COST ACTIONS ADDRESSING PRESSING CHALLENGES

Annual Report 2024

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

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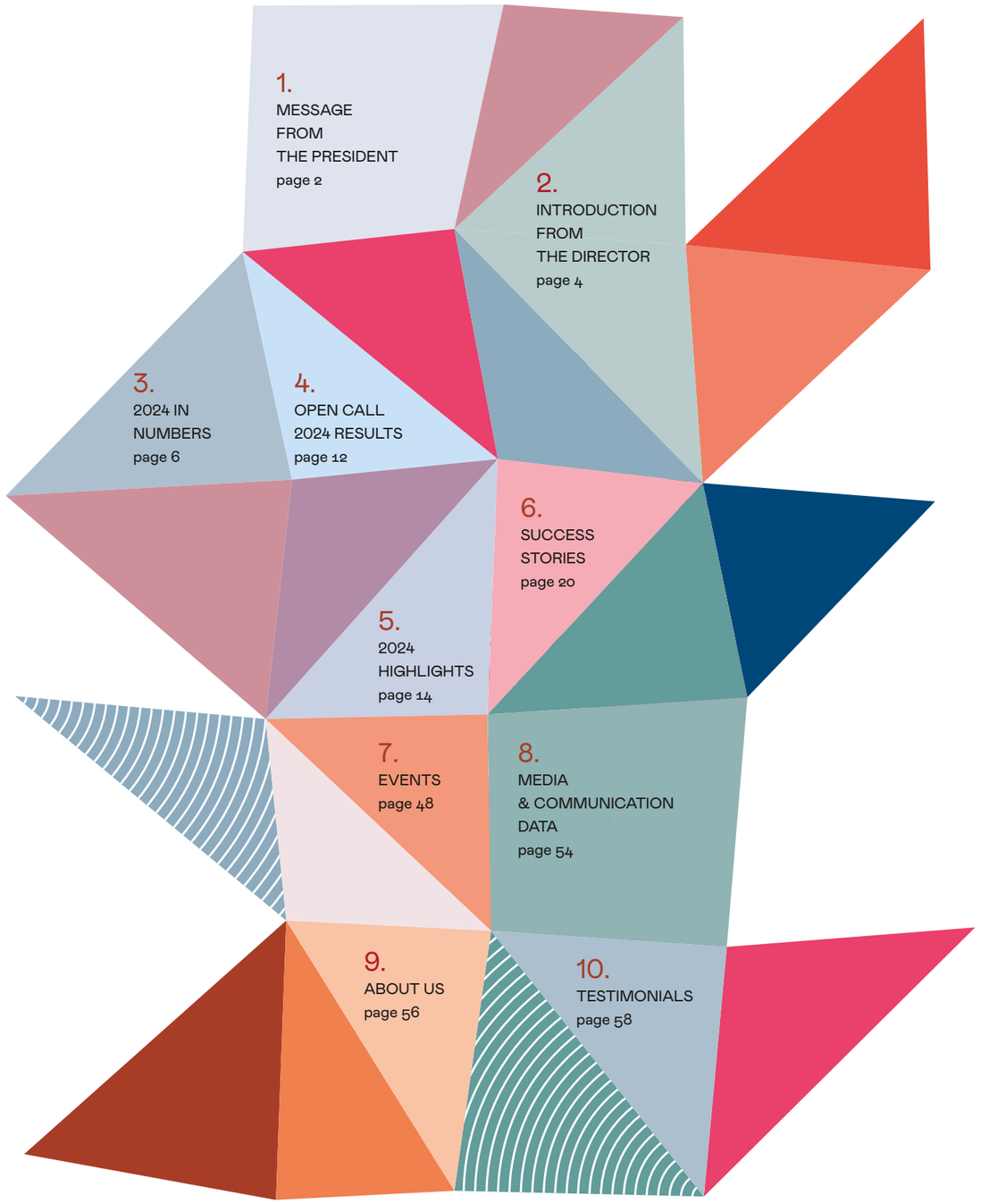

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MESSAGE FROM THE PRESIDENT

COST engages with European strategic priorities

"COST Actions demonstrate their direct contribution to key EU strategic priorities."

Prof. Salvatore Grimaldi,
President of the COST Association

As we reflect on another remarkable year for COST, it is clear that our networks continue to play a crucial role in advancing the European Research Area (ERA) and supporting the strategic priorities of the European Union. This year's Annual Report highlights inspiring success stories from COST Actions, from tackling climate change and fighting cancer to advancing smart cities and protecting our oceans and soil.

COST is instrumental in bridging the innovation divide and participation gaps in Europe. One of COST's greatest strengths lies in its ability to foster bottom-up, pan-European networks that enable researchers to address mission-specific challenges with agility and creativity. COST Actions serve as crucial platforms for interdisciplinary collaboration, connecting experts across disciplines, institutions, and countries. This inclusive approach ensures that scientific excellence is not confined to specific regions or institutions but is shared across the entire continent, enhancing the EU's collective capacity to address the most pressing societal challenges of our time. In 2024, we have seen a growing alignment of COST Actions with the EU's R&I Missions. 46% of Actions address mission-related topics: 22% support the fight against cancer, 10% contribute to climate-neutral and smart cities, 6% are dedicated to restoring our oceans and waters, 5% on adaptation to climate change and 3% on soil Deal for Europe. This strong alignment underscores COST's essential role in advancing Europe's strategic priorities.

COST offers simple and low-barrier processes for universal access to networks of excellence, making COST a crucial player in the continuous development of the ERA. With small grants, we deliver big leverage. a clear example is that participation in COST leads to anumber of follow-up proposals submitted for collaborative research under Horizon Europe, with an impressive success rate of almost 40%.

It is crucial to take advantage of the pool of talent that exists in the younger generation and offer them diverse career perspectives so they can develop and exploit their full potential. COST enables young researchers and innovators to quickly build a network of peers, obtain practical experience within pan-European collaborative research, and access training opportunities to build leadership capabilities. More than 40% of researchers involved in COST Actions are young researchers and almost 20% of the leadership positions are filled by them. We are proud to reinforce measures for young researchers and innovators from 2024 onwards.

Preparations for the 10th EU Framework Programme for Research and Innovation are underway and COST is fully ready to scale up. As stated in our FP 10 Position Paper, COST is ready to scale-up with an increased budget and scope to fund more networks and reach our full potential as the leading networking tool in the ERA.

As we move forward, COST remains committed to supporting EU priorities and ensuring that networking remains at the forefront of European science and technology cooperation. By empowering researchers, we continue to be a driving force in addressing the challenges that define our time. Together, we are building a stronger, more connected ERA.

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INTRODUCTION FROM THE DIRECTOR

Creating value for the community every day

"The overwhelming response to our 2024 Open Call, a 62% increase, highlights COST's growing influence in the European research landscape."

Dr Ronald de Bruin,
Director of the COST Association

Reflecting on 2024, I am pleased to report an unprecedented response to our 2024 Open Call for proposals. 845 proposals were submitted, a staggering 62% increase from the previous year. This overwhelming participation highlights COST's growing influence in the European research landscape, reinforcing its vital role in fostering collaboration. In Autumn 2024, we funded 60 new COST Actions, bringing the total number of active COST Actions throughout the year to 324.

Over the past year, more than 60,000 researchers and innovators engaged with COST, representing a one-third growth since the start of Horizon Europe. The COST Actions form a unique means to foster the inclusion of researchers from all over Europe and beyond. This helps create lasting networks of excellence that strengthen the European Research Area. To maximise the impact of COST Actions, COST embraces a philosophy of stewardship. From the moment a COST Action is launched, we accompany it throughout its four-year journey, providing continuous support and empowerment through a variety of innovative tools, such as the COST Academy, the COST Innovators Grant and the COST Connect events. These added-value activities are prime examples of how we enhance the effectiveness and impact of COST Actions.

The COST Academy plays a crucial role in supporting lifelong learning by equipping participants with transferrable skills. A mere example is that 54% of young researchers and innovators from Inclusiveness Target Countries who completed the leadership programme ended up in a leadership position in a new COST Action.

Bridging the gap between science and industry remains key at COST. The COST Innovator Grant was established to accelerate breakthrough innovations by unlocking the potential of COST Actions to develop marketable applications and societal solutions. In 2024, we awarded 6 COST Innovator Grants providing an additional year of funding contributing to the EU competitiveness agenda.

Scientific progress does not happen in isolation and providing networking opportunities is at the heart of the COST mission. Through the organisation of 8 COST Connect events, we provided a structured environment where participants of various COST Actions and stakeholders can meet, network, and create synergies on high-priority topics on the EU policy agenda. Examples include forest protection and sustainability, water management, and the blue economy. COST Connect serves as a dynamic platform for fostering multi-stakeholder partnerships, ensuring that research and innovation communities work together to drive impactful change.

60,000
researchers and innovators active in COST networking activities

So delve into 2024's facts and figures, explore the different events and highlights, and let's keep creating value for the community, providing the best environment where people and ideas can grow without limits.

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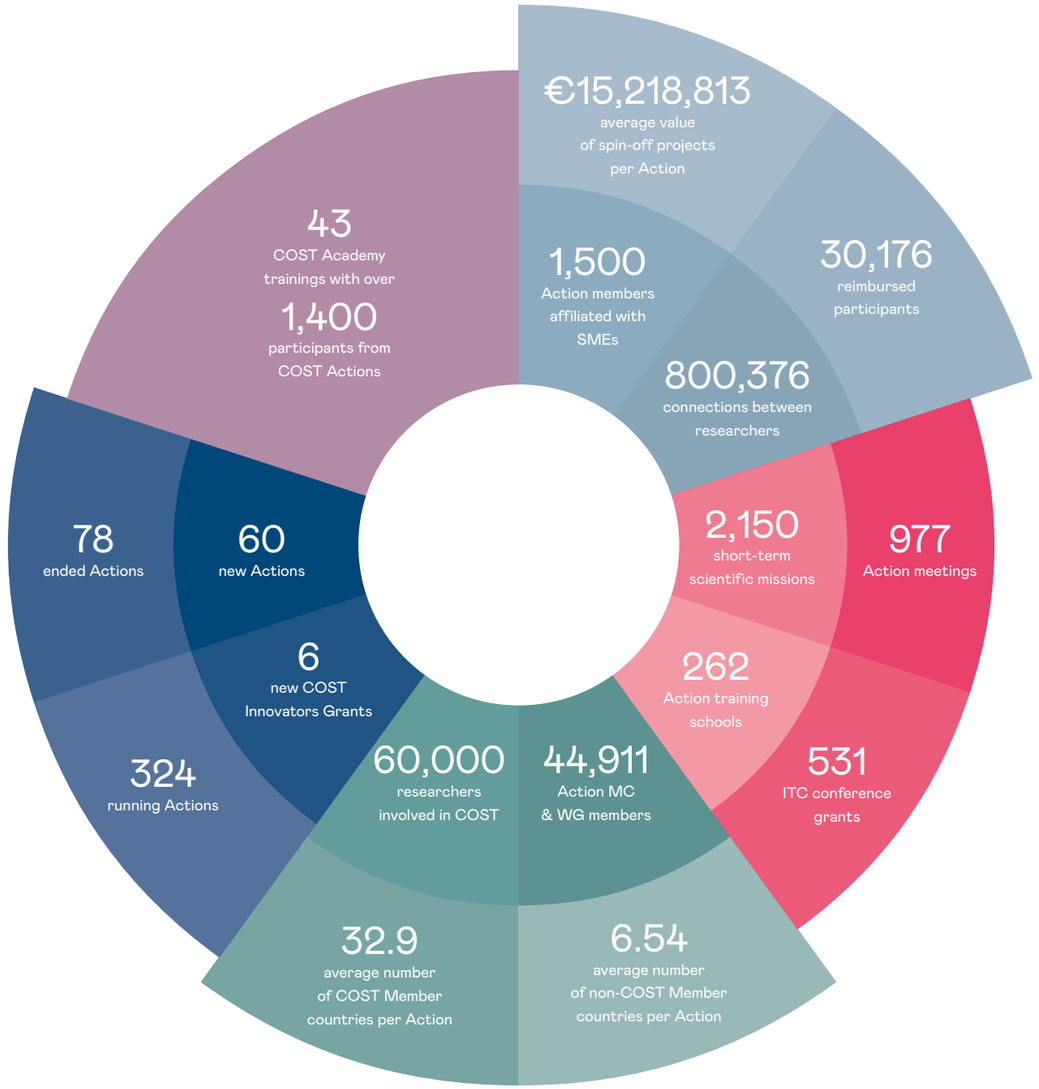
2024 IN NUMBERS



Annual Report 2023 ↓

Annual Report 2022 ↓

Annual Report 2021 ↓

Financial overview

COST is a global framework whose core activity is the networking of researchers and stakeholders from public and private institutions, NGOs, industry, and SMEs.

COST is financed as a Coordination and Support Action in the form of Multi-Annual Specific Grant Agreements (SGAs) within a seven-year Framework Partnership Agreement under Horizon Europe. The budget dedicated to COST stems from the Work Programme 11 Widening participation and strengthening the European Research Area. The total contribution in the first Multi-Annual SGA totals EUR 153 million. In its 3rd and last period of the Multi-Annual SGA from 1 November 2023 to 31 October 2024, the total budget was of EUR 55,745,863.

COST is a global framework whose core activity is the networking of researchers and stakeholders from public and private institutions, NGOs, industry, and SMEs. It carries out its activities on a multi-annual basis, which means the networks funded by the COST Association – the COST Actions – run for four years and are implemented under decentralised management, namely the COST Grant System.

2024 IN NUMBERS

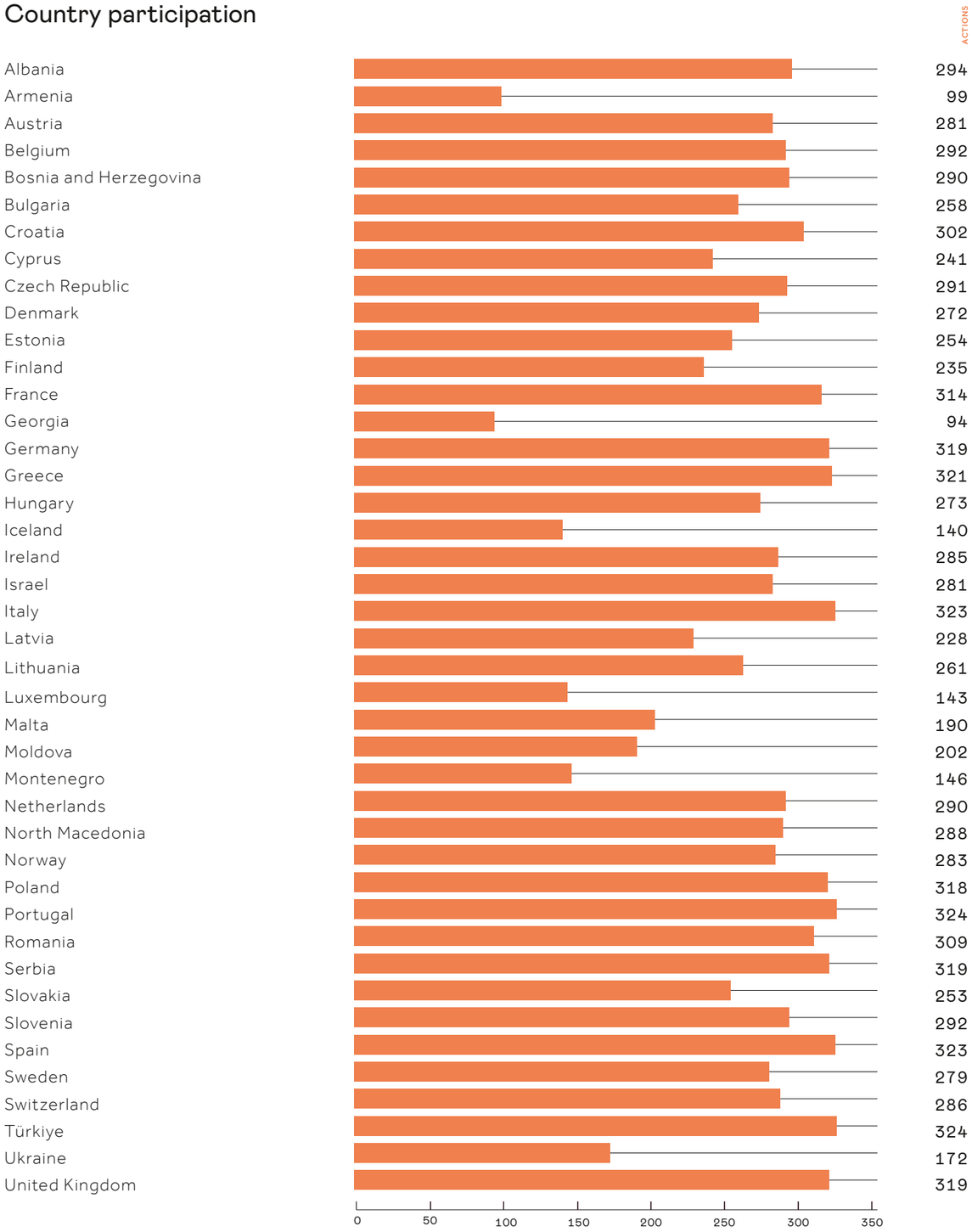
€153 M

COST budget
(in Horizon Europe
for a 3-year period)

€155,000

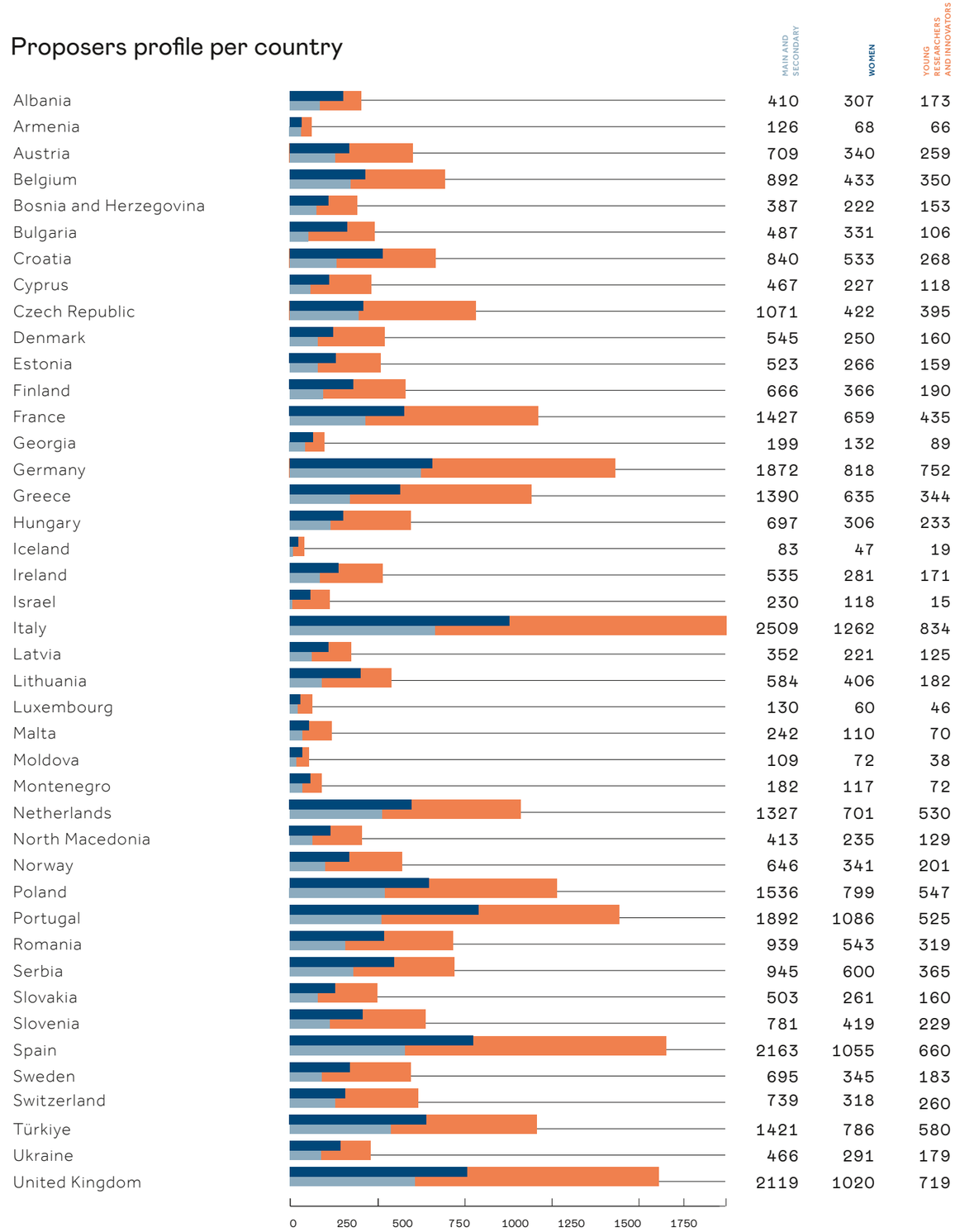
Average annual budget
of a COST Action

Country participation



2024 IN NUMBERS

Proposers profile per country



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OPEN CALL 2024 RESULTS

+62% INCREASE VS. OPEN CALL 2023

The highest number of proposals ever submitted!

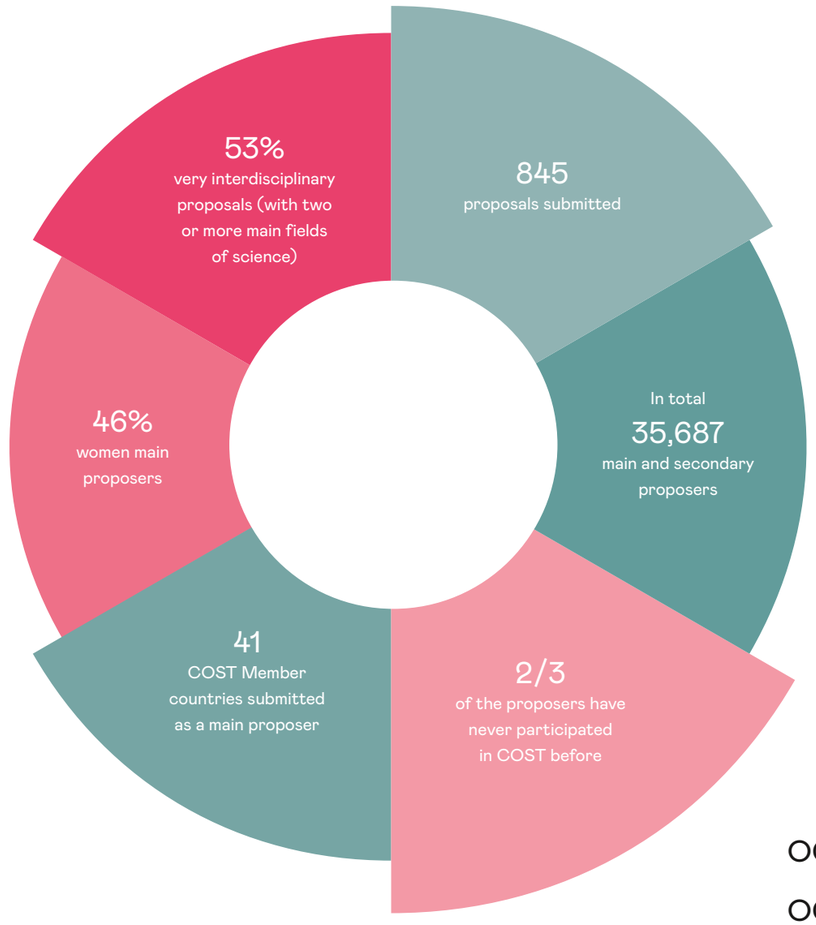
OVER **35,000** MAIN AND SECONDARY PROPOSERS

FROM **41** COUNTRIES

LARGEST EVER NUMBER OF

WOMEN MAIN AND SECONDARY PROPOSERS

MORE **INTER-DISCIPLINARY** PROPOSALS



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2024 HIGHLIGHTS

January

FP10 position paper: COST – the leading networking tool in the ERA

Since 1971, COST has pursued its mission by supporting bottom-up, excellence-driven, open and inclusive networks in all fields of science and technology. These networks have consistently demonstrated their value and given this track record, COST is well positioned to play an expanded role in the forthcoming 10th EU Framework Programme for Research and Innovation (FP10). The position paper outlines COST's role in the European Research Area and explains why it would benefit from COST's increased involvement and expertise.

February

Celebrating the 5th anniversary of the South-African-COST partnership

In 2019, South Africa became COST's first Partner Member, kicking off a thriving partnership that now involves 80 South African researchers in 52 COST Actions in fields ranging from public health to green technology. Their participation has more than doubled since 2019, while opening new pathways to funding opportunities in the European Research Area.

March

Webinar: how to submit COST Action research to Open Research Europe

COST Webinar from March 2024 informed COST Actions how to submit their research to Open Research Europe, the European Commission's Open Access publishing platform for research.

2024 HIGHLIGHTS

April

COST Connect on Water Management, Ecosystems and the Blue Economy

This COST Connect served as a dynamic platform for action, bringing together diverse stakeholders to identify cross-sector synergies and exchange innovative solutions for water-related challenges, ultimately accelerating progress toward sustainability and resilience.

May

60 new COST Actions ready for takeoff

COST's governing board, the Committee of Senior Officials confirmed the funding of 60 new COST Actions, that cover topics as varied as the impact of climate change on mental health, digital technologies to improve civic engagement, optimising insect nutrition, augmented reality in forestry, and alternative approaches to automated cancer detection.

June

COST and the U.S. National Science Foundation sign a Memorandum of Understanding

The Memorandum of Understanding marks a new step forward in developing international collaboration that is needed in the research community. It will last for the next three years to assess the progress made in the implementation and potentially develop further cooperation activities with the option to renew it further.

Six new COST Innovators Grants approved

To explore their innovation potential, six COST Actions have been awarded one-year COST Innovators Grants.

2024 HIGHLIGHTS

July

New COST Action outputs on Open Research Europe

New research from twenty COST Actions is now available on Open Research Europe, featuring groundbreaking studies on antibiotic detection in honey, innovative approaches to Parkinson's disease treatment, animal welfare enrichment strategies, and the documentation of historical sites linked to migrant women.

August

Summer break

September

COST highlights strong research cooperation with Western Balkans at Ministerial Meeting

COST opened the Western Balkans Ministerial Meeting in Skopje with a dedicated session highlighting its key role in promoting research cooperation in the region. a newly presented study showed an impressive doubling of their participation in COST since 2014.

2024 HIGHLIGHTS

October

Open Call 2024

In an unprecedented display of research collaboration interest, the 2024 COST Actions Open Call witnessed record-breaking participation, with the highest number of proposals ever. This remarkable surge represented a 62 percent increase from the previous year's submissions.

COST Connect on advancing research to achieve the United Nations Sustainable Development Goals

This COST Connect workshop highlighted the alignment between COST Actions and UN Sustainable Development Goals. Approximately 30 COST Action networks presented their research initiatives and established connections to SDG objectives. The event focused on identifying challenges, developing UN partnerships, and strengthening collaboration opportunities between COST Action researchers and UN agencies.

November

Young Researcher and Innovator Conference grant

As of 1 November 2024 COST introduced a new Young Researcher and Innovator Conference grant which will be offered by COST Actions to facilitate attendance at beneficial international conferences that are not organised by the Action.

Gender Equality Plan

The idea of this Gender Equality Plan is to encourage COST Actions to incorporate a gender dimension in their activities and provide suggestions on how to advance gender equality in what they do. Its aim is to promote an inclusive culture at the level of both the Administration, as well as the Actions, and create a 'gender equality mindset' among Action participants.

December

COST Academy video

A new COST video Train today, lead tomorrow with COST Academy has been released highlighting the inspiring and transformative work of the COST Academy. The video, available on YouTube, captures the dynamic and engaging experience of COST Academy trainings.

Launch of the Cross-Cutting Activity on career development of young researchers

COST has launched a new Cross-Cutting Activity (CCA) focusing on improving career development conditions to attract and retain top research talent in Europe. This initiative, which will run until November 2026, brings together young researchers, career advisory experts, and key stakeholders to promote balanced brain circulation and stronger career prospects for young researchers.

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SUCCESS STORIES

The European Union's Missions address some of society's greatest challenges – from combating cancer and climate change to protecting our water, soil and cities. COST Actions play an important role in advancing these missions through collaborative research networks that turn scientific knowledge into practical solutions.

Across Europe, these networks are delivering concrete results: developing climate adaptation strategies that make communities more resilient, improving our understanding of water systems – from coastal zones to freshwater resources – and accelerating urban sustainability through clean energy and smart design. In rural areas, COST Actions strengthen the foundations for environmental and food security by protecting soil health and supporting community development. Meanwhile, in health, these networks are driving progress in cancer research and treatment, bringing together experts to develop innovative approaches from drug development to diagnostic tools.

These success stories highlight how COST's unique approach to scientific collaboration – bringing together researchers, practitioners and stakeholders across borders and disciplines – directly supports EU Missions. Through their work, these Actions not only advance scientific understanding but also provide tested solutions that help build a more sustainable, healthy and resilient Europe.

ADVANCING CANCER TREATMENT THROUGH COST ACTIONS

Cancer is a major challenge in the modern world, affecting millions of people across Europe. The prevalence of this disease requires the development of innovative and complementary treatment approaches.

COST Actions are at the forefront of cancer research, driving innovation and progress in treatment. Three examples among many COST Actions dedicated to cancer research include initiatives focusing on novel drug resistance mechanisms, advancing gynaecological cancer awareness and research, and developing innovative diagnostic tools using nanotechnology. These and other collaborative efforts are contributing to the fight against cancer, providing hope and better outcomes for patients.

The power of astatine-211

Among the available treatments, astatine-211 is emerging as a game-changer in cancer therapy. By exploiting its unique properties, the COST Action 'Network for Optimized Astatine labeled Radiopharmaceuticals (NOAR)' aims to establish it as the gold standard for treating certain cancers in Europe.

Astatine-211's unique properties make it an excellent option for treating residual diseases such as blood, ovarian, and certain types of brain cancer. *"One of the key advantages of Astatine-211 is its ability to precisely target cancer cells"*, says the Action Chair Jean-François Gestin of the ARRONAX group (Accelerator for Research in Radiochemistry and Oncology at Nantes Atlantic, France). *"Its alpha-emitting properties minimise damage to healthy tissue while maximising the therapeutic effect. Because of its relatively short half-life of 7.2 hours and the potential for outpatient treatment and better waste management, astatine-211 represents a safer, more patient-friendly option for cancer therapy,"* explains Jean-François.

NOAR final conference, Nantes, October 2024

ALPHA SUCCESS

NOAR has achieved remarkable results through collaboration and partnerships by increasing astatine-211 production and defining optimal transportation conditions. The Action has advanced radiolabeling chemistry, which has facilitated the development of novel radiopharmaceuticals. Additionally, it has laid the groundwork for a Phase I clinical trial targeting non-muscle invasive bladder cancer. a key aspect of NOAR's mission is the establishment of Astatine-211 nodes strategically located across Europe. These nodes will serve as hubs of innovation and will include essential facilities

ADVANCING CANCER TREATMENT THROUGH COST ACTIONS

such as cyclotrons, radiopharmacy, imaging centres and patient injection facilities. NOAR's goal is clear: to standardise treatment protocols and ensure equitable access to cutting-edge cancer therapies for all European patients.

NOAR has actively engaged with international scientific communities through congress presentations, symposiums, and events like the Nuclear Medicine Europe conference. The Action has also collaborated with global partners such as the US Department of Energy and the Japan Atomic Energy Commission. *"Proud of this achievement, we have decided to continue the work of COST NOAR by creating an association (NOAR Europe) that will take over some of the work done"*, says Jean-François Gestin. *"A new page is being written that will be integrated into the World Astatine Community, and the NOAR Europe will represent the European part of this new consortium"*.

Prof. Jean Calleja-Aguis of the University of Malta

Advancing research for women and girls

The COST Action 'European network for Gynaecological Rare Cancer research: From Concept to Cure (GYNOCARE)', led by Professor Jean Calleja-Aguis of the University of Malta, focused on rare gynaecological cancers. Despite the term 'rare', these cancers affect over 9 million girls and women every year. With more than a decade of experience in COST Actions related to pregnancy, the Chair saw the potential for COST to bring together experts from different fields to address these gynaecological diseases. *"I wanted to finally see a COST Action combining women's health and rare diseases, in particular rare gynaecological cancers,"* she explains.

GYNOCARE's results include bringing brachytherapy treatment for cervical cancer to Malta in early 2023, eliminating the need for patients to travel to London for treatment. This was achieved through collaboration between GYNOCARE members, the Sir Anthony Mamo Oncology Centre, and the International Atomic Energy Agency.

The scientific impact of the Action is evident in the 40 open-access publications, contributions to the European Journal of Surgical Oncology and updates to the international reference textbook on rare gynaecological cancers. One notable innovation was the VeressPLUS needle, developed in collaboration between the University of Malta and Delft University of Technology. This surgical instrument improves the safety of invasive procedures by reducing the risk of overshooting – the needle going too deep after penetrating the abdominal wall – by at least 50% – particularly important for patients with unusual pelvic anatomy.

Jean Calleja-Aguis proudly notes: *"We managed to complete this Action successfully and achieve even more than expected"*.

The dedication and hard work of the members of GYNOCARE has not gone unnoticed. Prof. Calleja-Agius has been presented with the Giovan Giacomo Giordano NIAF Lifetime Achievement Award for Ethics and Professionalism in Medical Research. Dr Sharon O'Toole, Leader of a working group, won the Best Healthcare Campaign 2023 Award for Excellence in Public Relations. GYNOCARE has empowered patient advocacy groups by involving them in research and clinical trials to make their voices heard, raise awareness and address health inequalities. The network has also contributed to policy discussions, connecting with major EU initiatives such as the EU Mission on Cancer and Europe's Beating Cancer Plan.

ADVANCING CANCER TREATMENT THROUGH COST ACTIONS

EXTRATERRESTRIAL GYNAECOLOGY

One of the Action's outstanding achievements has been its collaboration with the National Aeronautics and Space Administration (NASA), resulting in a publication on the potential cancer risks of space travel for female astronauts This research examines how microgravity and radiation affect radiation-induced cancers such as lung, thyroid, breast and ovarian cancers in female astronauts and highlights the need for more research to ensure safer space missions and effective post-flight care.

The fingerprints of cells

One of the most fascinating outcomes of the COST Action 'Functional Glyconanomaterials for the Development of Diagnostics and Targeted Therapeutic Probes (GLYCONanoPROBES)' was the identification of the many specific conditions required to activate an effective personalised immune response against cancer. The Action explored the vital role of carbohydrates in cell functions. Every cell is coated with carbohydrates in the glycocalyx, which helps with cell signalling, adhesion, and growth. The glycocalyx acts like a fingerprint, helping the body recognise healthy, diseased, and foreign cells. This is crucial for cancer detection, as changes in these carbohydrates can serve as tumour markers. These markers are essential for early cancer detection, prognosis, and developing more targeted and effective cancer treatments.

The GLYCONanoPROBES Action also facilitated groundbreaking collaborations between scientists working on innovative nano-sized materials, such as chitosan (a natural biopolymer derived from chitin, found in the shells of crustaceans), hydrogels, peptide fibres, and nanoparticles. The Action worked with experts in glycans, which are sugars-containing molecules that play crucial roles in cell functions. These partnerships have led to the development of new glycosylated nanomaterials—nano-sized materials with attached sugar molecules—that have been the subject of patents and publications. These materials show promise in treating bacterial infections, combating antimicrobial resistance, and acting as immunostimulants in cancer treatment, either alone or in synergy with chemotherapy or radiotherapy.

Empowering young researchers and innovators

All three COST Actions have significantly benefited young researchers and innovators by integrating them into expert networks and fostering personal relationships through short-term scientific missions (STSMs). These research visits have enabled young researchers to acquire new skills and strengthen their CVs, thus improving their prospects for academic career advancement and new positions.

The NOAR Action has fully dedicated its STSMs and Inclusiveness Target Countries (ITC) conference grants to young researchers. In the case of the GYNOCARE Action, young researchers and innovators from countries and regions that normally do not have access to collaborative opportunities have not only benefited from the networking tools (e.g. training schools, conferences, STSMs) offered by COST but have also been empowered to start organising their own national conferences through their professional societies in collaboration with local patient support and advocacy groups.

Members of the GLYCONanoPROBES Action (from left to right): Maria Chatzinikolaidou, Cristina Nativi and Carmen Galan

ADVANCING CANCER TREATMENT THROUGH COST ACTIONS

Several young researchers in GLYCONanoPROBES secured academic positions or received prestigious grants such as Marie Skłodowska-Curie Actions or EU bilateral projects. a notable highlight was the organisation of a joint symposium of young researchers and innovators from GLYCONanoPROBES and another COST Action, 'Innovation with Glycans: new frontiers from synthesis to new biological targets (INNOGLY)'. At this event, participants shared their research results and discussed future collaborative initiatives, exemplifying the spirit of cooperation and innovation fostered by COST. Prof Carmen Galan of the University of Bristol and Cristina Nativi of the Università degli Studi di Firenze, Chair and Vice-Chair of GLYCONanoPROBES, reflect: *"One of the most gratifying aspects of our network has been to see early career researchers grow both personally and scientifically, reaching milestones that will shape the future of glycan-based research"*.

READ MORE

→ Network for Optimized Astatine labeled Radiopharmaceuticals (NOAR)

→ European network for Gynaecological Rare Cancer research: From Concept to Cure (GYNOCARE)

→ Functional Glyconanomaterials for the Development of Diagnostics and Targeted Therapeutic Probes (GLYCONanoPROBES)

→ Innovation with Glycans: new frontiers from synthesis to new biological targets (INNOGLY)

COST ACTIONS: GREEN SOLUTIONS FOR A HOT PROBLEM

As Europe faces the growing challenges of climate change, the European Union is mobilising scientific networks to deliver concrete solutions.

Three COST Actions demonstrate how targeted research collaboration directly supports the EU's mission of *"a climate-resilient Europe"* by translating scientific knowledge into practical climate adaptation strategies. From innovative techniques to reduce pollution in urban areas to ecosystem restoration in degraded landscapes, to data-driven forest management across biogeographical regions, these COST Actions demonstrate the power of pan-European scientific collaboration. Their work not only advances climate science, but also provides local communities and policymakers with tested approaches to building climate resilience.

PHOENIX: turning pollution into clean water and power for building climate resilience

The COST Action PHOENIX has made remarkable progress in the development of bioelectrochemical systems (BES), which offer an innovative way of restoring polluted environments. By integrating satellite imaging with BES technology, PHOENIX has developed strategies to reduce pollutants, recycle valuable elements and even generate electricity. BES exploit the biological activity of microbes, to turn wastewater into a clean resource while generating enough electricity for basic needs such as lighting and charging devices.

What makes this Action unique is its strong focus on empowering local communities to address environmental challenges. Dr Andrea Pietrelli, the Action Chair of the University of Rome La Sapienza, emphasised,

PHOENIX Final Conference, Naples, 2024

"The simple adoption of BES at the household or community level can significantly reduce environmental damage."

PHOENIX has fostered collaboration across countries and disciplines, bringing together experts from engineering to social sciences to address complex environmental problems of climate change. What's more, this work doesn't stop at the end of the Action. *"PHOENIX has been successful in its application for the COST Innovators Grant,"* says Andrea, *"which is an exciting opportunity to develop the BES technology into a business plan for widespread, equitable deployment in society."* The grant will ensure the long-term impact of the BES technology and position it as a commercially viable solution for sustainable development.

COST ACTIONS: GREEN SOLUTIONS FOR A HOT PROBLEM

BOTTOM-UP: forests fight back

The BOTTOM-UP COST Action is addressing the sustainability of forest management, as a contribution to the fight against climate change. The network has brought together experts and stakeholders to ensure that forests continue to thrive in a changing climate. *"The Action has tested forest health indicators, such as 'tree species richness' and 'deadwood', with promising results"*, explains Dr Sabina Burrascano of the University of Rome La Sapienza, *"The Action has also agreed on concepts and methods that have been disseminated throughout the scientific and conservation community, laying the foundation for effective forest ecosystem monitoring, which is being promoted within the European Commission ahead of the new Forest Monitoring Law."*

> "The BOTTOM-UP COST Action has laid the foundation for effective forest ecosystem monitoring, which is being promoted within the European Commission ahead of the new Forest Monitoring Law."

A major success of BOTTOM-UP has been its ability to nurture the next generation of researchers. Lucas Chojnacki, a young researcher at the University of Maastricht who joined the Action while working on his bachelor's thesis, said: *"Thanks to COST, I developed essential skills in data management and analysis. But most importantly, I met amazing researchers – some of whom became close friends and others with whom I still collaborate"*. Lucas also praised the COST Action training schools as both educational and an excellent platform for networking with peers in forest ecology. These networking activities ensure that the next generation of researchers is well prepared to tackle the complex environmental challenges posed by climate change.

BOTTOM-UP Final Conference, Rome, 2024

PEN-CAFoRR: nurturing forests for the future

PEN-CAFoRR is another COST Action focused on growing challenges of forest restoration in an evolving climate. *"By the end of the Action, we will produce a set of comprehensive guidelines for reforestation and forest restoration interventions in a changing climate,"* says the Action Chair, Prof. Vladan Ivetić from the University of Belgrade – Faculty of Forestry. *"These guidelines are based on science, but focus more on technical aspects and are written for readers who are involved at an operational level"*

COST ACTIONS: GREEN SOLUTIONS FOR A HOT PROBLEM

PEN-CAFoRR Action training school in Denmark, 2021

"Our guidelines are valuable for forest nursery managers who play a key role in ensuring the availability of high-quality forest reproductive material, as well as for forest managers and professionals involved in forest restoration projects", adds Dr Barbara Mariotti, the Action Vice-Chair from the University of Firenze. *"We are also extending our focus to forest scientists who can benefit from the evidence-based knowledge and methods"*.

Action training schools have given participants hands-on experience with forest restoration techniques. One outstanding event was a two-part training school in Sweden and Spain, where participants explored forest seedling technologies in the Boreal and Mediterranean regions and learned how different climates require tailored approaches.

A key output of PEN-CAFoRR is the ForestRestoration-Wiki, a platform for sharing knowledge and expertise on forest restoration across Europe. This resource is particularly timely as traditional forest management approaches are becoming less effective due to more frequent and extreme weather events such as droughts, heat waves, and frosts. The Action leaders are committed to keeping the ForestRestorationWiki active beyond the Action's lifetime, ensuring that it remains a vital hub for knowledge exchange.

PHOENIX, BOTTOM-UP and PEN-CAFoRR show how collaboration and innovation can lead to real progress in the fight against climate change. These COST Actions not only advance scientific research but also create practical, sustainable solutions that empower communities, researchers and policymakers alike. From reducing pollution with cutting-edge bioelectrochemical systems to conserving forest biodiversity and developing guidelines for reforestation, these Actions play a crucial role in Europe's mission to mitigate climate change.

READ MORE

→ Protection, Resilience, Rehabilitation of damaged environment (PHOENIX)

→ Biodiversity Of Temperate forest Taxa Orienting Management Sustainability by Unifying Perspectives (BOTTOMS-UP)

→ Pan-European Network for Climate Adaptive Forest Restoration and Reforestation (PEN-CAFoRR)

COST ACTIONS SHAPING WATER RESEARCH

Water is at the heart of humanity's greatest challenges — from ensuring food security and public health to protecting marine ecosystems and adapting to climate change. As Europe faces increasing pressure on its water resources, COST Actions are creating vital networks of scientists and practitioners to address these complex water-related issues.

Three innovative COST Actions illustrate how European research collaboration is advancing our understanding of water systems, from coastal ecosystems and marine biodiversity to freshwater resource management.

Guardians of our rivers

When you think of mussels, you probably picture those found in the sea and served at your favourite seafood restaurant. Less well known are freshwater mussels, which play a crucial role in our ecosystems, each one filtering tens of litres of water every day. As Professor Tadeusz Zajac, Chair of the COST Action 'Conservation of freshwater mussels: a pan-European approach (CONFREMU)', points out, these remarkable creatures are essential for maintaining water quality and biodiversity.

Historically abundant and an important source of protein during crises such as the Holodomor in Ukraine in the 1930s, these mussels have declined drastically due to pollution and habitat changes. Sensitive to environmental conditions, they are used in water monitoring systems and can live for over 200 years, with their shells recording centuries of water conditions. Their unique reproduction is dependent on fish, making them vulnerable to changes in fish populations. Protecting freshwater mussels supports the health of entire freshwater ecosystems, highlighting their ecological importance and fascinating life cycle.

A juvenile of an endangered mussel species

CONFREMU'S SUCCESS IN A MUSSEL SHELL

CONFREMU has transformed our understanding of freshwater mussels. By analysing and synthesising all available research on their ecosystem functions, they have provided new insights and practical tools for conservation. Their extensive work, published in leading scientific journals, includes a comprehensive database of mussel occurrences across Europe, accessible to all. This database is essential for conservation, spatial planning, and investment assessment.

CONFREMU has also tackled complex issues of evolutionary relationships (phylogenetics) and classification (taxonomy) of mussels, highlighting the Mediterranean's role in protecting endangered species. The Action has developed a European Committee for Standardisation

(CEN) standard for mussel studies and created an Action Plan with the International Union for Conservation of Nature (IUCN) for European mussel conservation. The Action's training schools have spread complex methodologies across Europe, equipping researchers with the skills needed for advanced studies.

CONFREMUs workshop on telemetry in Poland, 2023

FUTURE DIRECTIONS

The CONFREMU network, comprising over 130 scientists from 31 countries, continues its mussel conservation efforts with the coordination centre now established around the website and the plan to establish a European branch of the Freshwater Molluscs Conservation Society. Upcoming priorities include the submission of a comprehensive Action Plan to the European Commission, developed in collaboration with IUCN, and the finalisation of the CEN standard to improve freshwater monitoring and environmental impact assessment. a comprehensive analysis of freshwater mussel occurrence in relation to water quality parameters is underway, with the aim of establishing a global freshwater monitoring system. According to the Chair, *"the most valuable outcome of the COST Action was the identification and integration of young, talented scientists into top research networks, thus securing the future of freshwater mussel research"*.

The deep blue links of the world

The ocean is a web of fascinating connections that often go unnoticed. From fixed organisms like corals, algae and mussels that hitchhike on ocean currents over vast distances in their early days, to large animals such as whales and sharks that travel thousands of miles each year to feed and reproduce, marine life shows incredible connectivity. These migrations not only span ocean basins, but also link surface and deep-sea ecosystems through nutrient cycles driven by their feeding and the release of nutrients from their bodies. In addition, the movements of species such as salmon, seals, sea turtles and seabirds carry huge amounts of nutrients from sea to land, profoundly affecting how ecosystems on land function and thrive. Understanding these movements is the goal of the COST Action 'Unifying Approaches to Marine Connectivity for improved Resource Management for the Seas (SEA-UNICORN)'.

SEA-UNICORN IS REVEALING MARINE SECRETS

The success of SEA-UNICORN has been based on robust interdisciplinary collaboration, integrating diverse research methods such as genetics, animal tagging and biophysical modelling. Dr Audrey Darnaude, Action Chair of SEA-UNICORN, highlights: *"Our efforts have established an integrated multidisciplinary framework for studying Marine Functional Connectivity (MFC) and revealing the intricate spatial fluxes of matter, genes and energy across marine habitats and basins. This holistic approach not only advances our understanding of ocean dynamics but also supports sustainable ocean management and informs global policy. We've trained a new generation of marine ecologists, managers and policymakers to this aim and raised global awareness of the critical role of MFC for ocean resilience and services to mankind"*.

COST ACTIONS SHAPING
WATER RESEARCH

Dr Audrey Darnaude, University of Montpellier, Chair of SEA-UNICORN

Audrey continues. *"Even more so when we were invited to contribute to the Ocean Decade Vision 2030 White Papers: Challenge 2: Protect and restore ecosystems and biodiversity. Finally, the positive response to our educational cartoon video and video game on MFC, especially from teachers and primary school children, makes me very happy. It underlines our success in raising awareness among new generations about this process that is crucial for the functioning of the global biosphere and the future of society"*.

Turning the tide in marine research

Marine biotechnology harnesses the unique properties of marine organisms, which produce a vast array of metabolites with antibacterial, antifungal, anticancer, analgesic, anti-inflammatory, nutritional, and other beneficial activities. This field is crucial for advancing Blue Growth and Bioeconomy strategies within the EU and contributes to 14 out of the 17 UN sustainable development goals. Despite its potential, the marine biota remains largely untapped, with nearly 30,000 natural products discovered and many more awaiting exploration. The Action 'European transdisciplinary networking platform for marine biotechnology (Ocean4Biotech)' has played a pivotal role in promoting this field by uniting experts, fostering knowledge sharing, and encouraging collaborative research. This initiative has established a unique, diverse, and geographically extensive network of marine biotechnology professionals.

"I was particularly proud when SEA-UNICORN was officially designated as a UN Ocean Decade project in 2021."

OCEAN4BIOTECH IS MAKING WAVES WITH INNOVATION

The Action's publications, biorepository, and Map of Expertise have significantly advanced the marine biotechnology community. The biorepository, in particular, was a groundbreaking achievement, providing smaller nations and Inclusiveness Target Countries with their first opportunity to participate in EU-level biorepositories. Additionally, the Map of Expertise increased visibility for many members, highlighting their skills and making them more accessible to the marine biotechnology community. These efforts underscore Ocean4Biotech's commitment to inclusiveness and knowledge sharing, greatly benefiting the field.

Ocean4Biotech made great strides in advancing marine biotechnology through proactive collaboration with policymakers. These efforts led to valuable publications, policy consultations, and the establishment of yearly events Blueware Slovenia. Ongoing publications and participation in the Scientific Committee for the upcoming XIV European Conference on Marine Natural Products in Slovenia in September 2025 further underscore the enduring legacy and continued collaboration within the Ocean4Biotech community.

Dr Ana Rotter, the Action Chair is enthusiastic: *"This journey has been a profound personal and professional growth experience, allowing me to connect with remarkable experts and kind professionals across Europe. Together, we have built not just a network, but genuine friendships—a precious achievement in the professional world"*, she concludes.

COST ACTIONS SHAPING WATER RESEARCH

The power of collaboration

The unique structure of the COST Programme facilitated the success of the CONFREMU, SEA-UNICORN and Ocean4Biotech Actions by enabling collaboration and knowledge exchange, leading to breakthroughs that would not have been possible in isolation. Professor Tadeusz Zajac notes that COST funding has enabled different researchers to work together and achieve excellent results. *"It is not technology that creates science, but people,"* he says. *"Thanks to COST funding, a professor from Cambridge collaborated with a small institute in Poland and achieved excellent results. COST is an opportunity to meet, to get to know each other, to create a good atmosphere for cooperation and to integrate people who never knew each other before"*.

OCEAN4BIOTECH in action
© Matis

Dr Audrey Darnaude agrees that *"international transdisciplinary collaboration and co-construction of science has also been key to bringing scientists and stakeholders closer together"*. According to Audrey, *"disseminating the collective knowledge on Marine Functional Connectivity to a wider audience will undoubtedly promote transboundary integrated management of marine resources and ecosystems in the near future"*.
Through the networking and collaborative framework provided by COST, Ocean4Biotech has increased the visibility and impact of marine biotechnology. This has led to several career advancements, leadership roles and collaborative projects that might not have happened otherwise. Dr Ana Rotter confides: *"Writing joint articles that also addressed horizontal and general aspects related to marine biotechnology, an exciting field of research, was a very important collaborative initiative. This exercise was very time-consuming, as the publications were only the result of our networking activities and with several colleagues whom each of us met for the first time. Nevertheless, I would do it again in a heartbeat,"* she concludes.

READ MORE

→ Conservation of freshwater mussels: a pan-European approach (CONFREMU)

→ Unifying Approaches to Marine Connectivity for improved Resource Management for the Seas (SEA-UNICORN)

→ European transdisciplinary networking platform for marine biotechnology (Ocean4Biotech)

SHAPING SUSTAINABLE CITIES

The transformation of European cities into sustainable, resilient spaces requires innovative solutions in many areas – from renewable energy and green technologies to inclusive urban design. Three COST Actions demonstrate how targeted research networks can accelerate this urban evolution through collaborative scientific discovery and practical implementation.

These Actions have catalysed breakthroughs in critical areas: advancing clean energy technologies essential for decarbonising cities, developing sustainable industrial processes that support the circular economy, and creating smart urban environments that improve the quality of life for residents of all ages.

Bringing together diverse expertise – from materials scientists and chemical engineers to urban planners and social researchers – these Actions exemplify COST's ability to address complex urban challenges through interdisciplinary collaboration.

Powering the future, splitting water, and sparking change

The COST Action 'Computational materials sciences for efficient water splitting with nanocrystals from abundant elements (CompNanoEnergy)' focused on the development of advanced materials to harness solar energy and produce hydrogen, a clean and renewable fuel. This initiative brought together scientists from different disciplines to apply a range of cutting-edge computational modelling techniques to predict the behaviour of atoms and molecules – and later integrated machine learning to accelerate research.

The primary goal of CompNanoEnergy was to design nanocatalysts, tiny materials that speed up chemical reactions, for solar-to-hydrogen conversion. By studying these materials at multiple scales, from atomic structures to practical applications, the Action advanced the understanding of how to improve their efficiency. The results were shared widely through review articles and training sessions, including a notable event in Israel in 2022, which enabled CompNanoEnergy's young scientists to master emerging topics such as machine learning and apply them to renewable energy challenges.

CompNanoEnergy Training School on Computational Materials Modeling, Haifa, 2022

The Action's success extended to securing a COST Innovators Grant, which led to the NanoCatML project, which uses machine learning to identify patterns in complex data sets, accelerating the discovery of higher-performing nanocatalysts. These innovations are crucial for Europe to meet its sustainable energy goals and strengthen its industrial competitiveness globally. As Chair of the Action Prof. Maytal Caspary Toroker of TECHNION – Israel Institute of Technology, explains:

"Our united network has advanced the understanding of the challenges in multi-scale modelling and provided realistic models meant for industry consideration. These efforts could have a real impact on industry and society".

PRACTICAL ADVANCES FOR SUSTAINABLE CITIES

CompNanoEnergy research also produced practical results. Improved materials, such as transition metal oxides, perovskites (medium hard oxide minerals), and metal-organic frameworks (MOFs), demonstrated their significant potential. For example, one discovery showed that selectively modifying MOFs increased hydrogen production efficiency by 500%. This strategy will allow materials engineering to transform environmental technologies and energy production.

The collaborations within CompNanoEnergy and Nano-CatML directly support the EU Mission on Smart Cities, which seeks to create sustainable and efficient urban energy systems. By enabling the adoption of hydrogen as a clean energy carrier and advancing solar-driven catalytic processes, the research contributes to greener, more sustainable cities.Reflecting on the Actions' impact, Prof. Toroker concludes:
"The seeds of collaboration planted in our Action are expected to grow into impactful joint projects, fostering a sustainable future for Europe and beyond."

Turning chemistry green

The COST Action 'Green Chemical Engineering Network towards upscaling sustaainable processes (GREENERING)' has made remarkable progress in promoting green chemistry by bringing together academia, industry and policymakers. These efforts are closely aligned with the EU's sustainability goals for a greener economy.

GREENERING has built an active community of over 500 participants, fostering collaboration and knowledge exchange. Chair Dr Ana Rita Duarte from the New University of Lisbon highlighted the achievement: *"A functional, proactive community for the development and implementation of green processes has been created."*

The networking and training activities of the Action have had a far-reaching impact. Two international conferences and seven 'GREENERING Bubbles' workshops trained more than 55 industry professionals in green strategies and engaged more than 35 companies. Three entrepreneurship courses equipped 60 young researchers to bring green innovations to market. Training schools and short-term scientific missions provided hands-on experience in sustainable technologies, while educational videos reached a global audience of over 17,000 viewers, raising awareness of green chemistry principles.

Dr Ana Rita Duarte, Universidade Nova de Lisboa, Chair of the GREENERING Action

INNOVATION AND ENTREPRENEURSHIP

GREENERING has also delivered significant research and innovation results. With 52 patents and 36 publications, the Action provided practical tools such as the GREENERING Expert Database, which connects stakeholders with 100 global green technology experts. Pilot-scale projects demonstrated how laboratory research can be translated into real industrial solutions. Open days further strengthened the links between academia and industry by enabling researchers to understand industry needs and tailor their efforts accordingly.

SHAPING SUSTAINABLE CITIES

A key focus of GREENERING was to empower researchers to be entrepreneurial. Courses and workshops helped participants refine business ideas and turn them into market-ready solutions. For example, a 2023 event in Portugal brought together 25 young researchers to pitch innovative green processes. Dr Duarte described the wider impact:

"Providing the necessary tools to pave the way to the market strengthens Europe's leadership in green and sustainable industries."

The legacy of GREENERING will continue through its enduring tools and initiatives. The GREENERING International Conference, to be held at Khalifa University in Abu Dhabi in 2025, will bring together stakeholders from around the world while raising a new generation of environmentally conscious entrepreneurs and scientists.

Dr Duarte summarised the achievements of the Action:

"Through creative events and tools, GREENERING has significantly improved knowledge, initiated innovative thinking and created a proactive community for a greener future."

Ageing smarter, living better

'International Interdisciplinary Network on Smart Healthy Age-friendly Environments (NET4AGE-FRIENDLY)' tackled the challenge of creating supportive environments for people of all ages. It focused on older adults and people in vulnerable situations, by promoting social inclusion, interdisciplinary collaboration, and practical solutions. The Action's primary achievement was developing the Reference Framework for Smart Healthy Age-Friendly Environments (SHAFE), a guide for integrating digital tools, Integrated care models, and sustainable solutions into everyday life. As Chair, Carina Dantas from SHINE 2Europe highlighted: *"We want to promote communities where people can learn, grow, work, socialise and enjoy healthy lives, benefiting from digital innovation and adaptable support models."*

The Action fostered collaboration among stakeholders using the 'quintuple helix' model, which brings together academia, industry, government, civil society, and environmental organisations. One key outcome was the SIRENE project, which introduced a framework for integrating social innovation in the Development of smart built environments. At the Action's final event in Brussels in October 2024, NET4Age-Friendly showcased how SHAFE could scale across EU regions and ecosystems to drive local and regional change. SHAFE also gained global recognition as a best practice for achieving the Sustainable Development Goals, selected by the United Nations.

Ms Carina Dantas of SHINE 2Europe, Lda, Chair of the NET4Age-Friendly Action

TURNING CONCEPTS INTO ACTION

NET4Age-Friendly moved beyond theoretical work to implement practical, inclusive solutions. At the New European Bauhaus Festival, participants collaborated to design solutions for a fictional family, the Garcias, addressing mobility and mental health challenges. This initiative demonstrated how SHAFE principles could solve real-world issues through innovative design and technology. The event's findings were captured in a White Paper published in April 2024, providing poli-

SHAPING SUSTAINABLE CITIES

cymakers and developers with a roadmap for creating inclusive, health-promoting neighbourhoods. Willeke van Staalduinen, Vice-Chair explained: *"This roadmap aligns policies and strategies to promote ecological, health-promoting environments."*

Final meeting of the Net4Age Action at the European Parliament Brussels, 2024

The Action also prioritised training and knowledge-sharing, equipping young researchers, policymakers, and local stakeholders with the tools to create age-friendly environments. Workshops and schools helped transfer critical expertise, empowering participants to foster intergenerational well-being.

Young researchers played a vital role, participating in hands-on activities like the 'Garcia Family' workshop. The final event included a dedicated session to train these researchers to implement SHAFE concepts in their communities, ensuring the Action's vision will continue to grow.

A LASTING LEGACY

The SHAFE Foundation, co-founded by the Action Chair and Vice-Chair, will carry forward NET4Age-Friendly's mission. This organisation will continue advancing SHAFE principles through research, policy development, and mentoring, expanding its reach across Europe and beyond through local pilot projects.

Summarising this vision, Carina Dantas noted: *"Many countries are addressing healthy ageing and digital transformation, but holistic approaches like SHAFE are still rare. Our goal is to connect fragmented efforts into sustainable networks."*

NET4Age-Friendly laid a solid foundation for creating inclusive, age-friendly communities while promoting sustainability and well-being for all generations.

READ MORE

→ Computational materials sciences for efficien water splitting with nanocrystals from abundant elements (CompNanoEnergy)

→ Green Chemical Engineering Network towards upscaling sustainable processes (GREENERING)

→ International Interdisciplinary Network on Smart Healthy Age-friendly Environments (NET4AGE-FRIENDLY)

→ Machine learning from computational materials science data for modelling nanocrystal catalysts (NanoCatML)

CULTIVATING SOIL SOLUTIONS, METAL BALANCE, AND RURAL YOUTH

Healthy soils and resilient rural communities are the backbone of Europe's sustainable future, underpinning both food security and ecosystem health. Three innovative COST Actions show how research networks can strengthen this foundation through coordinated scientific collaboration.

By bringing together experts in soil science, plant biology and rural development, these Actions are advancing solutions to pressing challenges – from protecting soil biodiversity and understanding plant responses to environmental stress and empowering rural communities.

Digging deep: Europe's soil secrets go digital

The COST Action 'EUdaphobase' addressed a pressing environmental need for European policymakers: a comprehensive database to monitor soil biodiversity and assess soil health across Europe. By building this database, which integrates diverse data on soil organisms with environmental factors, EUdaphobase laid the foundations for open data sharing in soil biodiversity research, moving the field towards greater collaboration and transparency. *"EUdaphobase has created a European community of soil biologists who understand the need for data sharing, marking a shift towards open data in soil biodiversity research and an important step towards providing actionable knowledge for soil biodiversity conservation at the local level,"* says Action Chair, Dr David Russell of the Senckenberg Museum of Natural History.

EUdaphobase has made a significant contribution to environmental protection by filling critical data gaps in under-represented regions, such as the Balkan Peninsula, and developing models to scale up local biodiversity data to a broader European perspective. Through this work, researchers have gained valuable insights into the variation in soil biodiversity across different land uses, climates and habitats, providing a strong foundation for soil conservation in diverse ecosystems.

Building on this knowledge, the database provides reference points and essential thresholds for EU soil health directives. *"The Edaphobase data infrastructure is a vital tool, not only for researchers but also as a basis for European soil policy,"* explains Dr Russell. *"Edaphobase serves as a primary reference for defining 'intact' soil biodiversity under specific environmental conditions, benefiting policymakers and conservation efforts."* Ongoing collaboration with European agencies also continues to refine 'functional' biodiversity indicators, which define ecological roles within soil ecosystems and provide the basis for future policy decisions.

EUdaphobase has had a lasting impact on the field of soil biodiversity, setting a new standard for data integration and guiding open-data soil research. Now integrated into German and European data infrastructures, including the Open European Science Cloud, EUdaphobase is positioned to become the leading resource for soil biodiversity assessment. This work directly supports the UN Sustainable Development Goals and the EU Soil Strategy by providing authorities with essential tools and data for effective soil protection and management.

CULTIVATING SOIL SOLUTIONS, METAL BALANCE, AND RURAL YOUTH

Metals in farming

The COST Action 'Trace metal metabolism in plants (PLANTMETALS)' tackled the complex role of trace metals in agriculture. Essential in small amounts, some trace metals, such as copper, iron, nickel, molybdenum and zinc, can become toxic when accumulated. Others, such as cadmium, have no function in most plants. In both cases, toxic accumulation results particularly from industrial activities and fertiliser use. By studying how plants absorb, process and detoxify these metals, PLANTMETALS offers solutions to reduce risks from both deficiency and toxicity of these metals, and increase agricultural productivity.

The PLANTMETALS conference in Ljubljana, 2024

The Action has made significant progress in understanding plant uptake, transport, physiological use, toxicity and detoxification of metals, identifying key genes and molecular pathways involved in these processes. This research has revealed the complex balance of metal metabolism in agricultural systems. *"Understanding trace metal metabolism in plants is crucial for today's agriculture,"* explains Action Chair Professor Hendrik Küpper from the Biology Centre of the Czech Academy of Sciences. *"These metals play vital roles, but their balance is delicate. Too much or too little can have serious consequences for both plant and human health"*.

Through extensive collaboration across 42 countries, PLANTMETALS has developed and shared standardised protocols for measuring metal levels and assessing risk. The network has conducted training workshops to equip researchers with these essential methodologies, promoting a unified approach to metal analysis in agriculture.

PLANTMETALS' findings have led to concrete agricultural applications, supporting targeted fertilisation practices, improved breeding strategies and practical recommendations for managing metal toxicity. Working closely with fertiliser manufacturers, the Action has developed knowledge and techniques to optimise micronutrient application, reducing environmental impact while improving crop quality and plant immunity, as shown by the scientific and educational publications on their website (plantmetals.eu). *"Our interdisciplinary approach is helping to bridge the gap between science and agriculture, enabling practical solutions for farmers,"* adds Professor Küpper. In addition, PLANTMETALS' research on hyperaccumulating plants is advancing soil phytoremediation techniques to address metal contamination.

Looking ahead, PLANTMETALS is preparing accessible 'white papers' to provide farmers with practical guidance on effective trace metal management, ultimately improving soil health and crop resilience. *"Our findings directly contribute to safer food and environmental sustainability,"* concludes Hendrik Küpper, highlighting the project's lasting impact on agricultural practices.

From farm to future: youth in focus

The 'Rural NEETs Youth Network (RNYN)' focused on the unique and pressing issue of high NEET (Not in Employment, Education or Training) rates among young people in Europe's rural areas, particularly in southern and eastern regions. Led by Dr Francisco Simões, the Action explored how social, economic and educational challenges particularly affect rural NEETs, deepening the North-South and East-West socio-economic divides across the continent. *"Our Action addresses a complex social problem that has remained unaddressed by both research and policy: the high proportion of rural NEETs and the risks they face due to limited opportunities,"* said Dr Simões.

CULTIVATING SOIL SOLUTIONS, METAL BALANCE, AND RURAL YOUTH

The RNYN training school in Iscte in January 2025

RNYN's findings, summarised in the Action publication, provided key insights into the barriers faced by rural NEETs, from limited access to employment services to the critical need for locally adapted education and training. Community engagement, education and flexible, person-centred employment services were highlighted as essential to reducing rural NEET rates. The Action also recognised the impact of Europe's green and digital transitions on rural labour markets, identifying opportunities in youth entrepreneurship, new farming models and digitalisation that could support rural youth employment.

One of RNYN's outstanding achievements is the European Rural Youth Observatory, a research-driven association that brings together researchers, policymakers and youth organisations to inform rural youth policymakers across Europe. Now a key member of European initiatives such as the European Alliance for Apprenticeships and the European Rural Pact Coordination Group, the Observatory is already informing decision-makers on approaches to rural youth inclusion. Dr Simões explains: *"The Observatory has become a key player, providing insights that could redefine rural youth policy across the continent"*.

The Observatory's future impact will be amplified through its contribution to a comprehensive study on rural youth across Europe, conducted by the Youth Partnership—a think tank jointly led by the Council of Europe and the European Commission—that will shape the EU's 2025 Youth Strategy.

The platform's influence goes beyond policy, inspiring youth-centred collaborations and connecting rural youth representatives with decision-makers to ensure their voices are heard.

The RNYN Action members were awarded a COST Innovators Grant the Future Youth Information for Rural Areas (FYI-R), to develop a strategic web-based tool across 16 countries to collect real-time data on the needs of rural youth and provide policymakers with insights to make informed decisions. Through continued partnerships and expanding research initiatives, Dr Simões envisions RNYN and FYI-R role in European policy: *"Our continued collaboration will help to inform rural youth policies at all levels, enabling a better future for younger generations in rural areas."*

READ MORE

→ European Soil-Biology Data Warehouse for Soil Protection (EUdaphobase)

→ Trace metal metabolism in plants (PLANTMETALS)

→ Rural NEET Youth Network: Modeling the risksunderlying rural NEETs social exclusion (RNYN)

→ Future Youth Information for Rural Areas (FYI-R)

OTHER SUCCESS STORIES PUBLISHED IN 2024

Celebrating 40 years of COST Actions in wireless communications

For more than four decades, COST Actions on mobile and wireless communications have helped to shape the way we communicate. These telecommunications research networks laid the foundations for the GSM standard and helped shape the successor standards of modern mobile communications, a legacy that cannot be overestimated. The results of these 40 years are many and varied, both tangible and intangible: workshops and conferences, joint papers, books, training courses, white papers, standards, new project consortia, recommendations and career-long connections.

→ Read more here.

Let's talk about sex with ESMN

Sexual medicine covers a wide range of issues related to sexual health and wellbeing at different stages of life. Dealing with issues such as low sexual desire, premature ejaculation and pain during sex means looking at the bigger picture – not just the medical side, but also the psychological and relational aspects. The media can influence how younger generations view and behave in relation to sex, sometimes leading to behaviour outside of social norms. That's why education to help people critically understand media messages about sex is so important. Dealing with these complexities requires open communication, understanding and personalised interventions that recognise the diversity of human sexuality at different stages of life and in different circumstances. The COST Action 'European Sexual Medicine Network (ESMN)' was established to address sexual health issues through a collaborative platform for European experts and researchers. Focusing on standardising practices, sharing resources and advocating for sexual health policies, ESMN prioritised the training of health professionals to advance research and improve patient care.

→ Read more here.

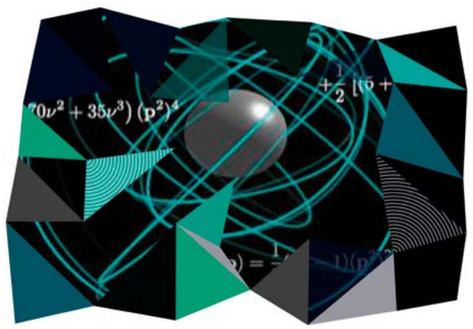
OTHER SUCCESS STORIES PUBLISHED IN 2024

World Wetlands Day: PERIAMAR protecting amphibians and reptiles in agriculture

Historically, amphibians and reptiles have suffered from negative stereotypes, often due to legends and stories that portrayed them as vicious and ugly creatures. These negative perceptions were reinforced by the association of snakes with the devil in the Christian tradition. Fortunately, attitudes towards these animals have evolved over time, with a growing recognition of their role in maintaining the balance of ecosystems and as an integral part of our natural heritage.
Despite these positive changes, pollution has taken its toll, resulting in population declines and even extinctions. to address these problems, the COST Action 'PEsticide RIsk AssessMent for Amphibians and Reptiles (PERIAMAR)' has worked to improve the effectiveness of the overall pesticide risk assessment process with regard to amphibians and reptiles.

→ Read more here.

GWniverse – the COST Action that looked up



Gravity is central to understanding the universe. It affects everything from planets and stars to galaxies, shaping the cosmos as we know it. Studying gravitational waves (ripples in space-time caused by massive events such as black hole mergers) can help us learn about the formation and evolution of black holes and better understand gravity. It can also lead to groundbreaking discoveries with far-reaching implications for astrophysics, cosmology and our understanding of the laws governing thenatural world. The COST Action 'Gravitational waves, black holes and fundamental physics (GWniverse)' has fostered a network of experts in Europe, positioning them to become world leaders in the coming era of high-precision gravitational wave physics. The story is about how this GWniverse has helped us unlock the mysteries of the universe by studying gravity, black holes and gravitational waves.

→ Read more here.

OTHER SUCCESS STORIES PUBLISHED IN 2024

Sustainable polymers for a greener future

Polymers, particularly those made from fossil fuels like many typical plastics, can take an extremely long time to decompose. Some estimates suggest that it can take hundreds to thousands of years for certain types of plastic to break down in the environment. The slow degradation of these materials contributes to environmental pollution and can have harmful effects on ecosystems, wildlife and human health.
That's why there are growing efforts to reduce the environmental impact of polymer waste through recycling and the development of green alternatives. These environmentally friendly options exist in the form of furans, organic (bio-sourced) compounds.
the COST Action 'European network of FURan based chemicals and materials FOR a Sustainable development (FUR4Sustain)' brings innovation by tackling old problems (like the case of petrol-based polymers and materials) with new solutions based on furans.

→ Read more here.

EURELAX cheesy science

Have you ever wondered whether the cheese you buy is real or fake? Imagine scientists who can tell the difference between different types of cheese just by looking at their molecular movements. The 'European Network on NMR Relaxometry (EURELAX)' is an Action that turns the seemingly simple act of enjoying cheese into a scientific adventure. But beyond the cheesy pleasure, EURELAX researchers are making the most of NMR relaxometry in important areas such as the early detection of disease, the development of better energy sources and storage, the creation of advanced materials and the improvement of food quality.

→ Read more here.

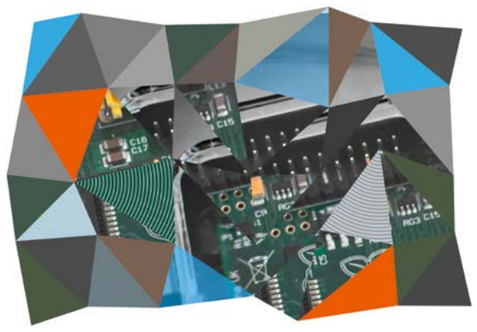
OTHER SUCCESS STORIES PUBLISHED IN 2024

Plant breeding grows success

How can we adequately feed a growing global population using agricultural practices that are environment-friendly, COST-effective, and also enable us to mitigate climate change and biodiversity loss? Research into the breeding of new resilient, nutritious and high-yielding plants is a key element and a very important part of that is the recent development of genome editing techniques, such as CRISPR/Cas9 (an acronym for clustered regularly interspaced short palindromic repeats), that allow an unprecedented level of precision in controlling plant genetic material and corresponding traits.
The COST Action 'Genome editing in plants – a technology with transformative potential (PlantEd)' brought together experts from 38 European countries and a further 13 countries beyond Europe, representing a range of disciplines, all with a focus on plant genome editing.

→ Read more here.

FIT4NANO is broadening nanotech horizons



In the fascinating world of nanotechnology, precision is key. Think of laser beams of light that can do amazing things like scan barcodes or read DVDs. Now imagine a similar tool, but on a tiny scale – focused ion beams (FIBs). These microscopic tools allow scientists to look at and change things at the smallest possible level, like working with atoms.
The 'Focused Ion Technology for Nanomaterials (FIT4NANO)' COST Action is a European research initiative focused on ion beam-based nanotechnology. The Action acts as a hub, bringing together researchers and industry to unlock the potential of ion beam-based nanotechnology. By bridging established FIB applications with emerging frontiers, FIT4NANO is driving scientific progress towards practical applications beyond conventional uses.

→ Read more here.

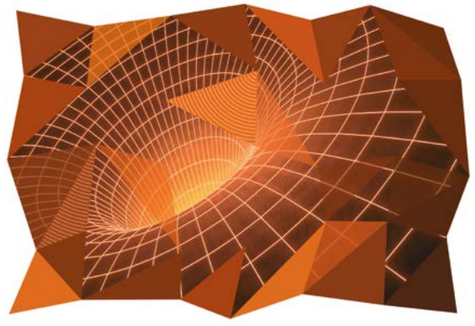
OTHER SUCCESS STORIES PUBLISHED IN 2024

Sensing the soil for ancient sites

Geophysical methods, such as ground penetrating radar (GPR) and magnetometry, allow archaeological sites to be detected and recorded in a high-resolution, non-invasive manner. These methods measure the physical properties of the ground, and surveys of a site can quickly reveal subsurface features that may be of archaeological interest. However, a significant problem is the interpretation of geophysical datasets due to an incomplete understanding of the relationship between soil properties and geophysical signatures. This has prevented geophysical surveys from moving beyond basic site prospection and becoming an important tool for answering more complex questions about archaeology in the landscape.
The COST Action 'The Soil Science & Archaeo-Geophysics Alliance: going beyond prospection (SAGA)', which ended in April 2023, aimed to move the field forward by establishing an international network of geophysicists, archaeologists, soil scientists and other experts to develop interpretation skills and promote research collaboration.

→ Read more here.

A coherent approach to quantum

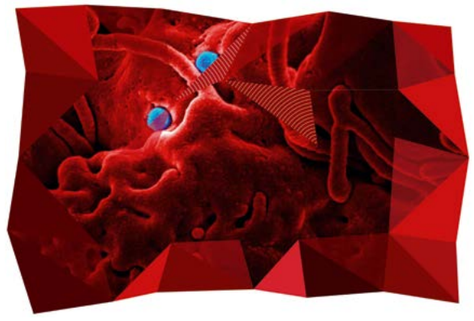


Quantum properties are known to occur in the extremely small world of fundamental particles and atoms, and these properties are mostly counterintuitive. In larger, macroscopic objects, however, quantum properties are often destroyed. But in a superconductor, for example, electrons move without experiencing such losses. Quantum coherence describes macroscopic systems that can preserve their quantum properties.
Europe has built up a leading position in superconducting quantum technologies in recent years, but the various scientific and technical communities have been somewhat dispersed. The main objectives of the NANOCOHYBRI COST Action were to provide a common area for sharing knowledge and infrastructure and to develop new projects: objectives that have been achieved.

→ Read more here.

OTHER SUCCESS STORIES PUBLISHED IN 2024

Zooming in on multi-mode imaging



Correlated Multimodal Imaging (CMI) combines two or more imaging techniques or modalities to gather information about the same sample, such as a tumour cell. CMI can provide valuable multidimensional information about a sample and its structure, function and chemical composition. No single imaging technique can reveal all these details, so advancing CMI is one way to gain a better, holistic understanding of a wide range of biomedical processes and diseases.
CMI draws on many different areas of expertise, including biologists, physicists, chemists, clinicians, microscopists and computer scientists. As such, it requires coordinated activities and knowledge transfer between different disciplines. However, no European interdisciplinary network existed in this field until the establishment of the COST Action 'Correlated Multimodal Imaging in Life Sciences (COMULIS)'.

→ Read more here.

Saving European archaeology from the digital dark age

Modern archaeology is increasingly reliant on digital technology, and while computing has liberated the field in many ways, critical challenges are emerging in relation to the digital resources produced. The archaeological record in digital form is at risk not only from obsolescence and media failure, but also from the field's inability to fully participate in open data due to divergent practices. Without rapid and informed consensus, archaeology will lose much of its research data heritage to a digital dark age.
The COST Action 'Saving European Archaeology from the Digital Dark Age (SEADDA)' was launched to mitigate the loss of primary archaeological data by developing a common understanding of data stewardship, building new networks of best practice to support the preservation and open dissemination of archaeological data, and creating more inclusive research partnerships.

→ Read more here.

7

EVENTS

January

17/01	Info Day Türkiye, online
18/01	Info Day Albania, Tirana, hybrid
22/01	COST at Celebrating 40 Years of Actions on Mobile and Wireless Communications, Lisbon
26/01	The European Institute of Innovation and Technology (EIT) Jumpstarter webinar for the COST community

February

06/02	COST Academy Grant Holder workshop, Brussels
08 → 09/02	COST Connect: Forests protection and sustainability: leveraging research and networking for a sustainable future, Brussels
15/02	COST Academy event: Sustainability of COST Actions, Brussels
21 → 22/02	COST Communication seminar for science communication coordinators, Brussels
28/02	COST Academy Canva training, Brussels

COST Connect is a series of thematic workshops providing an open space for COST Actions, policymakers, and the broader research and innovation community to network on science and policy-related topics. Topics are defined along the lines of the current EU policy agenda and societal challenges.

COST info days are organised to promote COST and its opportunities among the research community in the various COST Member countries. They are organised in close cooperation with the COST National Coordinators, the national contact points in the country.

EVENTS

March

01/03	COST Academy training: How to make a scientific research presentation, Brussels
05 → 06/03	COST Academy training: Storytelling, Brussels
19/03	COST Academy forum for Portuguese Grant Holder Managers, Lisbon
27/03	General COST Info Day, online

April

08 → 09/04	COST Action 'Women on the Move' (CA19112) exhibition at the European Parliament, Brussels
08/04	COST Academy Grant Awarding Coordinator workshop, online
09/04	Info Day Montenegro, Podgorica
09 → 11/04	COST Academy training: Media skills, Brussels
17/04	COST Academy webinar on GDPR for the COST community
17 → 18/04	COST Connect: Innovations in water management, ecosystems and blue economy, Brussels
19/04	COST Academy training: Understanding EU decision-making processes – How to advocate your interest, Brussels
23/04	Info Day Nordic countries (Norway, Sweden, Finland, Denmark, Iceland, the Faroe Islands), online
29/04	COST Connect: Mental health follow-up workshop, Brussels

COST Academy supports COST Actions in managing their networks by offering training, workshops, and webinars on topics highly relevant for the performance of the networks.

EVENTS

May

07 → 08/05	COST Academy COST Action Chairs forum, Brussels
13 → 14/05	COST Connect: Bio-based resources, materials and solutions, Brussels
17/05	Info Day Belgium, Brussels
17/05	COST Academy training: How to coordinate international research networks, Brussels
22/05	Info Day France, online
27/05	Info Day Hungary, Budapest
30/05	COST Academy forum for French Grant Holder Managers, Amiens

June

03 → 06/06	COST at the European Conference on Networks and Communications (EuCNC) and the 6G Summit, Antwerp
11/06	Info Day Moldova, online
18/06	Info Day Cyprus, online
19/06	COST Academy Grant Holder Manager seminar, Brussels
19 → 20/06	COST Academy Science for Policy and Science Diplomacy workshops for COST Actions, Brussels
27/06	Regional Info Day Wales, Swansea

August

29/08	COST Academy webinar: Final Financial Report for grant holder managers

EVENTS

September

09 → 13/09	COST at the NanoInnovation Conference, Rome
11/09	COST Connect: Research evaluation, Brussels
10 → 13/09	COST Academy Leadership workshop, Brussels
23/09/2024	COST-NSF session on Data sharing during the Science Summit at the 79th United Nations General Assembly, New York
25/09	COST Academy training: Social media, Brussels

October

04/10	COST Academy webinar: COST Action experiences in engaging young researchers
11/10	COST Academy training: WordPress, Brussels
09 → 10/10	COST Connect: Advancing research to achieve the United Nations Sustainable Development Goals, Brussels
17 → 18/10	COST Connect: Agriculture and its products, Brussels
24/10	Gender equality in research and innovation workshop, Brussels

November

28/11	COST at the next decade of innovations for the future of Europe. Celebrating 10 years of the EIT Regional Innovation Scheme, Budapest

COST Global Networking – reinforces collaboration with COST Near Neighbour Countries and promotes COST globally.

EVENTS

December

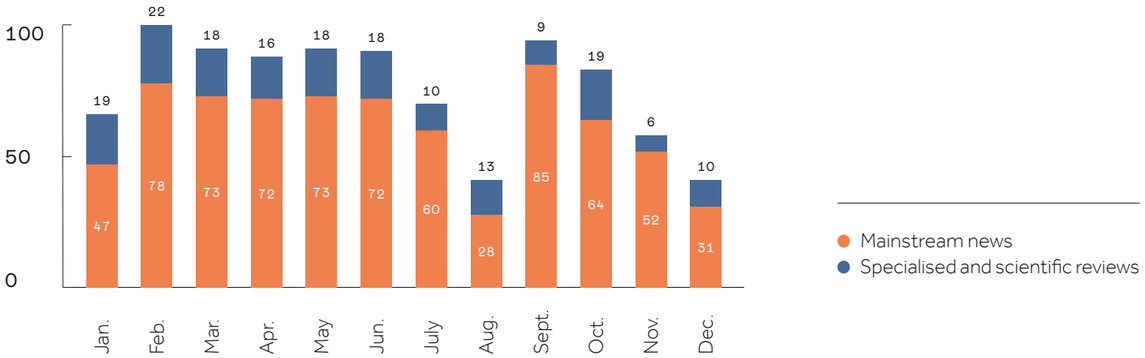
05/12	COST Academy Grant Holder Manager workshop Brussels
09/12	Info Day Ukraine, online
03/12	Launch of the Cross-Cutting Activity on balance brain circulation and career development for young researchers, Brussels

Cross-Cutting Activity is a governance tool with the objective to utilise the COST networking instruments for targeting specific policy priorities in order to strengthen the role of COST in a given policy domain related to COST policies, ERA priorities or other EU R&I policies. They focus on horizontal topics, they are decided top-down, and the primary beneficiaries of the outcomes are COST Actions participants and the community of R&I policy in Europe as a whole.

8

MEDIA & COMMUNICATION DATA

COST ACTIONS IN THE NEWS
AND SPECIALISED PUBLICATIONS



ABOUT US

COST (the European Cooperationin Science and Technology) is an EU-funded programme which enables researchers and innovators to set up interdisciplinary research networks in Europe and beyond.

WHAT IS THE COST MISSION?

COST provides networking opportunities for researchers and innovators to strengthen Europe's capacity to address scientific, technological and societal challenges. COST implements its mission by funding bottom-up, excellence-driven, open and inclusive networks for peaceful purposes in all areas of science and technology.

WHAT ARE COST ACTIONS?

A COST Action is an interdisciplinary research network that brings together researchers and innovators to investigate a topic of their choice over a four-year period. COST Actions are highly interdisciplinary and open to researchers and innovators.

WHO CAN PARTICIPATE?

COST Actions attract researchers and innovators from all types of institutions: academia, public institutions, SMEs and industry, NGOs, and European and international organisations. Participants may apply at any stage of their career.
COST Actions are based on the principle of inclusiveness and actively encourage the participation of researchers and innovators from less research-intensive COST Member countries known as COST Inclusiveness Target countries.
Researchers from Near Neighbour countries and Third States can also take part in a COST Action.

WHAT DO WE FUND?

COST does not fund research, but provides support for networking activities carried out within COST Actions. In this way, it complements nationally-funded research. These funds are used to organise meetings, events, short-term scientific missions, training schools, dissemination activities, grants to attend international conferences and virtual networking tools.

HOW TO APPLY?

There are two ways to take part in a COST Action:

- Participate in an existing Action. Browse the COST Actions on the COST website to find the network that best matches your scientific expertise.
- Create your own network. Submit a COST Action proposal at any time of the year. Proposals are collected once a year. The submission, evaluation, selection and approval procedure ensures a simple, transparent and competitive evaluation and selection process, in line with COST's bottom-up, open and inclusive principles.

Proposers benefit from a one-stage submission via the online e-COST tool.

Find out more on the → COST website:

→ COST Member countries

→ Action networking tools

→ Corporate brochure

→ Video 'Tips for submitting a COST Action proposal'

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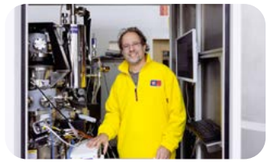
TESTIMONIALS

Prof. Derek Hausenloy
University College London, UK, Chair of EU-CARDIO-PROTECTION France, Chair of EuroXanth

"It has been a fantastic and rewarding experience for me to bring together cardioprotection researchers from across Europe and the world, and to help young scientists in their research".

Dr Gaye Hafez
Altinbas UNIVERSITY, Türkiye, Working Group leader in the CONNECT Action

"Participating in COST Actions has broadened my vision and increased my scientific passion. Overseeing the progress of a project, delivering results to patients at the European level and sharing scientific data have illuminated my research landscape. And the treasured friendships alone make participation worthwhile".



Dr Gregor Hlawacek
Helmholtz Zentrum Dresden Rossendorf Germany, Chair of the Action FIT4NANO

"FIT4NANO was a rewarding experience. It has enriched my perspective and allowed me to contribute to advances that will shape our future".

Prof. Helen Papadaki
University of Crete, Greece, Chair of EuNet-INNOCHRON

"The EuNet-INNOCHRON Action developed into a very successful network and interactive community, thanks to many dedicated scientists who looked into current and future aspects of neutropenia. Thanks to the Action work, patients have a better chance of receiving proper treatment".

Prof. Wim Thiery
Free University of Brussels, Belgium, WG member in the Action PROCLIAS

"My ERC project benefitted tremendously from COST Actions".

Dr Tamas Agh
Syreon Research Institute Hungary, Working Group Leader in the Action ENABLE

"My participation in the ENABLE COST Action has significantly broadened my professional network. This initiative has connected me with leading adherence researchers from over 40 countries across Europe".

TESTIMONIALS

Mr Radomir Ivanovikj
Archaeological Museum of the Republic of North Macedonia, MC member in the Action SAGA

"Thanks to the COST Action we gained a lot of experience that we are now able to implement on our geophysical surveys around the country".

Prof. Danuta Kruk
University of Warmia and Mazury in Olsztyn, Poland, Chair of the Action EURELAX

"Coordinating EURELAX and its CIG was an honour. The collaboration exceeded my expectations and showed the power of bringing different minds together. I was overwhelmed by the fact that so many countries and institutions joined the Action; it was incredible".

Prof. Pavle Spasojevic
University of Belgrade, Serbia, Science Communication Coordinator for The Action FUR4Sustain

"It's not just science; it's science that impacts global issues. It's impactful science".

Dr Marianne Greil-Soyka
Austrian Academy of Sexual Medicine, Chair of the Action ESMN

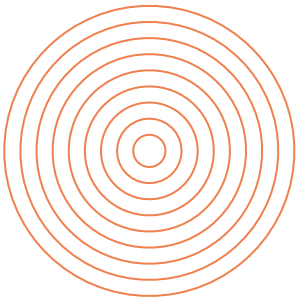
"The promotion of young researchers has been central to the growth of the ESMN COST Action".

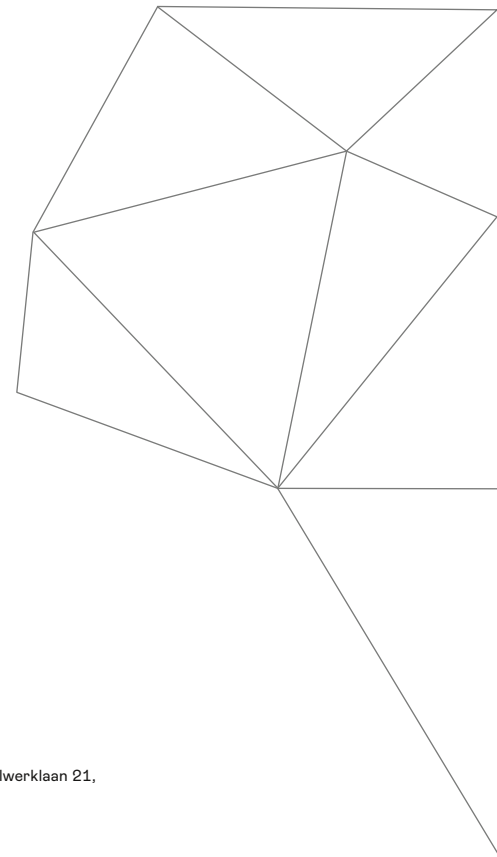
Dr Tatiana Sitchinava
Institute of Demography and Sociology, Ilia State University, Georgia, Management committee member in the HIDDEN Action

"Participation in a COST Action has opened doors to innovative ideas and collaborations. It increased the international visibility of my organisation and created new partnerships and funding opportunities. For Georgia, COST is essential for fostering innovation, strengthening global research links and enhancing our scientific competitiveness".

Dr Sergiu Sanduleac
Ion Creangă State Pedagogical University of Chișinău, Moldova, Working Group member in the Action BEiNG-WISE

"COST has facilitated the development of innovative projects and practical solutions to current challenges, thus contributing significantly to Moldova's integration into the European research and innovation area".





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IN SCIENCE & TECHNOLOGY

Funded by
the European Union

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