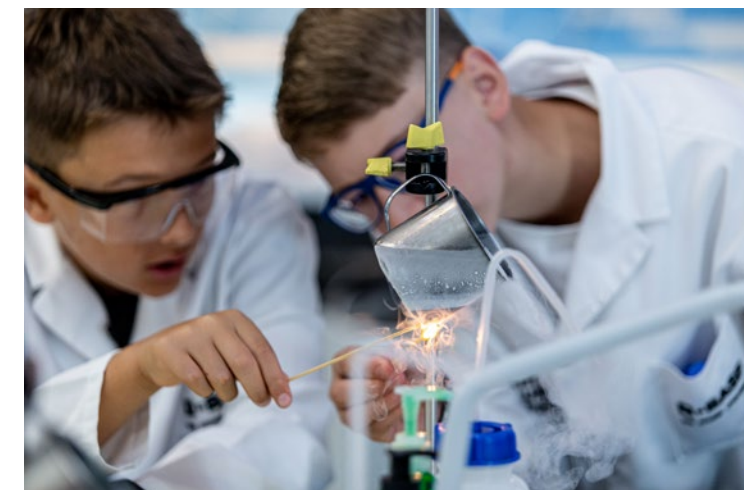
On Saturdays and Sundays, lab activities were available for individual visitors. They could experiment at research stations, including concocting natural paints from fruits, vegetables, and spices (chemistry lab), learning about the characteristic features of the human skeleton (biology lab), lifting the Earth (robotics lab), and exploring the secrets of luminescence (physics lab).

In 2023, the focus of our Laboratory team was on outfitting the new Copernican Revolution Lab building. We now know our new infrastructure inside out – from the complex procedures of its acquisition to installations, from eye wash stations to fume hoods. Due to the launch of the Copernican Revolution Lab building, the number of laboratory activities we conduct has decreased. In total, 14,543 students participated in group lab activities, and 34,918 individuals engaged in lab activities directed at individual recipients. This is less than in previous years, but we do plan to catch up!

The year 2024 is set to be a new beginning for us. We plan to launch three new programme lines in our Laboratories. “Education about the Planet” will be integrated into our existing biology and chemistry labs. In the physics and robotics labs, we will conduct “Education about New Technologies”. The EduFactory, our educational FabLab, will become our space of wonder, hosting Art&Science workshops. Overall, the new lab activities we offer our audiences will be prototyped in the Copernican Revolution Lab facility, which is fully prepared for making this a success.



Robots built during lab classes are put to the test in a race.



How do high and low temperatures affect the gases that make up air?

Tinkering for Younger Kids

Teachers of grades 1–3 reported that they sensed a lack of activities for the youngest school students at Copernicus. To provide them with additional attractions related to visiting the Exhibitions, we prepared a special workshop in the Thinkatorium tinkering space. Children helped us prototype it. “Building Music” is an activity linked to the temporary exhibition “We Play – We Win”. In the course of 45 minutes, children construct a musical machine that should be able to produce several different sounds. They do not have to start from scratch. At the workstations, there find the basic elements of various machines, including the Playing Incline, Cardboard Tubes, Musical Carousel, and Magnetic Music Wall. Children add the “sound” elements, which they previously search for among the available recycled resources – cans, metal boxes, pieces of wood, cutlery, paper clips, metal sheets, rubber bands, clips, etc. At the end, each group presents its machine and talks about it.

Workshop participants include both school students and their teachers. While children work in groups and explore the world of sounds, we encourage teachers to help facilitate their activities. Sometimes they get swept away just as much as their pupils and construct music machines themselves.

In addition to standard school groups, Thinkatorium workshops were attended by children from disability-integrated schools (one group included just as many carers as children), children on the autism spectrum, and children with intellectual disabilities. There are also individuals accompanied by additional carers. Sometimes children prefer to work individually or need noise-cancelling headphones. We do our best to approach each group flexibly.

In 2023, 167 Thinkatorium workshops were held for groups of up to 30 people.



Each of these objects can become a musical instrument. Which one to pick?



Tuning up a music-box.



How does this instrument work? Perhaps only its creators know...



This is presumably a percussion instrument in the making.

Summer at the Studio

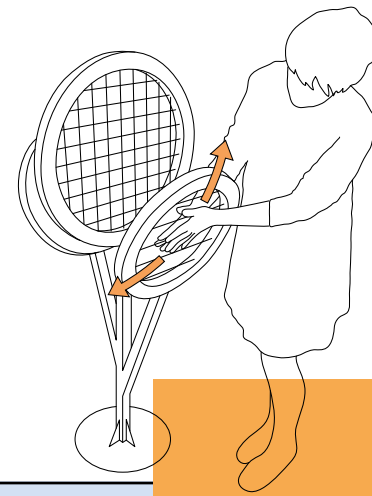
Our EduFactory educational FabLab has changed location and is now situated in the new building of the Copernican Revolution Lab (more on page 78). We tested out the potential of the new space during our summer activities for teens. Their participants had three hours to construct telescopes or headlamps. Everyone worked on their own project, using materials and tools provided by us. It was plainly evident that the children enjoyed tinkering. When asked for their opinion, they spoke positively about the activity. They added that in the future they would like to have access to more precise instructions and the possibility to personalise their work.

We held 37 FabLab workshops (in July and August) with 398 participants.



With just a bit of instruction, using a drill turns out to be not so difficult.

We are providing local communities with exhibitions and activities.



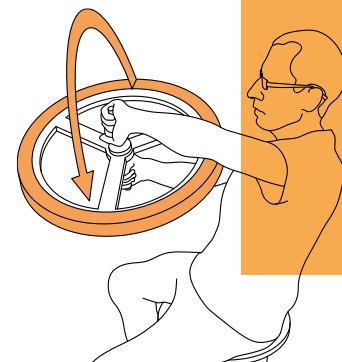
The SOWA initiative

The SOWA initiative aims to develop a nationwide network of local mini science centres, harnessing our best experience with educational exhibitions. Each of the SOWA "Zones of Discovery, Imagination, and Activity" include nearly 20 interactive exhibits plus a Thinkatorium space for undertaking tinkering challenges. These small centres are being set up all over the country (in towns with up to 150,000 inhabitants), on the premises of various existing cultural and science-educational institutions that have the popularisation of science, technology, education, art and culture as part of their statutory or programme activities. They are intended to bolster the scientific capital of local young people, help them develop a sense of agency and build twenty-first-century skills.

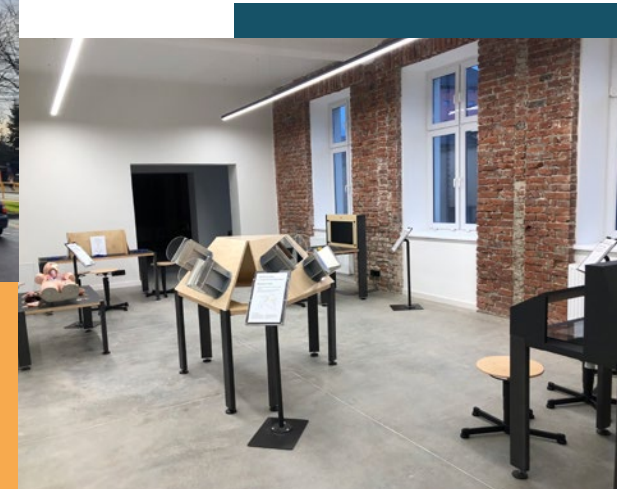
In 2023, we opened 13 SOWA zones. Adding these to the 17 that launched operations in 2022 plus the first 2 that opened up back in 2021, we can now announce that the task of creating 32 SOWA zones in the years 2021-2023 has been completed. However, every end is also a new beginning – in November, we signed a new agreement with the Polish Ministry of Education and Science to continue developing the SOWA Network for another 5 years. Under the agreement, 18 more SOWA zones will be established. Sixteen of the locations have already been selected in the recruitment process: the towns of Lubin, Sieradz, Tczew, Kowary, Złoty Stok, Złotoryja, Nowe Skalmierzyce, Ciechanów, Rygllice, Międzyrzecz Podlaski, Bydgoszcz, Wieluń, Uniejów, Opole, Orzysz, and Żory. The agreement also provides for the development of cooperation within the network and support for the current partners, as well as expanding the existing exhibitions with additional exhibits.

For each SOWA zone, we provide interactive exhibitions plus equipment for the workshop area – the "Thinkatorium". We also offer consulting, training, and full-service support. Although we equip all of them with similar sets of exhibits, each SOWA zone has a unique character due to the activities conducted by its parent institution. Our experience shows that the chance to engage in independent experimentation is nicely complementary to the traditional activities of libraries, cultural centres, museums, and educational institutions.

In 2023, the local SOWA zones were visited by a total of 184,930 people.



The SOWA zone in the town of Sanok is situated in the newly opened Mediateka, part of the Municipal Public Library. The building underwent a thorough renovation and revitalization – it used to be a school. Now, the SOWA zone's nearest neighbour a Retro Games Zone.



The restored railway station building in Wadowice, in turn, has been transformed into a Culture Station, which conceals a modern interior behind a traditional Galician façade. This is now home to a SOWA zone. If visitors become weary of experimenting, they can unwind in the adjacent relaxation area.

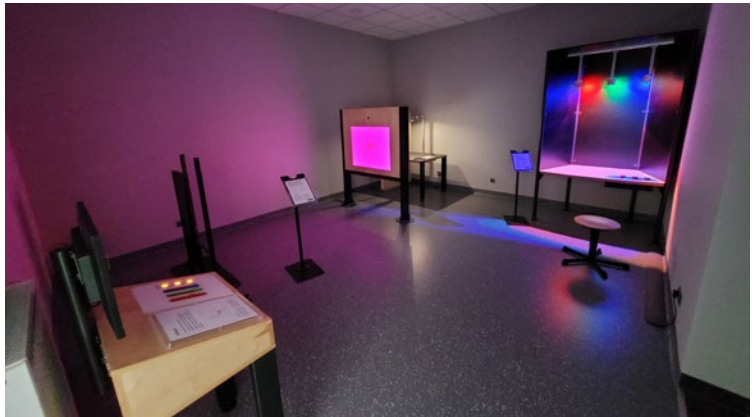
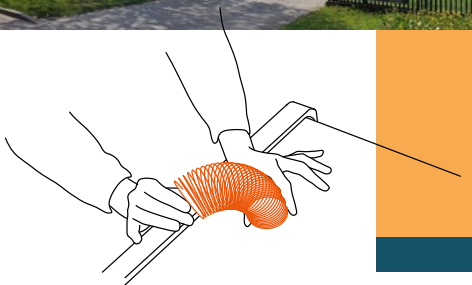


The Public Library in the town of Rawicz oversees the local SOWA zone there, located in the Multibiblioteka. This place attracts residents from the entire city – they can utilize the exhibition space and Thinkatorium for free, borrow books, spend time in the Multimedia, PlayStation 5, and VR zones, and also play board games.





The Municipal and Communal Cultural Centre in Drohiczyn is engaged in a broad and diverse range of activities. The institution runs the Nadbużańskie Kayak Tourism Centre, an Antique Motorcycles Exhibition, the "Zagubek" Local Product Promotion Centre, and the "Puszczyk" Ecological Education Centre, as well as a SOWA zone. All these sites are not adjacent to each other, but thanks to efficient transport links tourists can move smoothly from one location to another.



In the town of Gniezno, the SOWA zone has found a home at "Stolica eXperimentu", a modern educational centre for children, teens and adults. The underlying mission of this place is to instil a fascination for engineering and technology.



Gdzie są SOWY



Once a SOWA zone has opened, this does not mean the end of our cooperation. On the contrary, this is just beginning. We at Copernicus are keen to have these institutions jointly organise events with us, to promote science and to conduct or support educational activities in schools in their regions. You can find out more about our cooperation with the institutions already in operation on page 44.

The total budget of the SOWA programme (covering the years 2021-28) will come to PLN 147,755,949.98. This sum includes both operating costs (e.g. personnel, infrastructure, promotional) and capital expenditure (e.g. the costs of producing, purchasing, installing exhibits).

The "SOWA – Zones of Discovery, Imagination and Activity" initiative is funded by a subsidy from the Polish Minister of Science, under "Agreement No. 1/CNK-SOWA/2021 of 2 March 2021 on the Launch of 50 SOWA Zones of Discovery, Imagination and Activity by the Copernicus Science Centre in the Years 2021–2028".

“Science for You” programme

The “Science for You” programme allows us to reach nearly 66,000 school students in small towns and cities across the country with mobile exhibitions (the Educobus and the “For Math’s Sake!” exhibition) as well as a mobile planetarium (the Planetobus). Its aim is to promote hands-on and engaging teaching methods, to pique students’ cognitive curiosity and interest in the development of science, and to encourage families to experiment together.

In 2023, we visited 158 towns where residents have limited access to science centres. The Educobus went on tour 49 times, the Planetobus 60 times, and the “For Math’s Sake!” exhibition 65 times. With the objective of reducing CO² emissions firmly in mind, we tried to stop at multiple locations during a single trip – and managed to do so ten times.

The “For Math’s Sake!” exhibition, created in 2022, had its debut season. It consists of 22 exhibits exhibiting the grand beauty of the mathematical rules hidden in nature. It is divided up into three thematic groups: applied mathematics, foundations of mathematics, and recreational mathematics. The recruitment of schools willing to host the exhibition started in February 2023. In just 9 days, 263 applications were received! “For Math’s Sake!” first hit the road on March 15, visiting the Stanisław Moniuszko Primary School in the town of Łajski. Among the exhibits, the most popular are “Walk with a Function”, “Perfect Asymmetry”, and “Build an Arch”. As part of research work, a pilot scenario for school group activities was conducted, which develops students’ interest and knowledge on selected topics discussed at the exhibition (more on page 61). The exhibition made an appearance at the Polish Institute in Berlin, where it could be enjoyed by participants of the “Long Night of the Sciences” in Berlin.



Math can be found reflected in architecture, for instance.



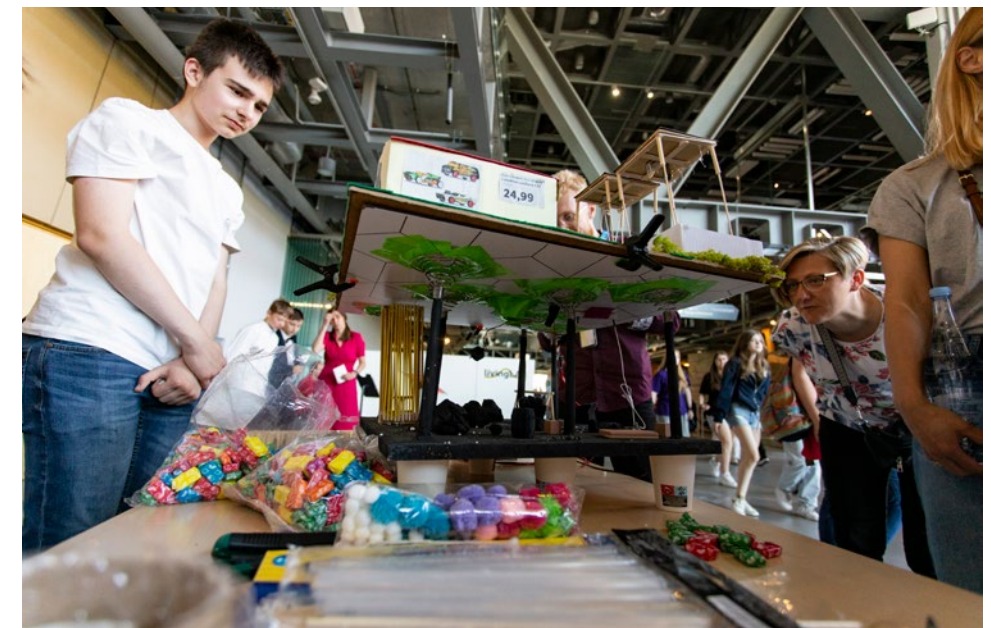
The “For Math’s Sake!” exhibition at the “Long Night of the Sciences” in Berlin.



The mobile planetarium fits inside a school gym.

The “Science for You at Home” activities show parents, other family members, teachers, educators, and facilitators how to wisely accompany children during experimentation. In 2023, we conducted 40 workshops at 20 institutions: schools, libraries, cultural centres, and SOWA zones. We visited a total of 11 voivodeships, choosing towns inhabited by less than 130,000 residents with limited access to science centres. During the engaging activities, we tried to show that awakening people’s curiosity is more important than conveying knowledge. A total of 418 people participated in the workshops. We distributed a total of 437 sets for family experimentation, containing proposals for home experiments, materials needed to perform them, and pedagogical tips on how to constructively accompany children as they discover the world around them.

Every year we organize a competition for new educational aids, in which teams consisting of primary-school students and teachers participate. In 2023, a total of 58 teams registered. The twelve teams best-rated by the jury (a total of 84 people) participated in weekend workshops entitled “Educational aids from scratch”, helping them to bring their projects to completion. Five teams competed in the finals. The winners received awards at a final gala and also presented their educational aids to visitors in our exhibition space.



The “Shock Project” – helps students understand the phenomenon of tectonic movements (Omega primary school in Katowice).



"House Full of Science" – a model of an interactive eco-house (Primary School no. 43 in Kraków).



"The Bubbleator" – a bubble generator (Primary School no. 38 in Sosnowiec)



"Computer plant growth control station" – allows the soil moisture level of plants and other parameters to be monitored (Primary School no. 98 in Krakow).



"Mobile bio greenhouse" – studies the impact of the Sun and artificial light on the growth time of plants (Primary School in Dobrowo).

Participants of the Prototyping Schools also had a chance to present exhibits they themselves had developed to our visitors. The Mathematical Prototyping School was attended by 20 teachers and educators, whose task was to construct educational solutions (mini experimental stations, school exhibits, educational aids) helpful in understanding mathematics. Six prototypes were created: "In Search of Symmetry" – a device for checking symmetry, "Sharp Cut" facilitating the cross-sectioning of a pyramid, "MultiMat" and "1 out of 10" – educational aids for a young audience, "10 = 1010" – an exhibit about different number systems, and "Cubic Meter" – a device for measuring the volume of solids.

The Summer Prototyping School next gathered another 20 people. This time they created original educational aids by following the principles of the scientific method. Our visitors had the chance to test the 8 prototypes: "Binary Abacus", "Become a Volleyball Player", "Illusion Fever", "Do You Gear?", "Flat Sphere", "Pixelitis", "Find the Treasure", "Straighteners and Benders".

The stations featuring the Summer Prototyping School exhibits attracted a lot of interest within our exhibition space, where they were enthusiastically promoted by the creators themselves.



The Summer Prototyping School: working on a project often sparks excited discussion.



Building a prototype of a "Flat Sphere".



Presenting the prototype of "Fever of Illusions".



"Binary Abacus" in our Exhibition space.

"Science for You", a joint programme of the Polish Minister of Education and Science and the Copernicus Science Centre, is funded by a subsidy from the Minister of Education and Science based on the Agreement of March 6, 2020, No. 1/CNK-NAUKOBUS/2020. In 2023, as part of the "Science for You" Programme, activities such as "Educobus", "Planetobus", "For Math's Sake!", and the 26th Science Picnic of Polish Radio and Copernicus Science Centre were carried out.

We support the development of the competences of the future.

The real school is the world around us. The best way to acquire knowledge and skills is to follow one's own curiosity, through observation, experiments, and solving the problems posed by life. Therefore, the role played by institutions other than schools involved in non-formal education – including museums, science centres, libraries, clubs, associations – is invaluable in the education process. The diverse activities of such institutions make up a complex and rich ecosystem.

We want the idea of an "open school", where the world can be discovered through experimentation, to become widespread and reach the furthest corners of our country, as well as far beyond its borders. We want school students, teachers, and educators, non-governmental organizations, teacher development centres, cultural institutions, and local governments to be both participants in and beneficiaries of modern education. We are seeking partners – joining existing networks and creating new ones.

To better understand the mechanisms of learning and the needs of school students, we are engaged in R&D activities together with partners at the Copernican Revolution Lab. The findings are useful in designing better educational aids, educational sets, and lesson plans.

To mark the 550th anniversary of the birth of our patron, Nicolaus Copernicus, we have established the "Revolutions" award, which we will grant annually to innovative educational initiatives. The name of the award refers to Copernicus' discovery of the heliocentric structure of the Solar System, which not only touched off a revolution in astronomy but also initiated a profound change in thinking about the world and humankind's place in it. Over 100 years ago, the American education reformer John Dewey called for a similar Copernican revolution in education, whereby "the child becomes the sun about which the appliances of education revolve". Despite the passage of time, the goal he set has not yet been achieved.

We are aware of the many innovative educational projects taking place across Poland. While some gain widespread attention, others unfold more quietly. Our aim is to acknowledge these efforts, turning them into a source of inspiration for others. We plan to recognize and honour the creators of educational revolutions both small and large, whether they take place in schools or at home, in virtual spaces or the real world, involving children or adults, local or broader communities, across a wide range of

topics or formats. We want to spotlight teams and individuals whose innovative ideas and dedicated efforts are making a significant impact. Furthermore, we hope that the "Revolutions" award will help spark dialogue within the community that is passionate about advancing modern methods and forms of learning, thereby shaping the future of education.

What kind of initiatives are we looking for?

- bold, innovative and subversive,
- engaging and inspiring,
- addressing socially relevant and topical issues,
- supporting independent thinking and the ability to work together,
- involving different groups of people.

Who can apply?

- individuals / teams of such individuals, working in schools, foundations, associations, start-ups, cultural institutions or on their own,
- non-governmental organisations (e.g. foundations, associations),
- organisational units forming part of the education system (e.g. schools),
- state or local government cultural institutions,
- universities.

Anyone can nominate their own initiative for consideration, as well as the projects of others.



NAGRODA
PRZEWROTY

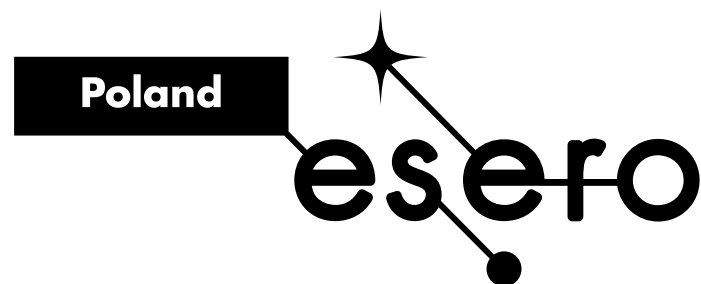
We are developing a networked learning community.

The quality of education is largely determined by competent and committed educators. Their capabilities increase when they join together in larger communities and collaborate through networks. By working collectively, they can extend their reach, adopt best practices, and avoid repeating past mistakes. We are actively fostering the growth of a number of networks and striving to interconnect them.

Within the Young Explorer Clubs (YEC) network, club members alongside their mentors engage in hands-on learning and exploration of the world. We are continuously facilitating the establishment of new clubs, both in Poland and internationally. Further details about YECs can be found on page 38.



The European Space Agency's ESERO programme (more on page 48), includes national and global competitions, challenges and workshops designed to inspire young people to choose engineering or science-related careers. ESERO ambassadors are educators working locally and collaboratively. Some of them run YEC clubs, others have participated in ESERO programme competitions or organize original popularisation programmes.



SOWA, our newest network, currently includes 32 small science centres (additional information on pages 24 and 44). These "Discovery, Imagination, and Activity Zones" (Polish abbreviation: SOWA) are integrated into existing facilities in towns with populations up to 150,000, such as museums, libraries, community centres, and schools. While some of these institutions have prior experience with hands-on experimentation and making-based activities, others are newcomers to this approach. The SOWA network provides local communities with access to Copernicus' educational programmes and collaborates to develop new ones.



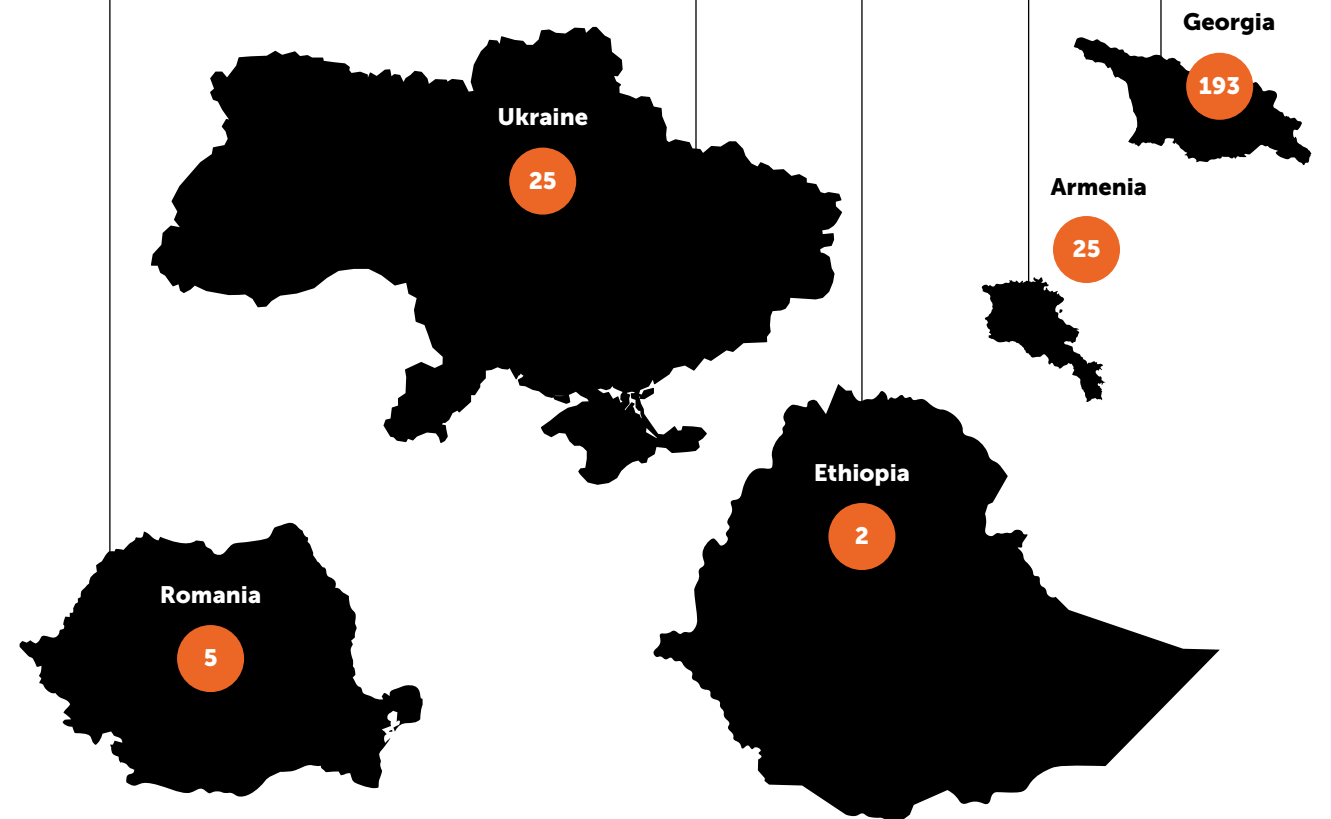
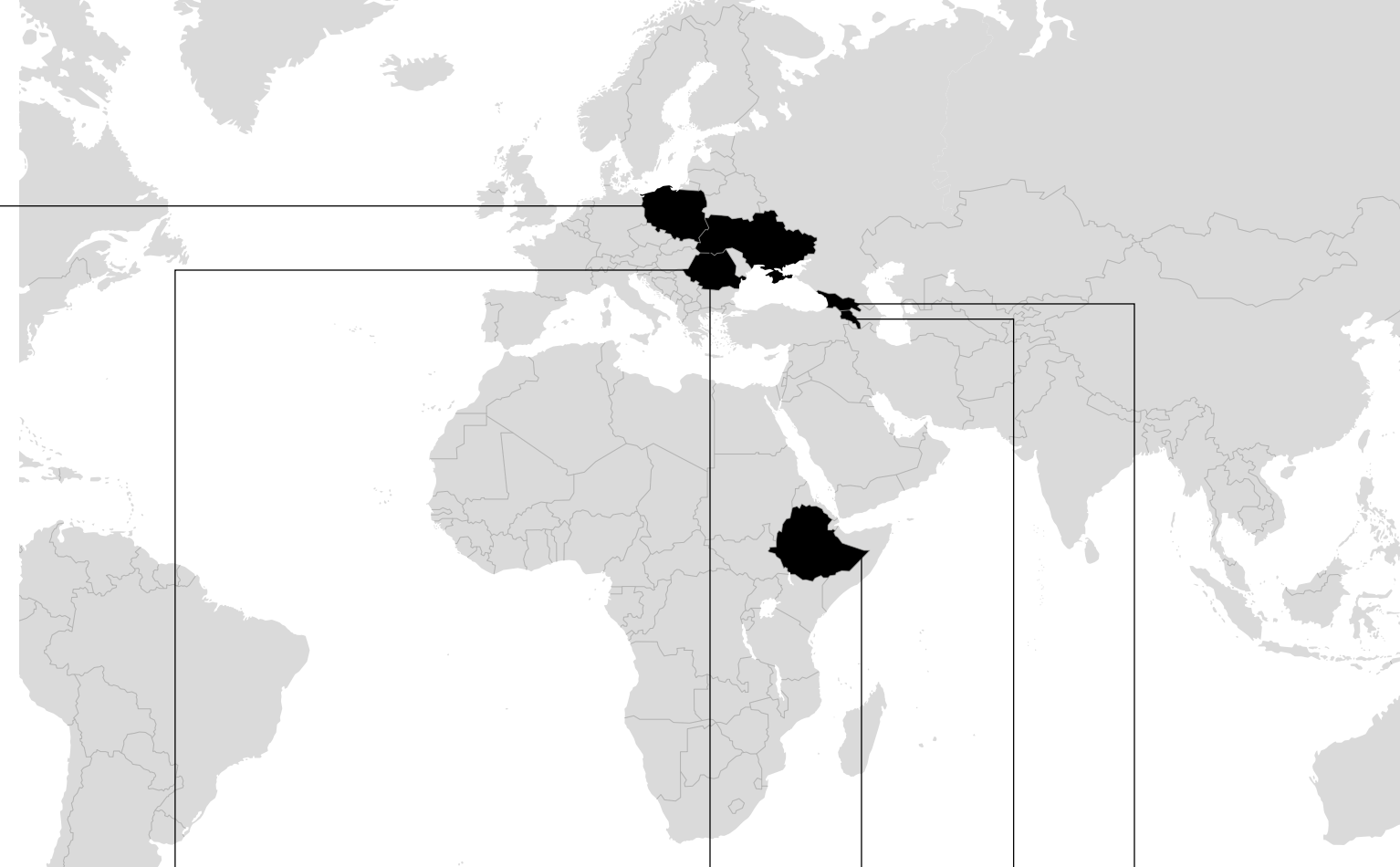
The "Science for You" programme (more details on page 28) links together all the points on the map of our networks and plays a crucial role in initiating new connections. Its initiatives like the Educobus, Planetobus, and the "For Math's Sake!" exhibition reach the remotest areas of Poland, sparking scientific curiosity and a passion for experimentation among future members of our community.

Nauka dla Ciebie

Our networks: in Poland and abroad



- Young Explorer's Clubs
- SOWA sites
- "Science for You" visits
- ESERO ambassadors



International Young Explorer's Club (YEC) programme

The Young Explorer's Clubs (YECs) provide an enriching extracurricular educational experience for children and youth, facilitating a collaborative and personal journey into the world of science. Club members engage in hands-on experiments under the guidance of mentors, not only gaining knowledge but also honing their skills at communication, logical thinking, creativity, and teamwork. As of November 2023, the YEC network proudly encompasses 1,000 clubs throughout Poland plus an additional 250 internationally, including 30 in Armenia, 200 in Georgia, 20 in Ukraine, and 2 in Romania.

Our network of Young Explorer Clubs is a vibrant tapestry of diverse learning communities, bringing together school students, tutors, and partners from both Poland and beyond. We emphasize the sharing of experiences among participants, offering them avenues to engage with other Copernicus programmes. Our focus is on fostering proficiency, encouraging independent learning, and also facilitating learning from one another. We also actively support the development of skills among YEC coordinators, tutors, teachers, and other educators, as well as students.

Collaboration is key

The expansion and vitality of our network hinge on the dedication and initiatives of our regional YEC partners. These partners maintain close connections with their local clubs, energizing their activities and collaborating with mentors. Through our annual "YEC Regions" grant competition, partners have the opportunity to secure funding for their unique projects. In 2023, four institutions successfully obtained such grants, enabling them to organize a variety of activities that enriched the YEC community. Additionally, regional partners play a pivotal role in planning and conducting inclusive events as part of the "Together for a Better Future" initiative (details on page 62).

The "YEC Trainer School" aimed to prepare individuals to lead start-up workshops for new club mentors. This programme saw participation from twenty-three trainers, educators, and methodological advisors, nominated by partners from various regions including Białystok, Kalisz, Chełm, Katowice, Kielce, Bydgoszcz, and Olsztyn, who all engaged in comprehensive training sessions.



Participants of this year's "YEC Trainer School".

YEC regional partners

Poland: ExploRes Association, Rzeszów • Youth Astronomical Observatory, Niepołomice • Teacher Training Centre in Olsztyn • Łódź Children's University (Łódź University of Technology) • State School of Higher Education in Chełm • Complex of Technical Schools and the Vocational and Continuing Education Centre in Leszno • Wrocław University of Technology • University of Białystok • Silesian Centre for Education and Interdisciplinary Research in Chorzów • Vocational Education and Training Centre in Kalisz • WSB Merito University • Kazimierz Wielki University in Bydgoszcz

From 2023: Kepler Science Centre and Venus Planetarium in Zielona Góra (Zielona Góra Cultural Centre) • Pomeranian Centre for Teacher Education in Gdansk (trilateral agreement with WSB Merito University) • Teacher Training Centre in Kielce • Piotrków Trybunalski Municipal Public Library (trilateral agreement with Łódź University of Technology – Children's University of Łódź) • Teacher Training Centre in Szczecin

Abroad: Ilia State University, Tbilisi, Georgia • Mekelle University, Mekelle, Ethiopia • Lviv Dovzhenka Centre, Ukraine • Science Centre in Ternopil, Ukraine • Byurakan Astrophysical Observatory, Armenia • Jinishian Memorial Foundation, Armenia • Scientifica Association, Romania

From 2023: Junior Academy of Sciences of Ukraine

Club mentor meet-ups

Through the efforts of regional partners, YEC clubs operating nearby get to know each other and establish cooperative ties. We are also keen to initiate contacts between clubs from different regions and direct contact between their mentors. In 2023, we invited them to the Copernicus Science Centre for four workshops attended by 55 people. Additionally, workshops for new YEC mentors were organized in Romania (Cluj-Napoca) and Armenia (Yerevan). Notably, the Armenian workshop featured a Georgian trainer making her debut in this role; her successful involvement led to her joining Georgia's YEC trainers' network. Overall, we provided training for nearly 50 teachers, educators, and trainers from abroad.



In Yerevan (Armenia) we visited one of the local clubs.

Club mentors from Poland and abroad are helped to develop their competences by means of webinars in the “YEC Academy” series, enabling them to share experiences and best practices. In 2023, we successfully conducted 10 webinars, with roughly 340 attendees in total. The success of these webinars is particularly noteworthy, given the complexities involved – like providing live translation for the diverse languages of participants, accommodating different time zones, syncing with various school calendars, and considering religious and national holidays. Additionally, we carefully think about the accessibility of materials needed for experiments (e.g. Will everyone be able to prepare red cabbage juice at home?).

YEC Academy activities		
month	topic	participants
January	The mysterious world of fluorescence	Poland/Ukraine
February	Measurements and what comes next	Poland/Georgia
March	Climate IBSE	Poland/Armenia/Romania
April	Almost anything can be measured	Poland/Ukraine
May	How we learn at YEC	Poland/Georgia
June	With and without tools	Poland/Armenia/Romania
September	From observation to measurement	Poland/Ukraine
November	The power of words	Poland/Georgia
December	Can measurements be trusted?	Poland/Armenia/Romania

Club member meet-ups

The most exhilarating and inspiring YEC events, however, are undoubtedly the meet-ups with club members. Each year, we extend an invitation to the clubs to participate in the Science Picnic of Polish Radio and the Copernicus Science Centre (details on page 69), which this year boasted significant international representation. We welcomed 6 clubs from Poland and 6 from abroad, including Ukraine, Georgia, Romania, and Armenia. Their diverse presence enabled us to inaugurate the Picnic in five languages. For many children, it was their first journey to Warsaw, and for many those from abroad, it marked their first-ever trip outside their home country. In our dedicated tent, club members showcased their prepared experiments, attracting a constant stream of curious onlookers. In total, 60 YEC participants contributed to the success of the Picnic.



Opening of the Science Picnic involving club members.



The YEC team had its own stands under our tent.

In a splendid display of scientific enthusiasm, 8 clubs from Warsaw organized their own science picnic in the spring. They set up over a dozen stands featuring experiments on the senses, optics, waves, colours, and sounds, creating an engaging and educational atmosphere.

Every year, clubs from the Mazovia province have the chance to engage in the “YEC Researchers” initiative, which involves conducting research projects centred around a specific theme. In 2023, the focus was on corrosion. The “Nature Explorers” club observed how beans grow in a corroded steel container. The “Babiniaki” club compared the corrosion rates of nails at room temperature and low temperatures. The “That’s How It Went”, “Rainbow Unicorns”, and “#laboratory” clubs experimented with various methods to protect metals from corrosion. A total of 20 clubs participated in these insightful research activities.

The “YEC Champions” competition is an open contest celebrating the most dedicated clubs. In Poland, 5 winning clubs received prizes of PLN 1,700 each. International mentors from Georgia, Ukraine, Armenia, and Romania were awarded non-monetary prizes. In total, 11 mentors from 5 countries, predominantly from smaller towns, were recognized for their outstanding contributions.



During the poster session, participants presented their own poster.



Every poster stood out in its own way.

What have the clubs been doing?

We designed modifications to the SOWA exhibits, including new patterns for drawing in the mirror.

We hunted for agates in an abandoned Permian basalt quarry. We also engaged in stonemasonry workshops and polishing of the stones we found.

We have divided the space around the school into four zones: a sports area (for exercise), a sensory zone (for exploring materials with different textures), an educational zone (featuring a vegetable garden) and a recreational space (with watering stations and hotels for insects).

We want to initiate the creation of rest areas in the school for students with disabilities. There they could enjoy special puffy armchairs, listen to calming music, and relax using sensory cushions, headrests, stuffed animals.

We've become adept at crafting homemade cosmetics. We have already managed to prepare hand and body scrubs, hair mask, cleansing and nourishing face masks, and bath balls.

We have set up a culture of Californian earthworms in our composter, feeding them plant waste generated at school. The earthworms produce valuable biohumus, which we will use in the spring.

We have a garden where we grow raspberries (3 varieties: red, yellow and black), currants, gooseberries, blueberries, Kamchatka berries, and blackberries. This season we successfully grew cherry tomatoes, peppers and pumpkins in the greenhouse for the first time.

We organise walking rallies in the nearby vicinity and support community projects, such as building insect houses in the park, creating flower meadows and creating box gardens for growing vegetables.

We wanted to find out why local apiaries were producing less honey. We built a prototype hive in an old fridge, which provides very good thermal insulation. We installed a router inside to transmit sensor data. We also want to share live camera feeds from the hive for anyone interested in observing our bees.

We examined lupulin from the fruiting bodies of common hops, trying to answer the question: What gives flavour to beer?

We built simple devices to test the weather. We made barometers (e.g. out of a balloon and a can, another out of a glass bottle), an anemometer (using paper cups), a humidity meter (using a human hair), a psychrometer (using milk cartons and thermometers), a wind meter (using a string), a rain gauge (out of a PET bottle).

We investigated how seatbelts work by building cars out of Lego bricks and putting them through crash tests. The pupils took the results of the project very much to heart and promised to make sure their family members wear their seatbelts when driving.

We built our own planetarium using recycled cardboard sheets sourced from big-box store packaging.

Our smart home project including creating twilight lights with RGB LEDs and photoresistors, servos for opening and closing the garage door, temperature sensors, distance sensors, an audible and visual burglar alarm.

We developed a pollution measuring device to monitor air quality. It evaluates the amount of dust and smoke, automatically activating a purification system when needed.

For years, we have been involved in various asteroid search projects. We have discovered a number of objects in space that are now being further investigated by professionals.

We make parachutes using household items such as plastic bags, ribbons, and cups.

The older members have launched a mini-YEC initiative for younger students (grades 1–3), organizing peer tutoring sessions on a monthly basis.

Twelfth YEC Forum

In November 2023, the annual YEC Forum brought together 325 individuals from 9 countries, conversing in 10 languages. The gathering was a vibrant assembly of 190 mentors, 10 translators, 17 volunteers, 3 interns, representatives from 16 Polish partner institutions and 8 international ones, along with 3 national partners and 3 donors. Each participant, in their day-to-day life, engages with just a segment of the broader network – their own club or partner institution. The YEC Forum offers a unique chance to view our community through a wider lens and truly feel a part of this expansive network.

The Forum was a melting pot of diversity, creativity, and potential. This was underscored by the presence of 133 exhibitors. For the first time in the programme's history, we managed to bring together partners and mentors from every country in the YEC network, including Armenia, Georgia, Romania, and Ukraine. We also welcomed representatives from partner institutions in Ethiopia, Israel, and Cuba. The focus of the event was on fostering cooperation and effective teamwork, which are essential in club environments. Such collaboration enhances experimental activities, transcending the personal skill development of individual club members or tutors. It cultivates a community united by shared experiments – starting with club members and mentors, then extending to parents, schools, and eventually to local businesses, authorities, institutions, and universities. With the participation of so many dedicated individuals, each of the thousands of clubs, both in Poland and internationally, becomes a catalyst for significant change, nurturing citizens who are independent, critical thinkers, and proactive. "Thanks to the Young Explorer Club, even a small village in a remote country can become the whole world", remarked Karen Martirosyan, a YEC mentor from the mountain village of Bayandur in Armenia, at this year's YEC Forum.

Young Explorer Club programme partners

Strategic partner

Polish-American Freedom Foundation

Polish-American Freedom Foundation

National Children's Fund • German-Polish Youth Office • Good Education Foundation

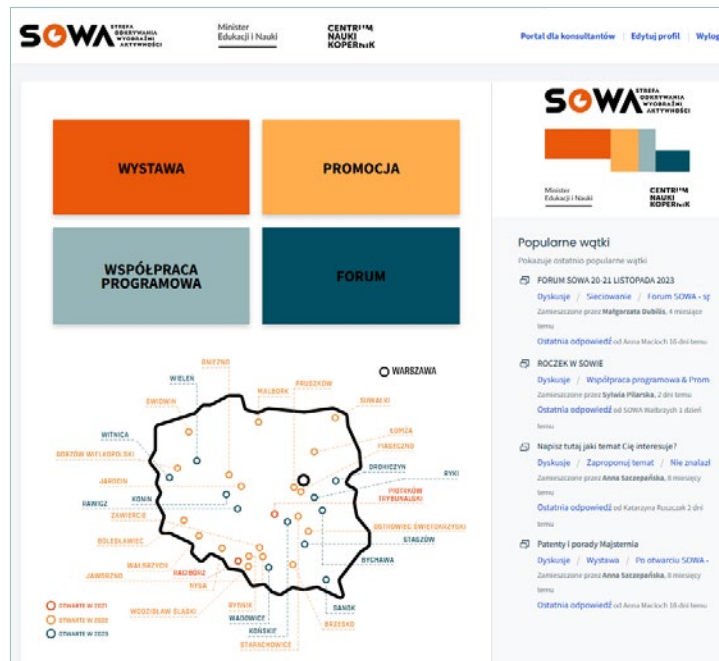
Programme development partner abroad

HumanDoc Foundation

In 2023, the YEC Programme received funding for intercultural integration from the Deloitte Foundation, the United Nations Global Compact, a grant for YEC development abroad from the Education for Democracy Foundation (RITA programme) and a donation from the Foundation of Bank Ochrony Środowiska bank. We also started working with a new YEC Abroad programme development partner, the HumanDOC Foundation, which boasts extensive experience working in an international environment (including in regions where YEC is active), implementing change at a systemic level and a great commitment to supporting Ukrainian refugees in Poland.

SOWA network

The network of SOWA “Zones of Discovery, Imagination, and Activity” has grown to encompass 32 institutions (details on page 24), and there are plans to establish 18 more in the coming years. Beyond preparing exhibits, ordering furnishings, and completing educational kits for the upcoming SOWA zones, we are focused on building an integrated, engaged, and active community. The launch of the “Freshdesk” app in 2022, enhanced with a discussion forum in 2023, has been instrumental in facilitating this, offering a networking platform for all SOWA initiative participants. The forum includes thematic categories covering exhibit content, popularization activities (events, workshops, demonstrations, etc.), technical exhibition management, customer service, communication, and programme activities.



The “Freshdesk” app facilitates the exchange of experience among all SOWA network members.

Our goal is to foster collaboration not only between the host institutions and the Copernicus Science Centre, but also amongst the SOWA host institutions themselves. In 2023, nine online meetings were held for teams from both existing and upcoming SOWA zones. Each meeting focused on a different theme and targeted a specific group of employees, discussing substantive, technical, organizational issues, and opportunities to participate in our programme activities. These meetings have been crucial in developing the skills necessary for active engagement and management at the SOWA zones.

Within the Copernicus exhibition space, we carry out various additional activities (e.g., science demonstrations and workshops) that are well-suited for smaller science centres. Many SOWA zone staff members were unfamiliar with these forms of activities, prompting us to conduct training to enhance their skills in science-communication techniques and standards. We leveraged the experience we gained in conducting the “Copernicus on Wheels” experiments over the years. Starting with simple, quick, and effective experiments requiring minimal equipment seemed ideal. Training sessions took

place in the towns of Racibórz, Malbork, Drohiczyn, Witnica, Starachowice, Jaworzno, and Bolesławiec, with additional sessions on animation standards in Suwałki and Zawiercie.



“Copernicus on Wheels” training in Drohiczyn.



Balloons are the science-communicator’s best friend, serving as the basis for dozens of experiments.

We encouraged the SOWA zones to participate in our programme conferences and special events. In 2023, a SOWA representative from Piotrków Trybunalski attended the Mathematics Prototyping School, and a SOWA employee from Wieleń participated in the Summer Prototyping School. Additionally, six individuals from three SOWA zones attended the “Lay Out, Let Out” educational conference.

We strive to integrate the SOWA zones into our projects, such as the creation and support of Young Explorer Clubs (YECs). In 2023, seven clubs from SOWA zones actively participated in special events and cross-curricular initiatives. A club from Piotrków Trybunalski was involved in the CanSat programme, run by ESERO. YEC mentors from the SOWA Zones took part in the YEC Forum, and the Municipal Public Library in Piotrków Trybunalski became a regional partner in this initiative.

Our mobile exhibitions and planetarium have become regular features at the small science centres. Under the “Science for You” programme, we have visited as many as 20 of the SOWA sites.

“Science for You” initiatives visiting the SOWA sites

Educobus:

Bychawa, Wieleń, Malbork, Wadowice

Planetobus:

Łomża, Witnica, Drohiczyn, Gorzów Wielkopolski, Rawicz, Suwałki, Bolesławiec

“For Math’s Sake!”:

Ostrowiec Świętokrzyski

Pedagogical training:

Piotrków Trybunalski, Gorzów Wielkopolski, Ostrowiec Świętokrzyski, Racibórz, Wodzisław Śląski, Jaworzno, Drohiczyn, Brzesko

We also participated in events organised by the SOWA zones themselves. During the “Festival of Explorers” in Racibórz and the “Science Festival” in Starachowice, we organized workshops on dactyloscopy. Within 3 hours, our Racibórz stand was visited by more than 250 people!



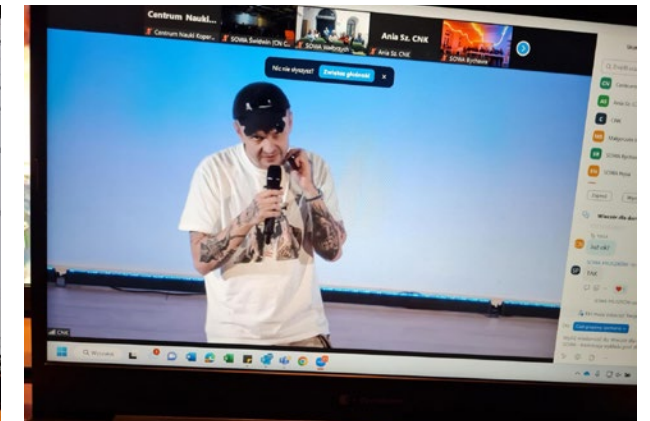
Dactyloscopy workshops work perfectly both indoors (in Raciborz) and outdoors (in Starachowice).

The highly anticipated “Night of the Falling Stars” event, held annually at Copernicus during the peak of the Perseid meteor shower, inspired us to engage the SOWA small science centres in hosting similar astronomical events. Presenters from our Planetarium travelled to Piotrków Trybunalski to join the SOWA staff there in sky-gazing. As added highlight, a live-streamed link was established with the audience in Warsaw. Rawicz also hosted a similar event. The SOWA zones had acquired a telescope for this special occasion, but unfortunately it remained unused due to heavy cloud cover. Instead, participants engaged in indoor star observations using the Stellarium app, complemented by a “Night Sky” workshop that helped attendees identify key points and constellations. The astronomical themes resonated so strongly with the SOWA staff that several volunteered for substantive online consultations with our Planetarium.



The historic first Night of the Falling Stars at the SOWA zone in Piotrków Trybunalski.

SOWA zones also debuted their “After Hours” Evenings for Adults. In November, we piloted a live transmission of a lecture by prominent physicist Prof. Andrzej Dragan during our evening themed “Human 2.0”. The lecture was live-streamed to 9 SOWA locations, captivating the audiences to such an extent that we are considering more streamed events of this type. We hope to have spread our tradition of hosting such evening events.



Our “broadcasting studio” at Copernicus.

In 2023, we formed a partnership with the LEGO Foundation. The SOWA zones received large Play Box brick sets and a collection of lesson plans, along with workshops focusing on play-based learning, collaboration, and creativity. We explored coding on paper, and ultimately constructed a massive track for a rolling ball.

December 2023 saw the third “SOWA Forum”, where we all convened at Copernicus. These days were packed with training and workshops aimed at strengthening competencies and igniting research curiosity. We developed a communication strategy, gained insights into fundraising methods for activities, and shared ideas at a science bazaar. The forum featured field games, various logic and construction kits, unique DIY kits, as well as geology and origami workshops.

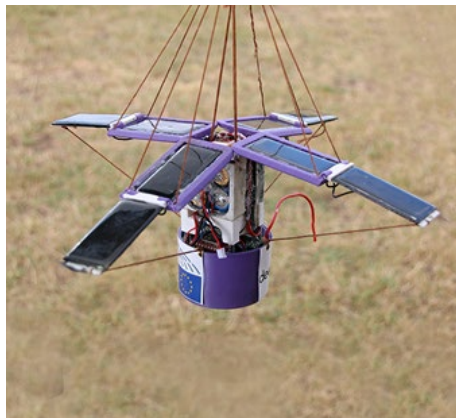
ESERO programme

ESERO is an educational programme of the European Space Agency ESA that targets teachers and students at all educational levels. Our aim is to enhance the teaching of scientific subjects by integrating them with knowledge about space, thereby inspiring young people to pursue future careers in engineering and technology.

At the congress of the Polish Astronomical Society in Toruń, the worrying findings of a University of Wrocław survey of physics, mathematics, and astronomy students were presented. These results indicate declining levels of knowledge and interest in advanced studies among new university entrants. Parental and teacher influence appears crucial in fostering their passions. Hence, sparking interest at an earlier educational stage and showcasing the real opportunities in the space sector is vital. Our experience confirms that there is a place for space science in schools. For instance, a secondary school in Gorlice has successfully run a “physics and astronomy” profile class for several years, attracting numerous applicants annually. Moreover, astronomical observatories are increasingly becoming a lively part of schools. The ESERO activities align perfectly with this educational context. We organize regular competitions that enable children and young people to undertake their own construction and research projects. We also collaborate with teachers to encourage them to incorporate space themes in their lessons.

Annual ESERO competitions for children and young people

- CanSat – independently building space probe simulators and conducting scientific experiments with them.
- Moon Camp – designing a moon base.
- Climate Detectives – finding solutions to local climate problems.
- Astro Pi – creating a computer programme for microgravity research.

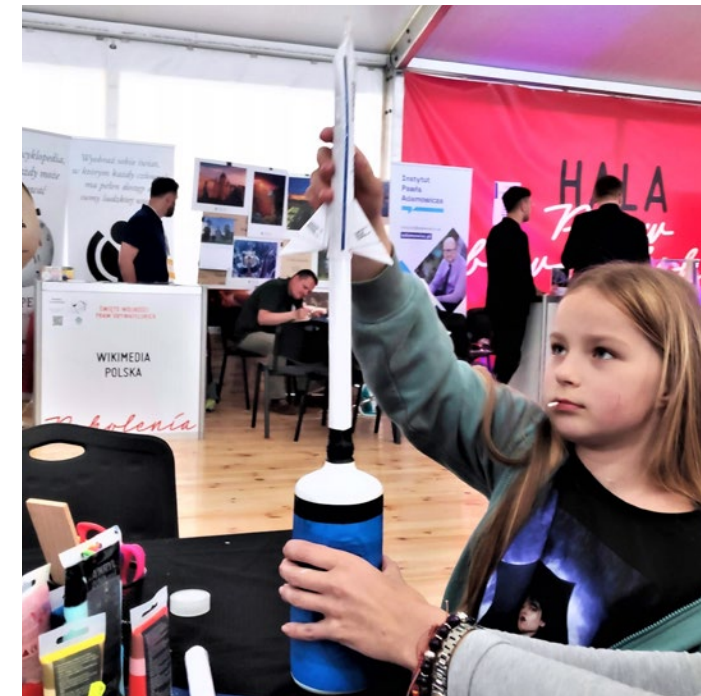


The CanSat competition: a mini space probe and the launch of a rocket lifting it into the air.

Selected ESERO events in 2023.

- 95 “Lessons from out of this world”, delivered by space professionals to some 2,688 students.
- Galaxy of Women – Meetings with space sector experts and workshops on space sector careers for young people.
- Training and workshops for 1,208 teachers.
- Other educational events, involving 1,018 teachers, 13,297 students and 3,952 other participants.

We have appointed new Space Education Ambassadors for 2023 to promote STEM education in Poland, particularly with a space-science theme. Seven individuals have joined the already active group. These new ambassadors come from various backgrounds, teaching a range of subjects in both small towns and large cities, and bring diverse ideas for collaboration. Some are familiar faces from other programmes like YEC, SOWA, NDC. The team now comprises 36 Space Education Ambassadors. To support their work and enable them to deliver engaging activities across various educational settings, we decided to collaboratively create a “Space-Science Education Kit”. This kit will include materials for 15 experiments and the necessary equipment to conduct them. We secured a grant from *Fundacja Empiria i Wiedza* to create a prototype of this kit.



The space-themed stand of our ambassador during the Gdansk Freedom Festival.

We make concerted efforts to involve socially excluded children and young people in ESERO activities. This year, with ESA’s support, we organized special holiday activities, inviting groups from the Mazovia province for a full day of experiences at Copernicus. The programme included planetarium shows, exhibition visits, and workshops on space energy. We also provided lunch and travel funds for groups outside Warsaw. Over six Tuesdays, from July 4 to August 8, we welcomed 628 individuals from foster care

centres, therapeutic care centres, community centres, and the “Summer in the City” campaign.

During the ‘Cosmos at School’ event, 89 teachers joined us at Copernicus. Our journey began with a lecture by Prof. Hanna Rothkaehl of the Polish Academy of Sciences’ Space Research Centre, who spoke about Jupiter, its characteristics, and humanity’s probes into distant space. We explored ways to get schoolchildren interested in Jupiter and tested space-related experimental stations. We also experimented with quickly prototyping educational solutions (educational aids, lesson plans, etc.). This new classroom format received overwhelmingly positive feedback from teachers, who appreciated the autonomy and the opportunity for creative group work.

In 2023, our ESERO team travelled extensively, sparking young people’s interest in space and encouraging them to consider space sector careers. We participated in conferences, local popularization events, summer picnics organized by allied institutions (SOWA facilities, YEC partners, our Space Education Ambassadors), and also visited some completely new locations. We conducted workshops and demonstrations, discussed competitions and challenges for young people, and talked about meetings and trainings for educators.

Together with the Analog Astronaut Training Centre, we organized a “Junior Space Camp” over the summer, packed with diverse scientific activities designed to foster cooperation and group dynamics. The camp included endurance training, physics, biology, chemistry, and engineering experiments, as well as survival training.



In September, we attended the European Rover Challenge, an international Mars rover competition featuring student teams from around the world, alongside a popular science conference. There, we conducted a workshop for young people on “Careers in the Space Sector”, delivered a lecture on “The Solar System Revealed and Other Celestial Bodies”, and maintained an information stand in the inspiration zone. The competition was won by a team from Poland: AGH Space Systems.

Selected events involving ESERO

- Congress of the Polish Astronomical Society in Toruń
In the session on education, we talked about Nicolaus Copernicus, places associated with him and the ESERO programme.
- Cosmiting Summit conference in Andrychów “space perspectives for 21st century education”
Invited guests talked about various educational projects (we talked about ESERO) and scientific findings. There were sky observations in the school observatory, as well as space, robotics and 3D design workshops.
- Celebration of Freedom in Gdańsk
Conducting space experiments alongside many NGOs supporting non-formal and informal education.
- Women in Tech Summit
During the workshop “Why do we want to build a base on the Moon?” we talked about the Moon Camp Challenge and the lunar base projects. The class was attended by women aspiring to change careers and move into the space sector.
- Space science picnic in Lututów
Display of materials used in spacecraft, a balloon lander moon landing, and a virtual Mars walk.
- Meeting of the “Between Us Librarians” network in Płock
We provided Training on using satellite imagery in education, and activities for school groups and teachers.
- Copernicus-Class in Płock
We ran Workshops on “Careers in the Space Sector” and “Analogue Astronaut Training” for young people, as well as “Rocket Lessons” for teachers.

The “Lay Out – Let Out” Conference

In 2023, the urgency of the need to combat climate change no longer needs to be explained to just about anyone. We are all witnessing chaotic weather patterns that devastate infrastructure and imperil nature. The impact of past changes is particularly evident in the global South, where people face hunger and displacement. The warnings of scientists about an impending catastrophe, coupled with the despair of many young people losing hope for a sustainable future, underline the need for action. Climate education is drawing attention from diverse sectors: schools, corporations, governments, and international organizations. There’s an increasing realization that while making the right individual consumer decisions may be gratifying, adequately tackling such a global issue will require communal and systemic approaches.

Our 2023 “Lay Out – Let Out” Conference was aptly themed “Climate Education: What Are We Doing Wrong?”.



Expert reports indicate that only a fraction of young people are engaged in climate action of any type, suggesting a disconnect in our educational approach. To explore this, we invited several young people actively involved in climate initiatives to share their perspectives. This provided teachers a valuable opportunity to listen to student voices outside the classroom and, in some cases, reconcile their perceptions with reality. The young speakers highlighted the urgency of addressing climate denialism and lamented the scarcity of climate change topics in school curricula. They emphasized their readiness to take grassroots action, being unwilling to wait for systemic changes.

The conference also featured expert discussions on the interplay between agriculture and climate change, mitigation strategies, urban water retention strategies, consumerism, and the youth expectations regarding the business sector. We also organized mini-workshops and an initiative exchange, showcasing organizations dedicated to effective climate education.

We fostered an environment conducive to dialogue and the sharing of knowledge and experiences. This approach paid off, with information flowing in multiple directions, and new connections and collaborations forming. One highlight was the Open Space session, encouraging networking among like-minded individuals in climate education, including teachers, educators, local administrators, and business representatives. Over 20 discussion groups formed, addressing topics like climate education methodologies in secondary schools, the performing arts, and even offering project consultations for youth, organized by the School Climate Conference team.

The “Around Water” seminar featured Ewa Ewart’s documentary “To the Last Drop”, followed by a discussion with the director, co-author Piotr Nieznański, and Piotr Panek from the Chief Inspectorate of Environmental Protection, focusing on monitoring Polish inland waters. The post-film discussion was so engaging that it continued well beyond the official session.

The conference concluded with a talk by prominent Adam Wajrak on the visible signs of Earth’s overheating and the beauty of what we still can save.

Approximately 200 people attended the event, nearly half of whom were first-time participants.

Dream Designers

The "Dream Designers" competition is an initiative aimed at fostering STEAM (science, technology, engineering, art, mathematics) competencies and project-based skills among children and teens.

In this year's edition of "Dream Designers", the focus was on simple flying structures and their potential uses, such as observing various phenomena or measuring environmental factors. The competition was open not only to teachers holding practical and technical classes in schools but also to mentors of model-making clubs in community centres and day-care centres, providing an opportunity for young DIY enthusiasts to craft their own flying creations. The top 10 project proposals were awarded kits of equipment, modelling materials, and funding to develop their prototypes. Out of these, 5 teams emerged as winners. The standout projects included two airships, a workshop on aircraft building for younger students, and an innovative campaign to launch balloons straight into the clouds.



The "Dream Designers" competition is held in partnership with Boeing.

We encourage exploratory behaviours in visitors and people participating in other activities.

We aim for our educational programmes and projects to be effective, modern, and to foster competencies for the future. This is what drives our R&D efforts within the Copernican Revolution Lab (more details on page 78). A key focus here is understanding the motivations and needs of learners. In 2023, we established a "Living Lab" for doing research on learning processes and invited regular visitors to Copernicus to consult with us on our programmes and plans. Based on teacher feedback, we're designing new school laboratory equipment, developing an educational kit for pre-schoolers, analysing how teenagers use mobile devices, and identifying their preferred learning content. Additionally, our participation in EU programmes enables us to approach educational challenges from a broader perspective.

Design thinking workshops at the EduFactory

In a small Silesian town, students often cycle to school, traversing considerable distances due to infrequent bus services. Improving road safety for these young cyclists was the challenge tackled in a pilot workshop at the EduFactory, our educational FabLab, using the design thinking method.

The workshop engaged 7th and 8th graders from local primary schools and secondary school students. Participants closely examined photographs of the Silesian school, traced the students' cycling routes on maps, analysed bus schedules, and listened to interviews. Their objective was to independently pinpoint the main issue and devise a solution. The students came up with a range of innovative ideas, including social campaign strategies and smart clothing prototypes. Throughout the process, they navigated all phases of the design thinking method, gaining a solid understanding of its application for future endeavours.

Projects improving road safety

- An illuminated 'CAUTION: CHILDREN' sign that can be mounted on a bicycle.
- A mock-up of the road to school, from which the most dangerous points were identified. This was to be the basis for a public awareness campaign.
- A Pikachu-themed yellow helmet with lights and ears, which children would not be ashamed to wear.
- Gloves with sewn-in LEDs that would light up when the hand is lifted up (to signal a turn).

We compiled the lesson scenarios tested by the students along with materials for educators into a publication, which is now available on our website. This resource is accessible to everyone; educators can download it for use in their lessons or other educational activities.

Raytheon partnered with us on this project.

The Naturalist's Backpack

In 2023, we initiated the development of an educational resource which currently has the working title "The Naturalist's Backpack". This kit is envisioned as a tool for outdoor education, specifically tailored for students in grades 1–4 of primary school. Our plan is to prototype 10 interactive activities and assemble the necessary materials for their execution. The core concept of the kit centres around the theme of 'ME in Nature', focusing on sensory and emotional experiences, as well as incorporating artistic activities that utilize natural elements.

Living Lab

The Copernicus Science Centre's exhibition space provides a unique research environment, attracting visitors from diverse social groups. We have invited scientists to take advantages of this opportunity for conducting social science research, offering our visitors the chance to be part of creating new knowledge. In 2023, we opened the "Living Lab", featuring research stations that blend into the environment like interactive multimedia exhibits.

Each station, crafted by a different scientist or research team, engages visitors in solving puzzles and tasks on screens. The data collected from these interactions are valuable for scientific research. There's no worry about making mistakes; every attempt contributes important data.



Prof. Dor Abrahamson's study focuses on the cooperative task of guiding an object through a maze, requiring two people to work together to achieve the goal.



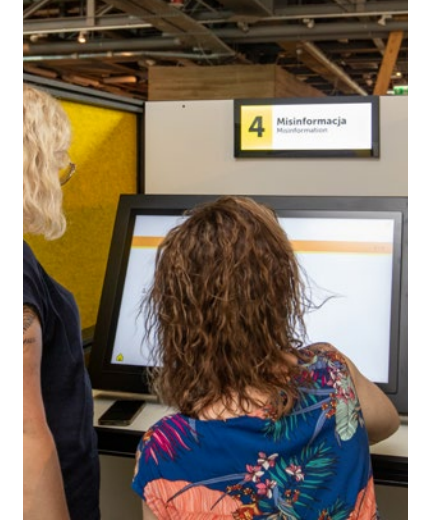
How do you turn an upward-facing triangle into one whose vertex is at the bottom? Take this challenge to help Dr Wendy Ross explore algorithmic thinking.



Dr Brenda Jensen's study examines to what extent we are open to the unknown – she analyses the choices visitors make in filling out "connect the dots" images.



Prof. Maciej Karwowski's project engages visitors in a study of creativity.



Prof. Dariusz Jemielniak's research on the credibility of social media posts examines the factors we consider when evaluating the veracity of online content.

Scientists hosted in the Living Lab

- Prof. Dariusz Jemielniak and Anna Kovbasiuk (Kozminski University)
- Prof. Maciej Karwowski (University of Wrocław)
- Dr Brenda Jensen and Dr Tessa van Schijndel (University of Amsterdam)
- Dr Wendy Ross and Prof Thomas Ormerod (London Metropolitan University)
- Prof. Dor Abrahamson (University of California, Berkeley)

DigiPatch

In the DigiPatch project, an international research endeavour led by social psychologists from Jagiellonian University in Kraków, critical questions are being explored: What triggers the adoption of radical attitudes among small online groups? Is there a link between psychological profiles and the propensity to express extreme views actively? How does the radicalization process unfold within virtual microgroups?

Our role in this project is to assist organizations interested in collaborating with the DigiPatch researchers. We're compiling a resource of useful information for these organizations. In 2024, we plan to host a workshop at the Copernican Revolution Lab, featuring the project's researchers. This workshop will focus on strategies to effectively counteract the radicalization of online communities. Additionally, we're establishing a new research station in the Living Lab to aid researchers in gathering data related to this crucial subject.

Road-STEAMer

Road-STEAMer is a consortium within the Ecsite network, dedicated to developing recommendations for effectively implementing STEAM (Science, Technology, Engineering, Art, and Mathematics) approaches in education across EU countries. The project's participants aim to identify gaps in the educational policies of different EU nations, understand their specific educational needs, and explore how STEAM-based teaching can fulfil these needs. The project's inaugural meeting took place in mid-December 2023.

In the near future, the Copernicus Science Centre will organise two dialogue sessions where experts from different fields related to education can exchange experiences. These sessions will focus on developing educational policies grounded in STEAM methodologies and will include a thorough analysis of the bottom-up solutions applied in Poland.

MEDfake

The MEDfake project's goal is to bolster confidence in vaccinations in Poland. Led by Profs. Dariusz Jemielniak and Anna Kovbasiuk, the project seeks to understand the decision-making mechanisms in patients' thinking and to create communication tools that help identify and debunk false theories. We are playing a supportive role in this endeavour. One of the exhibits in our Living Lab is gathering data for the research. Additionally, we've provided space in our robotics lab for further research, where visitors participate in experiments testing their ability to discern fake news. Some of these activities took place in December 2023, with more scheduled for January 2024. The researchers have also engaged with our audience and team through an online seminar, focusing on disinformation within the medical field.

Educational space

In 2023, in collaboration with My Bambino, a member of the Copernican Revolution Lab consortium, we initiated the "Space in the School Classroom" study. This project involved teachers who, through photos or descriptions, shared their visions of what ideal classrooms should look like. In the "Show Off Your Classroom" competition, which attracted 118 entries, the winners were awarded additional classroom equipment. We also conducted on-site surveys in a selection of the submitted classrooms. Our observations revealed that teachers often rearrange classrooms to suit the methodologies of specific lessons, such as moving furniture for group activities. However, we identified a common issue: a lack of storage space for educational materials and students' backpacks and bags, which often ended up on the floor, impeding free movement and room reorganization. Seeking student input, we inquired about what they would see as an ideal classroom environment. The responses highlighted a desire for comfortable furnishings that do not creak or break easily, an aesthetically pleasing and functional interior featuring warm colours, large windows, access to fresh air, and appropriate temperature control, along with additional elements like plants, greenery, and posters. Both students and teachers expressed a need for dedicated relaxation areas. The insights gained from this study will be instrumental in developing practical furniture and innovative design solutions tailored for STEAM classrooms and studios.



The arrangement of a classroom in Kłęczany.

Expert youth panel

In 2023, we established a youth consultancy team comprising individuals aged 7–20. Our goal was to gather their perspectives on new exhibits, programme proposals, and topics that matter to them. Discussions included favourite hobbies, environmental issues, and mobile device usage. We discovered that fashion and nutrition are significant topics for children and teens, which can be effectively leveraged to discuss planetary challenges and solutions.

The young consultants reviewed a science show in development. Their feedback helped us eliminate dull moments and enhance the narrative's clarity. They also served as jurors in the "Show Off Your Classroom" competition, alongside adult experts, assessing the best-designed classrooms in Polish schools. Additionally, we invited them to a social media video creation workshop held at the "The Future is Today" exhibition, using exhibits as the objects filmed.

This consultative approach enables us to tailor products and events more effectively to the audience's actual needs, aligning with their habits and interests.

More live nature

A survey provided insights into young people's views on the relevance and effectiveness of school and educational activities. Participants included students in grades 7 and 8 of primary schools and their teachers.

The findings indicated that students value activities that build practical skills and have a clear real-life application. They often find specialized knowledge less meaningful if its practical use is not evident. They appreciate lessons that integrate knowledge from different disciplines, employ active and project-based methods, and avoid monotony. A conducive learning space is also crucial, with comfortable furniture, relaxation areas, and plants, fostering creativity and attention. Respondents also advocated for classroom gadgets and teaching aids that stimulate curiosity and exploration across various fields. Technology, like smartphones and tablets, is seen as an integral part of the educational ecosystem. Well-being and a stress-free environment are also vital for meaningful engagement in activities. Teachers' opinions align with students', highlighting a desire for specialist support (psychologists, tutors, career experts) to enhance their teaching. The consensus of opinion indicates that teachers are well aware of the needs of young people, understand them and are prepared to teach "meaningful lessons".

Getting teenagers to take greater interest in mathematics

During math and science classes, the common teenage refrain is: "But what will I ever need this for? It won't be of any use to me in life!" Addressing this challenge, we introduced the "For Math's Sake!" exhibition as part of the "Science for You" programme (more on page 28), focusing on making mathematics more engaging and applicable. We developed lesson plans linked to the exhibition, keeping teenagers' favourite question ("What do I need this for?") firmly in mind, aimed to make the lessons interesting and practical. After prototyping over a dozen scenario versions, the best ones were

tested in schools hosting the "For Math's Sake!" exhibition and in schools with Young Explorer's Clubs in the Mazovia province.

Students were pleasantly surprised by the unconventional learning methods – without the use of notebooks or textbooks. A vast majority found the lessons enjoyable (75%) and educational (66%), appreciating the practical application of knowledge and its connections to other fields like art and architecture. Remarkably, 80% of students found the lessons engaging, crucial for fostering involvement in the learning process, which is our primary objective.

We mobilize people around important science-related topics.

The commemoration of the anniversary of Nicolaus Copernicus's birth presents an excellent occasion to touch upon topics related to scientific revolutions and the upheavals they have sometimes brought about. We reflected on milestones in the evolution of science at the Science Picnic, and showcased state-of-the-art research that has the potential to reshape our world at the "Przemiany" Festival. We envisioned a future of living longer lives in peak condition, while striving to be the very best versions of ourselves – the healthiest, strongest, and most resilient. Our discussions ventured into understanding quantum computers and the hopes and concerns associated with advancements in medicine, genetic engineering, nanotechnology, and robotics. A significant focus was also placed on one of society's crucial challenges: intercultural integration.

We inspire and lead dialogue on global and local challenges at the intersection of science and society.

Together for a Better Future

Engaging in experimentation and construction offers a unique platform for integration, fostering friendships and an appreciation of diverse languages and cultures. Inspired by this notion, we developed the national initiative "Uniting for a Brighter Future". This programme aims to integrate Ukrainian children with their Polish peers, enhancing their educational experiences, sense of empowerment, and social skills. We utilized activity formats that we created and tested, centred around collaborative experimentation, hands-on making, and observation – intending to expand these activities across Poland, particularly in areas providing temporary homes for visitors from Ukraine. In 2023, we successfully launched pilot programmes in collaboration with the SOWA centres and the Young Explorer Clubs network.

Regional YEC partners crafted their own activities, ranging from algae experiments and 3D pen drawing to DNA isolation, math puzzles, polyhedron building, educational excursions, science picnics, and more. These activities highlighted how Ukrainian children approach problem-solving differently than their Polish counterparts, showing more persistence and a greater emphasis on independence, a reflection of their educational background back in Ukraine. Their proficiency in certain subjects, like math and physics, often surpassed that of their Polish peers. "Dmytro and Oleh are much better than me at math and physics! I was surprised, given that we're in the same grade", remarked one teenager from Białystok. During YEC activities in Kalisz, it was observed that Ukrainian 8th graders faced challenges in choosing their future educational and career paths, especially in a new country with a different educational system. To assist them, a career aptitude test was organized, offering each participant insights into their own skills, strengths, weaknesses, and potential career paths.

For the first time, SOWA staff led a Family Workshop. This flagship cross-cultural programme brought together Polish and Ukrainian families, enriching activities with elements like reading poems in both Polish and Ukrainian, comparing words, and practicing pronunciation. The thematic variety of the individual workshops attracted many repeat attendees. In Piotrków Trybunalski, families formed close bonds, and the sessions evolved into warm, homely gatherings. These classes were a hit not only among participants but also with the facilitators, to the extent that they have become a staple at the SOWA centres.

The "Together for a Brighter Future" initiative also provided educators and teachers with valuable experience in an intercultural setting, enhancing their skills and broadening their competencies. A total of 151 individuals participated in training courses focused on intercultural integration. For those interested in gaining and applying knowledge about working with multicultural groups of children and adolescents, we've developed a thematic guide, freely accessible on our website.

In 2024, the programme is set to expand, with 25 additional Young Explorer Clubs, five regional YEC partners, and five SOWA centres joining the "Together for a Brighter Future" initiative.

A total of 2,433 people (including 348 of Ukrainian nationality) took part in YEC activities (in Olsztyn, Chelm, Lodz, Białystok, Bydgoszcz, Gdansk and Kalisz).

- In Podlasie, around 60 children from Belarus and Ukraine collaborated in scientific experiments.
- In Bydgoszcz, workshops were conducted at 5 schools, while in Łódź, four schools participated.
- In the Lublin region, classes were held at a kindergarten.
- The "Algae for the Future" project in Olsztyn involved 151 children from three kindergartens and three primary schools.

Three SOWA facilities (in Piotrków Trybunalski, Piaseczno and Suwałki) conducted intercultural Family Workshops for 407 people (including 102 of Ukrainian nationality).

More than 1,000 programme participants also visited the Exhibitions and Planetarium at the Copernicus Science Centre. An intercultural class for children was likewise organized at the chemistry lab (with support from BASF).

“Together for a Better Future” project partners

- Deloitte Foundation
- UN Global Compact
- ING Children’s Foundation
- “School with Class” Foundation

Educational programme in conjunction with “The Future is Today”

In October, we inaugurated the final segment of the “The Future is Today” exhibition (details on page 15), and towards the year’s end, we also completed its associated educational programme. This programme aimed to help students better themselves by boosting their digital competence, communication, collaboration skills, and critical thinking.

Addressing topics that resonate with young people makes it easier to connect with them. Such topics include digital advancements, robots, climate change, and medical innovations –all of which are featured in the “The Future is Today” exhibition. Our goal was to make a visit to this exhibition beneficial for both teenagers and their teachers, sparking inspiring classroom discussions and school projects. As part of the educational programme accompanying the exhibition, we work both with students, nurturing their sense of empowerment, and with teachers, demonstrating the potential of these cross-cutting themes for use in lessons on various subjects.

Young people were invited to dialogue meetings with experts, which took place at Copernicus and in various locations around the country. They dealt with artificial intelligence, energy, biodiversity and urban design in the context of impending climate change. “We don’t talk about these things at school because there’s just no time. Biology is mostly about protozoa and cells, with only a chapter on the Earth’s climate. But here, we can see these phenomena in a different light, and discuss them with knowledgeable people”, one high school student commented after one of the sessions. Teachers also had the opportunity to talk to scientists: during training sessions and seminars on disinformation, digital technology and artificial intelligence, climatology, biotechnology.

Two “Teachers’ Evenings” in 2023 combined a tour of the “The Future is Today” exhibition with an expert lecture. These events were highly acclaimed, with most attendees recommending them to others. The teachers reported that they felt it was time well spent and intriguing. The option to bring a companion was particularly popular. While not all agreed, many believed that the exhibition’s content could be integrated into school curricula. A significant number of respondents expressed interest in visiting “The Future is Today” with their students, and some had already done so. “After the exhibition,

I discussed it with my students; we always do this kind of debriefing. They were intrigued and had many questions, which gave us a great opportunity to talk about the future. Ultimately, after all, it’s their future”, one English teacher from Warsaw remarked during an online training course.

In collaboration with students, teachers, and experts, we developed lesson plans related to the exhibition, enriched with videos, expert and creator interviews, and virtual exhibition tours. These resources are suitable for classes in computer science, natural sciences, biology, geography, civics, and guidance classes. These materials are available on our website as well as on the National Education Network platform.

The “Future is Today” educational programme

- 21 lesson plans for the 3 parts of the exhibition: “Digital Brain?” (8), “Mission: Earth” (7), and “Human 2.0” (6).
- 22 dialogue meetings for young people at Copernicus (500 people).
- 12 dialogue meetings for young people in the regions (336 people).
- 16 teacher training sessions to help prepare for visiting the exhibition with students (253 people).
- 3 teachers’ evenings (250 people).
- 5 online training courses for teachers involving experts.



An “After Hours” Evening for Adults: A lecture plus a visit to the exhibitions.

The educational programme accompanying the exhibition “The Future is Today” was implemented from 2020 in cooperation with the NASK National Research Institute. The programme and the exhibition were part of the Education and Information Campaigns supervised by the Polish Prime Minister’s Office (formerly the Ministry of Digitalisation).

Meetings with experts

On weekends, experts set up stands in our exhibition space, offering visitors the chance to conduct additional experiments and engage directly with scientists, asking questions in a more intimate setting. This is also an opportunity for experts to refine their science communication skills. In 2023, we welcomed individual scientists and student science clubs, featuring activities like chemistry experiments, observation of microplastics, medical diagnostics, veterinary advice, and moon rover demonstrations. The visits by Polish Sign Language interpreters garnered so much interest that we hosted them multiple times.

We promote evidence-informed practices and attitudes.

Evenings for adults

The "After Hours" Evenings for Adults are monthly events that offer an exclusive opportunity for the adult audience to enjoy our attractions, both standard and themed, at convenient hours without the presence of children.

The "After Hours" Evenings were exceptionally popular in 2023, with tickets selling out well in advance. Surveys indicated a slightly higher attendance by women than men. The predominant age group was between 26 and 35 years, and most attendees had a university education. Approximately two-thirds were first-time visitors, though "regulars" who have attended at least four events have also started to make an appearance.



An "After Hours" Evening for Adults: "Mushroom Power".

Attendees typically came with their partners or friends, drawn by the event's theme (which in 2023 included topics like mushrooms, video games, airplane crashes, and dreams), the chance for an enjoyable evening, and the opportunity to visit Copernicus without throngs of children around. Nine out of ten visitors surveyed expressed "satisfaction" or "great satisfaction" with their visit. Planetarium shows, High Voltage Theatre performances, and thematic lectures generally received the highest praise, while the special art shows proved to be the least popular.

Participants expressed a desire for longer and more frequent "After Hours" Evenings for Adults, with many regretting that the event schedule limited their ability to experience

all the attractions on offer. This left visitors with a sense of wanting more – a sentiment we certainly welcome, hoping it will encourage them to come back for more.

Themes for the evenings in 2023

January: Copernicus Orbit • February: Sequence of Feelings • March: Lust for Money • April: Reaper of Minds • June: Forever Young • June: A Midsummer Night's Dream • September: Mushroom Power • October: Fear Factor • November: Humans 2.0 • December: Aces of the Sky

Special guest from NASA

Our conference centre was the venue where the latest photography taken by the James Webb Space Telescope (JWST) was shown for the first time. A segment of the galaxy NGC 5068, visible in the spring constellation Virgo, was presented by the NASA Administrator himself. Bill Nelson also toured our exhibitions and conversed with the robotic Copernicus. Above all, however, he met with students from Warsaw schools, who turned out to be keen space enthusiasts. They eagerly asked questions about the future of astronautics, spoke fluent English, and uninhibitedly asked Bill Nelson to take selfies.

The NASA Administrator was accompanied by US Ambassador to Poland Mark Brzezinski, Polish Space Agency Director Grzegorz Wrochna and Copernicus CEO Robert Firmhofer.



Mark Brzezinski and Bill Nelson experimented in the exhibition space, accompanied by Copernicus CEO Robert Firmhofer.



Copernicus CEO Firmhofer was among those who took the opportunity to snap a selfie with NASA Administrator Bill Nelson.

Meeting with quantum experts

There is a lot of talk about quantum computers these days, but few people have ever seen one with their own eyes. The “Near-Term Quantum Computing 2023” conference, held in Warsaw, brought in some of the world’s best specialists dealing with this complex, rapidly developing and little-known field of science, lying at the intersection of physics, mathematics and computer science. We invited some of these experts to join us for a meeting so they could prove that quantum computers are not “unicorns”, so to speak – that they really do exist. Thanks to the Centre for Theoretical Physics of the Polish Academy of Sciences and the Foundation for Polish Science, attendees included Dr. Anna Kamińska (Creotech), Dr. Wojciech Burkot (Beit), Dr. Rafat Demkowicz-Dobrzański (Warsaw University), Dr. Piotr Rydlichowski (Poznań Supercomputing and Networking Centre), and Dr. Michał Oszmaniec. Their demonstrations satisfactorily persuaded the audience that quantum computers are indeed a real thing.

Science Picnic

After a three-year hiatus, the Science Picnic of Polish Radio and the Copernicus Science Centre made a grand comeback at PGE National Stadium, with tents and picnic stands once again appearing on the lawns and pathways around the stadium.

The 2023 Picnic theme focused on scientific revolutions, commemorating the 550th anniversary of Nicolaus Copernicus’s birth. We looked at various milestones and breakthroughs in the history of science – from the Copernican Revolution, to Albert Einstein’s theory of relativity and quantum mechanics, to the discovery of the structure of proteins and DNA. DNA-related topics were particularly well represented among the exhibitors. Visitors were able to make their own DNA sample (from their cheek or saliva), learn about the structure of the double helix, and the sequencing technique. There were experiments relating to the discovery of electromagnetic waves, ionising radiation and brain waves, as well as demonstrations relating to key moments in the history of biotechnology: the discovery of antibiotics, the use of artificial fertilisers, the study of microorganisms, and advances in genetics.

Highlights included the latest inventions and technological solutions, such as a bus that purifies the air. Robots were also present in a wide array, including the humanoid Melson, the educational Photon, the detector Fafik, and even robotic dinosaurs. It was possible to play checkers with a robot, sign an autograph using a robotic hand, and witness industrial robots, drones, and rovers in action. Particularly noteworthy was a synthetic copy of a human arm, consisting of artificial bones and muscles – capable of lifting up to 20 kg!

Creative DIY enthusiasts constructed models of aeroplanes, rockets, and robots. There were workshops on papermaking, embroidery, engraving, and even a short “dry” windsurfing course. There was something for everyone, whether it was the chance to witness levitating semolina, or to check which one is more radioactive – a banana or a smartphone. Visitors particularly fond of communing with nature could also find many interesting exhibition stands. They could examine how ants cope with stress, see how bacteria behave under microgravity, and watch tiny tardigrades – the favourite organisms of astrobiologists. There were also woodworms, who like to munch on foil

and polystyrene, and clams that help purify water. A barefoot walk in a forest, examining trees “eaten” by beavers, and a firefighting competition all awaited the youngest visitors. The Picnic stage featured international show groups presenting breath-taking special effects.

Our tent offered insights into the prescriptions that Nicolaus Copernicus gave to his patients, showcasing our namesake’s lesser-known medical expertise (in face he dealt with medicine on a daily basis). We compiled some of the various prescriptions he jotted down in the margins of books. It turns out that some may have worked, such as the one for “blushes of fury”. Its exact recipe goes as follows: “Take camphor, *olibanum muram*, powder it, pour an equal amount into rose water and rub it on the blushing”. Rose water shrinks the blood vessels and therefore reduces discolouration. We also prepared black hair dye using a recipe from Copernicus. The consistency and proportions had to be fine-tuned, but the effect was already visible on the first attempt. But did Copernicus himself dye his hair? We did not know the answer to this question. The star attraction was undoubtedly our robot Copernicus: Picnic visitors asked for him as soon as they entered our tent. Nicolaus bravely endured the challenge of so many conversations as well as the journey, and safely returned to his permanent place in our exhibition space.



The 26th Science Picnic at the PGE National Stadium.

The event attracted 30,000 visitors, mainly families with children aged 6–7. Approximately a third of all attendees were under 15 years old. Visitors were predominantly from the Mazovia province, with three-quarters being from Warsaw itself. Most visitors came by public transport, arriving in the greatest numbers between 11:00 AM and noon, and spent on average around 3 hours at the Picnic.

Over 90% of attendees surveyed said that they were “satisfied” or “very satisfied” with the event. They had come to find out what was new in science, to get someone else interested in science, or because they had been persuaded to come by someone they knew. Adults were particularly interested in chemistry, physics, astronomy, and biology demonstrations. The main theme and location were highly rated, with the only drawback being the difficulty in accessing stands and interacting with scientists.



The main stage of the Science Picnic featured some of the best demonstrations from all of Europe.



Science picnic tents set up around the stadium.



A robotic dog designed by university students.



Building a replica of Warsaw’s Palace of Culture and Science took all day.

The 26th Science Picnic was co-financed by the “Science for You” programme of the Polish Ministry of Education and Science and the Copernicus Science Centre.

“Przemiany” Festival

What is a superorganism? We can see one just by looking in a mirror. We can also find one by looking at the Earth from a bird's eye view, or when seeing the micro-world through the eyepiece of a microscope. To examine the “superorganism” concept from different perspectives, we made it the protagonist of the 2023 “Przemiany” Festival.

The festival's diverse programme featured interdisciplinary expert panels, spirited debates on the biohackers, soldiers, and athletes of the future, alongside film screenings, performances, and an Art&Science exhibition. Audiences were also treated to electronic music concerts with immersive visualizations on the planetarium dome, as well as engaging meetings and workshops in the festival café.

At the opening session, the theme of “superorganism” was uniquely interpreted by three special guests: Dr. Ruth Dudek-Wicher spoke on microbiome research, Prof. Bogusław Pawłowski examined our species' adaptability, and Olivia Arthur showcased her photography project capturing the technological evolution of modern humans. Breaking tradition, the inaugural lecture was this year replaced with a panel of these three experts, fostering a dynamic session that kept the audience eagerly engaged and asking endless questions.

The expert panels drew such interest that larger venues were needed. Discussions included regenerative medicine with Prof. Maria Anna Ciemerych-Litwinienko, a stem cell specialist, and Dr. Marco Constantini, a bioprinting expert. Dr. Marta Klak, M.D., showcased a bionic pancreas design, while artist Amy Karle presented a model of an enhanced heart. A thought-provoking discussion on longevity and its societal implications was led by Dr. Rafał Lolo and Dr. Łukasz Jurek.

The festival's debates were equally captivating, featuring specialists like Dr. Łukasz Kamieński (soldiers of the future), Dr. Paweł Kaliszewski (athletes of the future), and Dr. Joanna Różyńska (biohackers). Following each expert's introduction, debate participants were then able to articulate arguments either for or against a specific position.

At the festival exhibition, visitors experienced works by acclaimed Polish and international artists in new media art, bio art, and kinetic art. Exhibits included a disease-resistant heart, a synthetic larynx influencing stem cell development, a patchwork of antibiotic-resistant bacteria, and a printer replicating human tissue. An enlightening session with the artists included Elvin Flamingo discussing his project Plant~Animals: Symbiosis of Creation, and Dr. Ellen Pearlman presenting her interactive multimedia installation “Language Is Leaving Me – An AI Opera of the Skin”.

The Cinema of Change offered an exploration into human corporeality, its possibilities and boundaries, and the interplay between humans and their physicality. The repertoire of five documentaries presented diverse perspectives on the human body, from the sacred to the profane, and from substantive to experimental visual narratives.

The festival's main themes were encapsulated in a special discussion between writer Jacek Dukaj and Jowita Michalska, founder of the Digital University. They explored

transhumanism, radical life extension projects, and the limits and potential substitutes of enhancing organic bodies.

The “Przemiany” Festival attracted over 10,000 attendees, marking it as a significant event in exploring the intersections of science, art, and technology.



“Plant~Animals”: Living in this incubator are plant-animal hybrids.



This art installation by Natalia Kopytko symbolizes the hidden web of interconnections that make up an ecosystem.



At every meeting with experts, the room was packed.



During the festival debates, everyone had to come out in favour of one side or the other.



In workshops at the café, visitors could make their own preserves for the winter.



Amy Karle created the prototype of an improved heart.

We secure funding to sustain activities and development.

Financial data related to revenue from a variety of sources can be found in the 2023 financial statements of the Copernicus Science Centre. Not wishing to duplicate that information here, we instead focus on qualitative changes and the most important aspects of collaboration with partners and customers that allowed us to meet our revenue targets for 2023.

We secure specific-purpose subsidies for carrying out the most important projects.

The year 2023 was a period of final settlements for major investment projects.

We completed purchases and settled subsidies for the "Implementation of the Copernican Revolution Lab" project – receiving long-term funding from the Capital City of Warsaw (amounting to 27,690,100.12 PLN) and the Mazovian Unit for the Implementation of EU Programmes (amounting to 16,670,690.03 PLN).

The implementation and settlement of projects related to the preparation of exhibitions and exhibits as part of the "SOWA – Zones of Discovery, Imagination, and Activity" initiative came to an end, subsidized by the Polish Ministry of Education and Science (amounting to 45,413,96.07 PLN).

We concluded and settled accounts for the educational programme "The Future is Today", carried out as part of the "Educational and Information Campaigns" project, funded by the Polish Ministry of Digitalisation in the Prime Minister's Office (amounting to 9,679,512.53 PLN).

Due to the necessity to complete major investments, we did not commence the planned "Biodiversity Park" project. However, we have not abandoned the idea of its construction and continue to seek appropriate sources of funding.

We are increasing our income from fundraising and from products and licensing sales.

In 2023, we successfully met our attendance goals, allowing us to achieve the anticipated revenue from ticket sales. Total income from sponsorships, fundraising, sales, and leasing exceeded 11.6 million PLN, aligning with our strategic plans.

This year witnessed a modest increase in sponsorships and corporate donations, mainly driven by our enduring, long-term partnerships with companies like Samsung, Polkomtel, BASF, Saint-Gobain, and Mercedes.

The challenging market environment and high inflation led companies to be more cautious about engaging in new collaborative partnerships. Securing new sponsors proved challenging in 2023, and some long-standing partners, such as Raytheon and E.On, decided to discontinue their long-term contracts.

A notable shift in our revenue structure was the increase in special-purpose donations. Our "Together for a Better Future" project, aimed at fostering Polish-Ukrainian integration through STEM education, attracted the attention of the Deloitte and HP Polska foundations. They contributed a combined total of over 600,000 PLN towards its realization. Moving forward, we plan to expand our corporate offerings, allowing companies to achieve shared objectives in Environmental, Social, and Governance (ESG) areas, including through donations.

Revenue from licensing products developed in the Copernican Revolution Lab was lower than in previous years. This was largely due to the life cycle of the products; educational sets created in previous years were reaching the point of market saturation, while new products launched in 2023 are expected to bring in more substantial revenue in the following years.

Despite these challenges, we managed to secure a solid financial outcome. This success was bolstered by higher-than-anticipated earnings from short-term rentals, including income from our conference facilities and the summertime rental of our riverfront Pavilion 512, as well as revenue sharing from our onsite shop.

Strategic Partners and Supporting Partners

Samsung Electronics Polska

Exclusive Partner of the Robot Theatre, Partner for temporary exhibitions, Partner for the series "After Hours Evenings for Adults by Samsung", Strategic Partner of the Copernican Revolution Lab

PLUS

Supporting Partner, Exclusive Partner of the Bzzz! Gallery

Space partners

Raytheon Technologies

Exclusive Partner of the Robotics Laboratory, Exclusive Partner of the EduFactory

E.ON Polska S.A. (formerly innogy Polska S.A.)

Exclusive Partner of the High Voltage Theatre

BASF

Exclusive Partner of the Chemistry Laboratory

Łukasiewicz Research Network

Exclusive Partner of the Physics Laboratory

Saint-Gobain

Investment Partner of the Copernican Revolution Lab

Special project partners

Deloitte Foundation – Partner of the project "Together for a better future"

UN Global Compact and HP – Partners of the project "Together for a Better Future"

Erbud – Partner of the project "Young Girl Builders"

Astra Zeneca – Partner of the "Przemiany" Festival

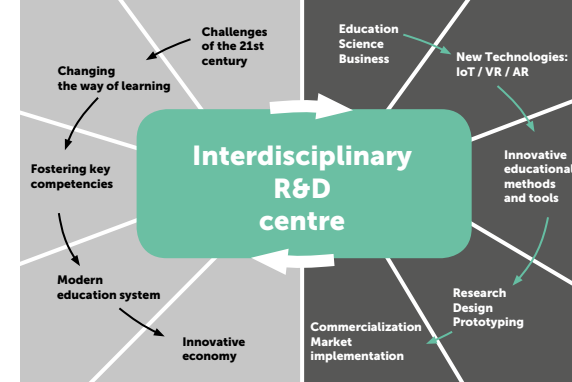


We provide space for research and development activities and offices.

On 31 March 2023, we celebrated the official opening of the Copernican Revolution Lab (CRL). Situated adjacent to the main headquarters of Copernicus, the CRL is a cutting-edge research and development facility. Here, designers, educators, scientists, and researchers come together to prototype new exhibits, educational kits, and innovative scientific communication formats. The facility is fully equipped with everything necessary for creative endeavours, all under one roof – including a workshop, carpentry shop, laboratories, testing spaces and meeting places.



The CRL harnesses contemporary scientific achievements to foster the creation of solutions that nurture competencies of the future. It stands as a facility unique in Poland, a space where the entire R&D process can be carried out from start to finish: from conception, to prototype creation and testing, culminating in presentations to partners and users.



Our grand opening was graced by the presence of those instrumental in the establishment of the Copernican Revolution Lab – the Mayor of Warsaw, the Marshal of the Mazovian Voivodeship (who co-financed the project), the builders (UNIBEP SA), the consortium members (Moje Bambino, BeCREO Technologies), and our partners (Samsung, Saint-Gobain). We also welcomed representatives from scientific institutions, universities, and business, as well as scientists, teachers, and educators. They all play a crucial role in advancing educational development and can utilize the CRL infrastructure for their own projects or collaborate on ours. We envision the Lab as a dynamic hub for transforming bold ideas into innovative solutions.

When I think about school, I also think about the students, who desire more than rote learning for tests. The CRL provides them with extraordinary opportunities to collaborate in bigger groups on remarkable projects that would be impossible without such a facility. I'm truly grateful for this.

Dariusz Wróblewski, a senior at the Warsaw Mechatronic Technical High School

By leveraging insights on learning, we aim to design next-generation educational and science-communication solutions. To effectively connect science and science-teaching with the interests, passions, and needs of today's school students and the opportunities that technology offers us today. Our goal is to support young minds in preparing for the challenges of the future.

Robert Firmhofer, CEO of the Copernicus Science Centre

The inauguration of the Copernican Revolution Lab marks an important day for science. Here, today, we are launching a research centre, unique not only in our country, but also worldwide, where, researchers from Poland and all over the world will be able to implement projects from inception to completion, to the benefit of Warsaw residents. This will deepen our understanding of the human mind and learning processes, which is crucial for the advancement of education.

Rafał Trzaskowski, Mayor of the City of Warsaw.

I am very pleased that we have been able to contribute to the creation of such a creative and inspiring place, and thus to play a part in the development of modern education and science-communication – not only in Mazovia, but also in the whole country. Especially as this is the only place of its kind in Poland. We are dedicated to supporting such valuable scientific initiatives, prioritizing the education and development of Mazovia's youth

Adam Struzik, Marshal of the Mazovia Province



The CRL's grand opening, with speeches by Rafał Trzaskowski, Mayor of the City of Warsaw, Adam Struzik, Marshal of the Mazovia Province, and Robert Firmhofer, Copernicus CEO.



Guests had a chance to visit the robotics laboratory, where we devise state-of-the-art lesson plans.



The interdisciplinary laboratory space is a place where we test finished projects. During the opening of the CRL, guests could observe various specimens under the microscope.



Observation booths behind one-way mirrors allow researchers to study educational sessions as they are underway. Our guests also had a look inside.

We have built and outfitted the Copernican Revolution Lab building.

The Copernican Revolution Lab building can accommodate up to 600 people. It has three above-ground and one underground storey, totalling approximately 6,000 m² of floorspace.



The architectural vision for the new Copernicus building was crafted by the Wrocław-based studio Heinle, Wischer und Partner Architekten Sp. z o.o., under the direction of Edzard Schultz and Anna Stryszewska-Stońska. UNIBEP SA served as the principal contractor, with Bico Group providing investor supervision.

The CRL space has been set up to facilitate the full R&D cycle. Ideas are born in the labs and design studios. They then take on material form in the workshops. These innovative prototypes can then be tested with future users – some of the testing spaces resemble a school classroom, others a home or a school laboratory.

The CRL infrastructure can be used by our team as well as by external partners. The first scientist to test out the new capabilities was Dr. Marcin Gierczyk from the University of Silesia. He studied students' cognitive load during interactive classes in our interdisciplinary laboratory, using the Noldus observation and data analysis system installed there.



Biology and chemistry lab, where we design experiments before they become part of classes.



The wooden stairs are the most distinctive element inside the CRL building.



One of the research spaces, with a view over the riverside boulevards.



Prototyping room, where ideas for new exhibits and educational aids become a reality.

CRL equipment:

The facility boasts over 3,000 different pieces of equipment of more than 250 types, including:

- 34 state-of-the-art microscopes, 17 industrial robots, precision scales, magnetic stirrers, automatic pipettes, measuring probes, and other laboratory equipment,
- over 50 different tools and power tools in the EduFactory (our educational FabLab),
- about 10 large workshop machines, including a CNC lathe, industrial laser cutter, milling machine, and 3D printer,
- 2 sets for observing and analysing the test subjects' behaviour, complete with a monitoring system (cameras, microphones) and stationary and mobile eye trackers.

Together with the consortium members of the Copernican Revolution Lab – the companies **Moje Bambino Sp. z o.o.** and **BeCREO Technologies Sp. z o.o.** – we conduct R&D activities, develop products and launch them onto the market.

The activities of the CRL are also financially supported by our partners: the Main Partner of the Copernican Revolution Workshop is **Samsung Electronics Polska Sp. z o.o.**, and the Investment Partner of the Copernican Revolution Workshop is **Saint-Gobain Innovative Materials Polska Sp. z o.o.**

The project "Construction of the Copernican Revolution Lab Building as part of the expansion of the Copernicus Science Centre" is co-financed by the Capital City of Warsaw – under special-purpose subsidy agreement no. C/OM/VII/P3/99/U-263/2018-2021 dated 31 October 2018. Amount of funding: PLN 27,690,101.00.



The project "Establishment of the Copernican Revolution Lab within the Copernicus Science Centre" is co-financed by the European Union from the European Regional Development Fund under the Mazovian Voivodeship Regional Operational Programme for 2014–2020, Priority Axis I Utilisation of R&D activity in the economy, Measure 1.1 Research and development activity of scientific entities – Project funding agreement no. RPMA.01.01.00-14-9876/17-00 of 31 October 2018. Amount of funding: PLN 16,765,860.42.

We are working to maintain continuous operations, agility and development potential.

The development and success of an institution crucially hinge upon having an engaged, motivated, and efficiently functioning team – satisfied with their work conditions (including salary), equipped with modern tools and transparent procedures. Thanks to a twofold pay-raise in 2023, we managed to mitigate the impact of inflation on salaries and maintain competitive pay levels. We launched a new employee benefits system, began implementing Electronic Document Management, and introduced a tool to facilitate procurement.

We are working to maintain a committed team, tailored to the Copernicus Science Centre's needs and capability.

We aim to be an attractive employer, offering salaries commensurate with market conditions. In 2023, despite high inflation, we managed to increase the percentage of employees whose salaries fall within the market median range of 80–120%, from 80% to 90%. The first raise, a 7% increase across the board, was given in May. Additionally, 80 employees received a further raise between October and November. After assessing our budget, we also raised the base for annual bonuses by 25%.

To bolster the appeal of our additional employee benefits, we launched the “Motivizer cafeteria” platform in 2023. It provides access to a variety of benefits, such as cultural event tickets, sports stores, and bookshops. Each month, individual accounts are credited with funds from the Company Social Benefits Fund. Employees have the autonomy

to choose which offerings to enjoy. The Motivizer platform has also streamlined and digitized the procedures for accessing other employee benefits – requests for eyeglass subsidies or Multisport cards are now submitted electronically.

One of the most prized employee benefits nowadays is the opportunity for personal growth and skill enhancement. In response to both team and institutional needs, we developed and launched an app in 2023 that digitizes the entire process of applying for and approving participation in available training. This new system also facilitates ongoing tracking of the training budget. As of September, we have been able to use an educational platform with courses in areas such as management, marketing, cyber-security, and negotiation skills – the video courses are accessible anytime and on any device.

It is critical for the entire institution to embrace the Copernicus strategy as a set of overarching principles. The entire team participated in setting the strategic goals for 2024–2027. The internal consultation process lasted four months and comprised two phases. Initially, volunteer consultants met with employee groups to gather input for the leadership team. This feedback informed the final strategy draft. The second phase focused on collaborative methods to achieve the established goals, culminating in a variety of initiatives and actions proposed to the leadership team. This collective reflection on the future provided valuable inspiration for crafting Copernicus's new strategic plan.

Volunteer consultants reflect on their role:

“The consultation process showed me that, despite the diametric differences in how the work is done and what each department faces at the Copernicus Science Centre, we do have more in common than just the buildings we work in”.

“As a consultant I felt in my element, delving deeper and deeper. The process required me to have the courage to listen actively, observe keenly, and be fully present in the moment”.

“I honed my attentiveness to others and discovered what the difference is between leadership and management”.

“I came to understand that people are accountable for what they co-create, and I need not shoulder the responsibility for everything that others produce and do”.

To offer a memorable, inspiring and friendly experience to more than one million visitors annually.

To provide visitors with comfortable visiting conditions, top-quality exhibits, interesting shows at a state-of-the-art planetarium and engaging activities.

To reach out to local communities across Poland with Copernicus exhibits and shows.

To foster cognitive independence and collaborative skills.

To promote dialogue, with diverse participants, about challenges that lie at the intersection of science and society.

To create and disseminate solutions that transform education.

To develop networks of learning communities.

To increase the participation of underrepresented individuals and groups in Copernicus programmes.

To remove barriers and include people at risk of social exclusion into the programme activities.

To build an inclusive organizational culture.

To make Copernicus a green cultural institution.

To reduce the carbon footprint of our operations.

To apply the “3R” principle.

To create a biodiversity park and make our environs greener.

To ensure Copernicus’s financial stability and partnerships.

To raise revenue to ensure operations and growth.

To build partnerships that contribute to the Copernicus vision.

To create a friendly and efficient organization.

To streamline operations and ensure better internal cooperation.

To ensure job satisfaction among the team.

We are working to increase the effective implementation of institutional goals.

In 2023, we finalized the formal and technical groundwork for deploying an Electronic Document Management System (EZD RP). This system streamlines the full spectrum of document management – from handling incoming and outgoing mail, through correspondence distribution and annotation, to compiling, approving, and signing documents, and finally archiving. By 2024, the traditional paper-based registry system at the Copernicus Science Centre will be obsolete. The EZD RP system offers multiple benefits: it simplifies document access, significantly heightens information security, ensures task transparency, and boosts team productivity.

The procurement plan for 2024 was created using the new ZPPlus IT tool. It supports the entire procurement process: from planning and application submission to processing, approval, contract signing, and settlement. The tool also enhances monitoring of the plan and execution of orders. All documentation is centralized and easily accessible. The status of a particular procedure can be verified at any time. The time taken for financial requests to be reviewed by the Public Procurement Department has been significantly reduced to 1–2 business days. As the tool allows for ongoing modifications and improvements, it is easily adaptable to the institution's evolving needs.

Our team

As of 31 December 2023, Copernicus employed 385 individuals across 367.65 full-time equivalent positions, including 144 men and 241 women. The average age of our employees is 39 years, with 30 individuals being under the age of 26. Overall, 290 of our staff hold higher education degrees, 6 have completed post-secondary education, 60 have a high school diploma, 5 have basic vocational training, and 3 have primary or lower secondary education (data not available for 21 individuals).



Our holiday-season gathering – barely managing to fit everyone into the frame!

Programme Board of the Copernicus Science Centre

(for the term of office finishing at the end of 2023).

Prof. Łukasz Turski, Centre for Theoretical Physics, Polish Academy of Sciences – Chairman of the Council

Prof. Aleksander Bursche, Department of Archaeology, University of Warsaw – Deputy Chairman of the Council

Prof. Marek Abramowicz, Prof. Emeritus of Chalmers University, Göteborg

Prof. Roman Cieślak, Rector of the SWPS University of Humanities and Social Sciences

Prof. Magdalena Fikus, Prof. Emeritus of the Institute of Biochemistry and Biophysics, Polish Academy of Sciences

Catherine Franche, Executive Director of the European Network of Museums and Science Centres ECSITE

Maya Halevi, Director of the Bloomfield Science Museum in Jerusalem

Prof. Dariusz Jemielniak, Vice-President of the Polish Academy of Sciences, head of the MINDS (Management In Networked and Digital Societies) Department at Kozminski University

Maria Mach, General Director of the Polish Children's Fund

Mirella Panek-Owsiańska, expert in CSR and social communication; co-founder of the "Space for Girls" foundation.

Prof. Tomasz Sowiński, Institute of Physics, Polish Academy of Sciences

Dr. Barbara Streicher, Managing Director, ScienceCenter-Netzwerk, Austria

Prof. Tomasz Szkudlarek, head of the Department of Philosophy of Education and Cultural Studies, Institute of Pedagogy, University of Gdańsk

Prof. Jan Szmidt, head of the Department of Microsystems and Electronic Materials Technology, Institute of Microelectronics and Optoelectronics, Warsaw University of Technology

Rosalia Vargas, President of the Portuguese National Agency for Scientific and Technological Culture "Ciência Viva" and Director of the Pavilion of Knowledge in Lisbon

Hanna Wróblewska, Vice-President of the ICOM POLSKA National Committee of the International Council of Museums, Deputy Director for Academic and Exhibition Affairs at the Warsaw Ghetto Museum

The Management of the Copernicus Science Centre

Robert Firmhofer – Chief Executive Officer

Irena Cieslińska – Programme Director

Joanna Kalinowska – Director for Development

Ewa Kloc – Administrative Director

Anna Lipińska – Deputy Programme Director for Visitor Experience

Dr. Ilona Łłowiecka-Tańska – Deputy Programme Director for Innovation (prior to 31.03.2023: Krzysztof Murawski)

Dr. Katarzyna Młynek – Deputy Programme Director for Education and Science Communication

Barbara Juszcak – Deputy Administrative Director, Chief Accountant

The Copernicus Science Centre is a member of the following organizations:

European Network of Science Centres & Museums (ECSITE)

Association of Science and Technology Centers (ASTC – in 2023, Copernicus CEO Robert Firmhofer became secretary of the board)

SPiN Association

European Science Engagement Association (EUSEA)

International Planetarium Society (IPS)

International Laser Display Association (ILDA)

EU ThinkTank

Polish Conference & Congress Association

Power of 4

In 2025, we will be proud to host the annual ECSITE conference!

For us, being part of the ECSITE network, which we joined during our institution's formative years, is like being part of a family. ECSITE's annual conference is a prime opportunity to share experiences, best practices, and forge partnerships for collective initiatives. Organizing this prestigious event is a tremendous honour and a unique chance to display the wealth of our activities to European science centre representatives. Copernicus' Director for Development, Joanna Kalinowska, has joined the conference's programme committee.

Awards

In 2023, Copernicus CEO Robert Firmhofer received the “Mermaid of Warsaw” statuette, an honour bestowed during the ceremonial 85th session of Warsaw City Council for contributions to the capital city. Firmhofer was recognized as a co-creator and director of the Copernicus Science Centre, a science advocate, and a visionary who has propelled the growth of an innovative institution that supports Warsaw’s strategy as a welcoming, open metropolis and has contributed to revitalizing Warsaw’s Powiśle district and enhancing the city’s international reputation.



Robert Firmhofer accepting the award from Ewa Dorota Malinowska-Grupińska – Chairwoman of Warsaw City Council (left).

The “Sunflower” awards are given by the portal czasdzieci.pl, recognizing the most developmental initiatives for children up to 14 years old. This year, the Science Picnic won the parents’ award in the “Nature” category, and the “Young Girl Builders” project received the Jury’s distinction in the “Movement” category.



“Sunflowers” for the Science Picnic...



... and for the “Young Girl Builders”.

Our laser effects specialist Mateusz Wyszyński won the top award for “planetarium laser show” from the International Laser Display Association (ILDA). His creation, the Cyber-show, was highly commended by the jury.



Mateusz Wyszyński at work.

The Copernicus Science Centre is a cultural institution.

Its organisers are the Capital City of Warsaw, the Minister of Science and Higher Education, and the Minister of National Education.

Legal Basis

Agreement from 1.06.2005 on creating a joint cultural institution named the Copernicus Science Centre, with annexes from 21.06.2006, 26.07.2010, 24.06.2014 and 3.11.2015.

Granted the status of a cultural institution named the Copernicus Science Centre on 1.06.2005, with amendments from 21.06.2006, 26.07.2010, 24.06.2014 and 3.11.2015.

Polish Parliamentary Act dated 25.10.1991 on organising and implementing cultural activities

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Adam Kozak: pp. 6, 21, 73

Jan Król: p. 89

Robert Łoziński: p. 78

Franciszek Mazur: cover, pp. 7, 81

Katarzyna Nowicka: pp. 7, 17

Agata Steifer: pp. 28, 29, 30

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Organisers



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Ministerstwo
Edukacji Narodowej

Ministerstwo Nauki
i Szkolnictwa Wyższego

Strategic Partner

SAMSUNG

Supporting
Partner

plus