ANNUAL REPORT

OF THE SLOVENIAN RESEARCH AND INNOVATION AGENCY

2024

Slovenian Research and Innovation Agency

Annual Report of the Slovenian Research and Innovation Agency for the year 2024

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Content

Tjaša Dobnik,

director

The year 2024 marked a significant milestone for the Slovenian Research and Innovation Agency (ARIS), characterised by consolidation of the foundations of a high-quality, transparent and internationally comparable research environment. During this period, ARIS implemented numerous strategic and operational measures to enhance efficiency, modernise its content and strengthen its organisational operations.

We have placed scientific excellence, strengthened cooperation with various stakeholders, and the creation of a supportive environment for research and innovation activities at the heart of our mission. We placed particular emphasis on further upgrading the evaluation system by strengthening the editorial role in evaluation procedures, with the aim of ensuring higher quality, better-substantiated and more equitable evaluations. By implementing random assignment of reviewers within specific scientific subfields, we further reduced the risk of secondary bias and enhanced the objectivity of the procedures. Initial steps were also taken to conduct a sectoral evaluation.

2024 also brought significant changes to our call/competition procedures. ARIS developed and launched new funding calls, including the Gravity call, intended for scientific consortia that are conducting innovative and high-impact research within their discipline with the potential (or proven ability) to reach the absolute global forefront, and the Strategic Projects call which targets outstanding researchers at specific career stages who deliver promising, established and ground breaking results.

We further strengthened our organisation in 2024 – both through staff expansion and the development of new initiatives, such as the RDI Hub and our innovation activities. At the strategic level, a key milestone was the signing of agreements with the Ministry of Higher Education, Science and Innovation (MVZI) and the Ministry of the Economy, Tourism and Sport (MGTŠ). Through these agreements ARIS assumed the role of the implementing body for the implementation of measures under the European Cohesion Policy (ECP 2021–2027) at the end of 2024. This transition represents a key foundation for preparing and implementing innovation-focused calls for proposals funded by European cohesion funds.

Another significant step in the strategic development of innovation activities was the appointment of the ARIS Innovation Council which began operating as an ARIS advisory body in 2024. The Innovation Council serves as a key platform for dialogue enabling ARIS to enhance its role in supporting the transfer of knowledge into practice.

Alongside these changes, we adopted or revised a large number of internal rules in 2024 which strengthened the formal framework of our operations and ensured compliance with broader systemic changes. Our sincere gratitude to all whose dedication and expertise collectively shape an ambitious, inclusive, and dynamic research and innovation ecosystem. Together, we are laying the foundations for science and innovation to effectively address contemporary challenges and contribute to society's long-term prosperity.

Prof. Dr. Zoran Ren,

President of the Agency's Management Board

Science and research are fundamental building blocks of a sustainable future for society. In times of rapid technological change and complex global challenges, they are becoming a reliable compass for decision making, guiding us toward economic growth and quality of life, an inclusive society, and long-term resilience. Research activity plays a pivotal role in this process, not only as a source of new knowledge but also as a connecting force across diverse societal subsystems, from the economy to education, from culture to public health.

Despite rapid technological progress, we are increasingly aware that social change often fails to keep pace with scientific and technological breakthroughs. This creates gaps in understanding, cooperation and shared developmental direction. Rather than fostering interdisciplinary connections and collective problem-solving of complex challenges, we increasingly witness fragmentation, competition, and individualism. In such an environment, we urgently need systems capable of fostering connections and building trust at all levels of the research and innovation ecosystem.

In this context, since 2023, the ARIS Management Board, together with the Agency's management, has been consistently implementing a vision of gradually aligning the management of the Slovenian research system with best practices in the European Research Area (ERA), while respecting national specificities and development opportunities. The core focus of our work is enhancing connectivity – both among research organisations and between science, innovation and society at large. Simultaneously, we are working to consolidate research excellence and foster development of emerging fields that will drive future breakthroughs.

Therefore, strategic orientation and strengthening of innovation activities represent a natural and necessary extension of the Agency's mission. Innovation is a key mechanism for translating knowledge into practice, a cornerstone of economic competitiveness, and a powerful instrument for addressing environmental and social challenges. By integrating innovation activities into the operations of ARIS, we enhance the coherence of the Slovenian research and innovation ecosystem, create new opportunities for science-business collaboration, and support the emergence of high-impact, high-value solutions. Investment in innovation goes beyond technology alone – it is an investment in science's social relevance and the entire system's long-term resilience.

These efforts are grounded in legislative changes adopted in recent years – the Scientific Research and Innovation Activity Act (ZZrID, 2021, Amending Act 2025), the Decree on the Scientific Research Public Funding from the Budget of the Republic of Slovenia (2022) and the revised internal acts of ARIS. These documents have established a framework for more stable, transparent, and development-oriented governance, gradually transitioning from a predominantly project-based approach to a more strategic and sustainable funding model.

Although Slovenia still lags behind the European Union average in terms of investment in science, the year 2024 once again confirmed that we possess an exceptional research community, characterised by scientific excellence, innovation and dedication. Among Slovenian researchers are individuals and teams collaboratively achieving breakthrough results across the natural sciences, engineering, social sciences, humanities, and the arts. Their work demonstrates that Slovenian science continues to progress with courage and vision.

Looking back on 2024, we can proudly affirm that ARIS remains a steadfast pillar of the Slovenian research ecosystem. Consistent and professional engagement strengthens the foundations of science, enables collaboration at national and international levels, and creates the conditions for the long-term sustainability of the entire system. Moving forward, it will be even more crucial to leverage this stability for bold action toward deeper cooperation, more effective knowledge transfer into practice, and fuller integration of science in shaping our collective future.

The ARIS Management Board is confident that ARIS will continue to exemplify an unwavering commitment to excellence, cooperation, and the shared vision of science and innovation as a common good.

Prof. Dr. Peter Križan,

President of the Agency's Scientific Council

The Scientific Council, with the help of the agency's staff and in cooperation with the relevant ministry, strives for effective and transparent funding of the best research ideas, thereby contributing to a positive research climate in Slovenia.

Research projects are an important instrument for the support of research. This is a highly competitive form of funding, since out of approximately one thousand submitted projects, we can only finance a little over two hundred. In 2024, we managed to significantly increase the amount of funding per individual project. We also introduced a dynamic allocation of funding for fields (capacities) based on the quality of the field, as determined by applications submitted that year — the share of funds for each field is determined according to the ratio of applications rated above 80% in the current year, while maintaining the previous distribution among ERC domains. With changes to the regulations, we have achieved greater transparency in procedures. A very important part of this is the continuous updating of the database of international reviewers, experts who evaluate research proposals in each scientific field, with the Scientific Councils of disciplines playing a decisive role. The project evaluation process was enhanced in 2023 with scientific editors, and in 2024 we further reinforced their role.

We continued with calls for projects that facilitate the return of successful young Slovenian scientists from abroad, aiming to make them more attractive through greater flexibility. In 2024, we introduced two new schemes: Gravity and Strategic Projects. Gravity is intended for a consortium of scientists conducting innovative and impactful research within their discipline, with the potential to reach the global forefront. Strategic Projects are intended for outstanding researchers who are achieving promising and breakthrough results at three career stages; projects in this scheme reach TRL (Technology Readiness Level) 1–3 on the development scale. We also continued with calls for multilateral projects, by which we aim to expand the pool of agencies with which ARIS cooperates in accordance with the lead agency principle.

We are pleased to see an increase in successful applications for prestigious European Research Council projects, while the ARIS complementary scheme represents an important incentive for applicants.

Management of the stable component of research funding has, under the new Research Activity Act, been transferred to the competence of research organisations. We continued preparations for the panel evaluation of research programmes according to the European Research Council's fields, which we will gradually introduce over the coming years. High quality research equipment plays an important role in ensuring suitable conditions for research. The ARIS Scientific Council is pleased to note that funding for this form of research support is increasing, and we have updated the conditions of the call. We have also revised calls for the promotion of science and introduced new calls to support citizen science and science communication.

The Scientific Council of the agency remains open to comments and suggestions from scientists for the further improvement of the agency's work as an important element of the research climate in Slovenia, and looks forward to successful cooperation with the scientific community.

Prof. Dr. Radovan Stanislav Pejovnik,

President of the Agency's Innovation Council

In 2024, the Innovation Council acted as a strategic advisory body, striving to create an inclusive and competitive environment for innovation. Particular attention was paid to establishing ARIS as a new institution that does not simply continue the practices of its predecessor, but instead redefines the rules of the game – particularly in innovation. In this regard, the agency has demonstrated that it is ready and willing to cooperate openly with various stakeholders.

We recognise that a successful innovation system requires long-term stability and transparency, as well as an effective response to measures. We therefore took part in the strategic overhaul of instruments designed to boost innovation and called for a more coordinated set of incentives to cover the entire cycle of innovation – from research to market. We emphasised the importance of including innovative SMEs and start-ups.

In cooperation with the Ministry of Higher Education, Science and Technology, we welcome the fact that reviews of budget appropriations for innovation will be carried out, including at other ministries. However, we would like to point out that these are primarily either existing funds, which do not represent an increase in investment in innovation, or completely new funds in the Republic of Slovenia's budget. With only EUR 25 million allocated for innovation in the 2025 integral budget, these funds are insufficient to realise the objectives of smart specialisation and the green transition.

We also want to draw attention to the fragmented and uncoordinated nature of the measures, which often fail to align with business development cycles. Another critical issue in the transfer of knowledge is the significant shortage of professionals such as innovation managers or technology brokers, and this undoubtedly poses an obstacle to the effective integration of research and production.

An important aspect of our work involved developing indicators to monitor the impact of innovation incentives. We proposed creating more refined quantitative and qualitative metrics that would enable realistic assessments of the effectiveness of measures and allow for international comparability. We drew inspiration from a selection of practices in Scandinavian and Benelux countries.

Although the Innovation Council has operated without a clear legal or financial basis for most of 2024, the new amendments to the Scientific Research and Innovation Activity Act coming into force will ensure that it will be fully operational in the future.

The Innovation Council remains committed to strengthening innovation policy and co-creating the conditions necessary for a sustainable, inclusive and internationally competitive innovation ecosystem in the long term. We are keeping the door open to dialogue with all key stakeholders: the economy, the research community, the state administration, and civil society.

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The Slovenian Research and Innovation Agency (hereinafter referred to as: ARIS or Agency) is a public legal entity, governed by the provisions of laws and regulations applicable to public agencies, unless otherwise stipulated by the Scientific Research and Innovation Activity Act (Official Gazette of the Republic of Slovenia, No. 186/21, 40/23 and 102/24; hereinafter referred to as: ZZrID). ARIS was established by the Republic of Slovenia with the Decision Establishing the Slovenian Research and Innovation Agency (Official Gazette of the Republic of Slovenia, No. 48/23, hereinafter referred to as: Decision Establishing ARIS) to perform certain tasks specified by the ZZrID in the public interest ensuring permanent, professional and independent decision-making on the selection of scientific research and innovation activities funded through the state budget and other sources. In accordance with Article 2 of the Decision Establishing ARIS, in legal transactions within its scope of activity ARIS operates autonomously, with full rights and obligations, in its own name and for its own account.

ARIS mission and operating strategy

Knowledge is the key driver of national economic competitiveness. Investing in development and research is one of the fundamental conditions for creating knowledge and technological advancement which increasingly defines economic competitiveness. Increasing investment in knowledge and human development is essential for transitioning to a knowledge-based society.

The mission of ARIS is to manage funding of Slovenian science and innovation. Pursuant to Article 43 of the ZZRID, the tasks of ARIS include performing professional, developmental and executive tasks to promote scientific research and innovation activities in accordance with the purpose set out in the Decision Establishing ARIS and the guidelines of the ministry for science, the Ministry of Higher Education, Science and Innovation (hereinafter referred to as: MVZI). The operation and development of ARIS follow the provisions of Article 44 of the ZZrID which defines the tasks of ARIS. The ARIS work programme is aligned with the MVZI's strategic directives and is linked to the implementation of measures of the Resolution on the Slovenian Scientific Research and Innovation Strategy 2030 and other national and EU strategic documents. When designing individual measures, the Agency in co-ordination with the MVZI also takes into account the guidelines of other line ministries, given the available financial resources from various financial sources and in co-ordination with the ministries that provide them. By fulfilling its work programme, ARIS plays a decisive role in enhancing capacities to harness global knowledge and technological progress as the main source of labour productivity growth, national competitiveness, and improvement of individual and societal quality of life.

Strategic directions of the Agency:

- *Sound implementation of activities according to the legal bases, Decision Establishing ARIS, and applicable national strategic documents.*
- *Transparent operations and responsiveness.*
- *Optimisation of existing instruments and development of pilot instruments.*
- *Monitoring the effects of the implementation of activities.*
- *International integration and comparability.*
- *Transition to fully electronic services.*
- *Open public communication and science promotion.*

Organisational structure of the Agency

In 2024, ARIS underwent restructuring resulting in organisational changes to its operational framework. The Agency is now divided into four areas of operation, each comprising specialised departments. Two content areas have been established (Research and Innovation Projects area and Quality Assurance area) and two support areas (Financial Business Affairs and Information Technology support area and Legal affairs and General Matters area).

In 2024, the ARIS Innovation Council was established to serve as the highest professional body in matters of innovation activity.

ARIS Management Board	**Agency Director**	**ARIS Scientific Council**	**ARIS Innovation Council**
Director's Office			
Research and Innovation Projects area			
Department of Research Projects	Department of Innovation Projects	Department of International Cooperation	
Quality Assurance area			
Department of Evaluation and Stable Funding	Department of Open Science	Department of Analysis	Department of Recovery and Resilience Plan and Research Development and Innovation Hub
Financial Business Affairs and Information Technology Support area			
Department of Finance and Accounting	Department of Information Infrastructure and Business Informatics		
Legal Affairs and General Matters area			
Department of Legal Affairs	Department of General Affairs		
Permanent Expert Bodies	**Reviewers**		
External Expert Panels	**Commissions**		

ARIS Management Board

The ARIS Management Board is the governing body of the Agency. It consists of nine members appointed by the Government of the Republic of Slovenia for a two-year term of office. Members of the ARIS Management Board may be appointed for a maximum of two consecutive terms. The President and Vice-President are elected by members of the ARIS Management Board.

In 2024 the ARIS Management Board operated with the following composition:

- **Prof. Dr. Zoran Ren,** President
- **Dr. Stojan Sorčan**
- **Dr. Jernej Štromajer**
- **Dr. Nataša Vrh**
- **Dr. Tatjana Zagorc**
- **Žiga Lampe**
- **Prof. Dr. Andreja Gomboc**
- **Prof. Dr. Egon Pelikan**
- **Prof. Dr. Marta Klanjšek Gunde**

ARIS Scientific Council

The ARIS Scientific Council is the highest expert body of the Agency in the field of scientific research. It consists of six members covering all fields of research. The members and the president of the ARIS Scientific Council were appointed by the minister responsible for science, upon proposal of the Science and Technology Council of the Republic of Slovenia for a five-year term without the possibility of reappointment.

In 2024 the ARIS Scientific Council operated with the following composition:

- **Prof. Dr. Peter Križan,** President
  Natural sciences and Mathematics
- **Prof. Dr. Željko Knez,** Deputy President
  Engineering Sciences
- **Prof. Dr. Ksenija Geršak**
  Medical Sciences
- **Prof. Dr. Janko Kos**
  Biotechnical Sciences
- **Prof. Dr. Miha Škerlavaj**
  Social Sciences
- **Prof. Dr. Alenka Zupančič Žerdin**
  Humanities

ARIS Innovation Council

The ARIS Innovation Council serves as the highest expert body of ARIS in the field of innovation activities. It has seven members, namely one representative each of the development and innovation partnerships, the innovation support ecosystems, the Slovenian Academy of Engineering, SID Bank, the Slovene Enterprise Fund and the Chamber of Commerce and Industry of Slovenia, and one representative nominated jointly by the Slovenian Rectors Conference and the Co-ordination of Independent Research Institutes of Slovenia. The ARIS Innovation Council is appointed by the government for a two-year term on proposal of the Development Council of the Republic of Slovenia. Individual members of the ARIS Innovation Council may serve a maximum of one consecutive term.

In 2024 the ARIS Innovation Council operated with the following composition:

- **Prof. Dr. Radovan Stanislav Pejovnik,**
  President
  Representative of the Slovenian Academy of Engineering
- **Simona Knežević Vernon**
  Representative of development and innovation partnerships
- **Prof. Dr. Lidija Fras Zemljič**
  Representative of innovation support ecosystems
- **Matej Zalar**
  Representative of SID Bank
- **Simona Grobelnik**
  Representative of the Slovene Enterprise Fund
- **M.Sc. Marjana Majerič**
  Representative of the Chamber of Commerce and Industry of Slovenia
- **Prof. Dr. Andrej Kos**
  Representative of the Rectors Conference of Slovenia and the Co-ordination of Independent Research Institutes of Slovenia

Internal organisational units

To execute its mandate, the Agency is structured into internal organisational units which are organisationally subordinate to the Director and group substantively meaningfully related areas in such a way that the implementation of their tasks ensures the professional, efficient and cost-effective delivery of the Agency's founding objectives. With the General Act on Internal Organisation and Job Qualification in the Slovenian Research and Innovation Agency, No. 100-117/2024-1 of 6 June 2024, the areas and departments have been (re)formed as indicated below.

Director's Office

The Director's Office ensures the implementation of tasks related to the work of the Director, performs professional, advisory, co-ordination and administrative-technical tasks, and coordinates work on joint tasks with the Agency's internal organisational units and other Agency bodies. In 2024, the Director's Office established a dedicated two-person compliance team to monitor the targeted use of funds by research organisations and other grant recipients.

Research and Innovation Projects Area

Department of Research Projects

Head of Department:
Dr. Nika Razpotnik Visković

This department carries out tasks in the field of evaluation and selection of research projects. Within its scope of operation, it organises the procedures for substantive monitoring and control of co-funding, implementation and attainment of research project objectives. The department also carries out tasks under complementary scheme mechanisms. The main activities of the department are the implementation of the public call for (co)funding research projects, the implementation of the public call for the selection of research projects of the Targeted Research Programme (CRP), and the implementation of public calls within the framework of the Seal of Excellence mechanism and ERC supporting instruments.

Department of Innovation Projects

Head of Department:
Tjaša Dobnik

With the establishment of ARIS, the Department of Innovation Projects began to develop innovation activities and tasks related to the implementation and monitoring of the programmes and measures to promote technological development and innovation activities, the promotion of technological development, innovation activities and knowledge transfer with the aim of promoting networking and knowledge transfer between higher education institutions, industry, research and educational organisations, government and other stakeholders. The department focuses on managing public calls and tenders that support research, development, and innovation at higher Technology Readiness Levels (TRL). In the first years, it is planned that the department will implement public calls and tenders primarily funded under the European Cohesion Policy Programme 2021-2027. Namely, public calls and tenders managed by ARIS for the MVZI will support cooperation between research organisations and companies mainly in the TRL 3 to TRL 6 range, while public calls and tenders managed by ARIS for the Ministry of the Economy, Tourism and Sport (hereinafter referred to as: MGTŠ),

will support business cooperation of companies for market-driven product development, primarily in the TRL 6 to TRL 9 range. In 2024, the Agency established agreements with some other ministries to implement additional calls and tenders.

Department of International Cooperation

Head of Department:
Blanka Mekinda Vidmar

The Department of International Cooperation strengthens Slovenia's global scientific research ties, thereby significantly contributing to its integration into global scientific trends. The department's activities focus on both bilateral and multilateral cooperation implemented through various mechanisms – from partnerships with leading agencies and international organisations to special national projects like Gravity and Strategic Projects which are in the list of special projects of national importance. In addition, the department carries out tasks under the Recovery and Resilience Plan, with special focus on promoting the international mobility of Slovenian applicants.

Quality Assurance Area

Department of Evaluation and Stable Funding

Acting head of Department:
Dr. Klemen Miklavič

The Department provides core funding for scientific research activities enabling research organisations to pursue long-term planning and implement their strategies and goals. It currently carries out tasks within the first three of four pillars of stable funding, namely (1) the institutional pillar of financing scientific research activities which aims to finance infrastructure, management and supporting activities as well as other institutional infrastructure, (2) the programme pillar of financing scientific research activities which aims to finance research programmes and young researchers, (3) the development pillar of funding scientific research activities which aims to finance activities promoting the development of scientific research and infrastructure activities, and (4) the national research programme.

Department of Open Science

Head of Department:
Dr. Mirjam Dular

The Department carries out tasks in the following areas: open science measures in accordance with the regulations governing the implementation of scientific research work in accordance with the principles of open science, including the Action Plan for Open Science; research equipment (implementation of the public call for (co)financing the purchase of research equipment) and research infrastructure (infrastructure programmes implemented outside the stable financing of scientific research activities) while ensuring their open access; international scientific literature and bibliographic databases including co-ordination and harmonisation with IZUM and OSIC; scientific and popular science publications; open access to scientific publications, research data and other research results; data collection and processing procedures on researchers' involvement in securing funding from other users (call for A3); and popularisation and communication of science.

Department of Analysis

Head of Department:
Dr. Anja Šulin Košar

The Department is analysing and monitoring development in research and innovation activities, and participating in planning national research and development policy. It prepares and publishes reports to support the operation of ARIS and the work of its bodies, as well as legally mandated analyses, such as annual reports on state budget expenditures for research and development activities,

reports on the structure, results and impacts of research projects under state aid schemes, and other regulatory reports. The Department of Analysis monitors the quality of the Agency's work, prepares the Agency's annual report, and oversees the preparation of the substantive part of the proposed work programme.

Department of Recovery and Resilience Plan and Research Development and Innovation Hub

Head of Department:
Dr. Lidija Tičar Padar

The former Recovery and Resilience Plan Department was reorganised in 2024 and renamed. Department carries out tasks under the Recovery and Resilience Plan, specifically under Reform A: Activities to strengthen ARRS and the R&I management system as well as establishing a Research Development and Innovation Hub (hereinafter referred to as: RDI Hub). It was the latter that received special emphasis in 2024. The department also co-ordinates activities for promoting research work, innovations, technological development and innovation activities, knowledge transfer and international cooperation between stakeholders of the innovation ecosystem.

Financial Business Affairs and Information Technology Support Area

Department of Finance and Accounting

Head of Department:
Mojca Kastelc Selan

The Department carries out tasks related to the Agency's financial operations. It is responsible for planning, implementing, recording, and reporting on funding research activities, as well as the Agency's programme tasks and operation. It ensures the Agency's solvency. The department is responsible for putting in place payment, recovery, and control mechanisms; it also carries out accounting tasks and co-ordinates the conclusion of joint contracts with research activity operators.

Department of Information Infrastructure and Business Informatics

Head of Department:
Tomaž Žitnik

The Department of Information Infrastructure and Business Informatics lays the expert groundwork for the determination and implementation of the Agency's information policy, provides information support for business processes and co-ordinates the development of information and communication infrastructure. The department manages projects for the installation, operation and maintenance of hardware, system software and basic user interface software tools.

Legal affairs and General Matters Area

Department of Legal Affairs

Head of Department:
Katarina Hren

The Department of Legal Affairs prepares legal foundations for the Agency's operations and handles legal remedy procedures. The department performs tasks related to administrative procedures, personal data protection, public information disclosure, and intellectual property and trade secret protection.

Department of General Affairs

Head of Department:
M.Sc. Amalija Krnc Zdešar

The Department of General Affairs carries out tasks related to employment law procedures, human resources services, and work contracts. It performs tasks related to occupational health protection, public procurement procedures and processes related to the acquisition of assets and services. It is responsible for routine maintenance of the Agency's business premises and equipment, management of documentary archival materials and maintenance of the register of research activity providers.

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Areas of Activity

Policy 05 – Science and Information Society

Science falls under Policy 05 – Science and Information Society. Science and Information Society is a key strategic domain that, in accordance with international, EU and national strategic documents, enables long-term economic competitiveness, value-added growth and the related provision of basic conditions for enhanced societal wellbeing. The Science and Information Society policy covers the most important aspects of research funding and the establishment and operation of a supportive environment for the science system, as well as other measures to promote the development of the information society and electronic communications. This policy pursues the goals of enhancing global competitiveness which is implemented through measures to promote innovation and effective modernisation as well as investment in research and development towards technologically advanced and innovative products and services.

Under the aforementioned policy ARIS carries out the Programme 0502 – Research Activity with the associated sub-programme.

Under this programme ARIS performs the following tasks:

a. Within the framework of stable funding of research activities it finances management and support activities, infrastructure operations, research programmes, training of young researchers and the development of research and infrastructure activities;

b. Co-finances basic, applied and post-doctoral research projects, international research, research equipment and other programmes that support research activities;

c. Enables the purchase of international scientific literature and databases.

Through this programme, ARIS implements specific guidelines from the Framework for Economic and Social Reforms of the Government of the Republic of Slovenia which relate to the second development priority, i.e. the effective knowledge creation, two-way knowledge transfer and use of knowledge for economic development and quality job creation, especially through the effective use of knowledge, and the implementation of the specific objective "Enhancing the excellence and international recognition of Slovenian science (C7166)".

Innovations

With the establishment of ARIS as the universal legal successor to the Slovenian Research Agency (ARRS), the Agency's mandate has been expanded to include innovation, in accordance with the Act Amending the Scientific Research and

Innovation Activity Act - ZZrID-A (Official Gazette of the Republic of Slovenia, No. 40/23). In accordance with the Decision Establishing ARIS, Agency implements programmes and measures regarding innovation activities to promote technological development and innovation activities by continuously implementing instruments in accordance with Article 14 of the ZZrID; promotes technological development, innovation activities and knowledge transfer between the businesses, higher education institutions, research and educational organisations, the state and other stakeholders; provides consulting and professional support to project leaders for product development, system solutions, production processes and services in obtaining information and financial resources; promotes international cooperation, transfer and adoption of international technological knowledge and innovation activities; promotes knowledge exchange and cooperation between businesses, higher education institutions, research and educational organisations, government entities and other stakeholders; monitors the implementation of programmes and measures, evaluates the impact of innovation and technological development policies and investments in scientific research and innovation activities to increase the economic competitiveness; provides data for guiding and implementing innovation policy and, within its scope of activities and competences, collaborates with other organisations in scientific research and innovation activities; ensures the acquisition of additional funds for implementing the Scientific Research and Innovation Strategy of Slovenia; participates in the planning of the national technological development and innovation policy; in accordance with regulations it ensures regular reporting on the implementation of annual programmes, the realisation of financial plans and effects to the ministry responsible for the economy and the ministry responsible for innovation; ensures the transparency of its work and ensures that the public is informed about the orientations and effects of innovation policy; performs other professional tasks in accordance with its founding purpose.

2024 marked the intensive establishment of innovation activities within ARIS. With the MVZI we continued aligning the legal bases for implementing calls for proposals funded by the European Cohesion Policy 2021-2027. We also began aligning the legal basis in this area with the MGTŠ. The two ECP 2021-2027 agreements were signed with both ministries in November 2024. Preparations for the 2025 public calls were also under way simultaneously. During the year, we also began aligning the legal basis for implementing innovation calls with the Ministry of Digital Transformation (MDP).

Implementation of measures from the Recovery and Resilience Plan (RRP)

In accordance with the Recovery and Resilience Plan in which ARIS is included as the final recipient (Reform A) and the implementer of measures (Investment B and Investment C), in the period from 2022 to 2026, it is planned to strengthen and empower ARIS with additional temporary project employment for the purpose of transforming or reorganising the management system in the field of research and innovation for the purpose of implementing RRP investments, participating in the programme committee, establishing mechanisms for connecting stakeholders of the research and innovation system on the basis of joint events,

strengthening advice to stakeholders to support applications for centralised EU programmes, implementing support for strengthening international cooperation, enhancing company skills, partnering with foreign support networks, and transferring knowledge and good practices to Slovenia (Reform A).

Funding activities in all three areas proceeded as planned in 2024. Under the »Strengthening ARRS and R&I management system« programme in 2024, we organised all 2024 planned joint training events for agency capacity building in cooperation with SPIRIT. These included networking activities to connect implementing agencies. We conducted four joint training sessions and an annual networking event of connecting ARIS and SPIRIT, thereby achieving all required indicators for event organisation in accordance with the investment documentation.

ARIS mechanisms of competitive funding

DOCTORAL LEVEL	POST-DOCTORAL LEVEL	POST-DOCTORAL LEVEL	YOUNG DOCTOR	ESTABLISHED RESEARCHER
Up to doctoral degree	Up to 3 years after obtaining a doctorate degree	Up to 5 years after obtaining a doctorate degree	Up to 10 years after successfully defending the first doctorate	
	RESEARCH PROJECTS			
	Post-doctoral research project (basic or applied) Public call for (co)funding of research projects	**Post-doctoral research project (basic or applied)** Public call for (co)funding of research projects	**Post-doctoral research project (basic or applied)** Public call for (co)funding of research projects	**Post-doctoral research project (basic or applied)** Public call for (co)funding of research projects
	Research projects of the Targeted Research Programme Public call for the selection of research projects of the Targeted Research Programme »CRP«	**Research projects of the Targeted Research Programme** Public call for the selection of research projects of the Targeted Research Programme »CRP«	**Research projects of the Targeted Research Programme** Public call for the selection of research projects of the Targeted Research Programme »CRP«	**Research projects of the Targeted Research Programme** Public call for the selection of research projects of the Targeted Research Programme »CRP«
	Gravity projects and Strategic Projects Public call for (co)funding of Gravity and Public call for (co)funding of Gravity and Strategic Projects	**Gravity projects and Strategic Projects** Public call for (co)funding of Gravity and Public call for (co)funding of Gravity and Strategic Projects	**Gravity projects and Strategic Projects** Public call for (co)funding of Gravity and Public call for (co)funding of Gravity and Strategic Projects	**Gravity projects and Strategic Projects** Public call for (co)funding of Gravity and Public call for (co)funding of Gravity and Strategic Projects
	+ INTERNATIONAL COOPERATION (INCLUDING INTERNATIONAL PROJECTS)			
	ERC Perspective Public call for (co)funding of ERC Perspective research projects	**ERC Perspective** Public call for (co)funding of ERC Perspective research projects	**ERC Perspective** Public call for (co)funding of ERC Perspective research projects	**ERC Perspective** Public call for (co)funding of ERC Perspective research projects
	ERC Potential Public call for (co)funding of ERC Potential research projects	**ERC Potential** Public call for (co)funding of ERC Potential research projects	**ERC Potential** Public call for (co)funding of ERC Potential research projects	**ERC Potential** Public call for (co)funding of ERC Potential research projects

DOCTORAL LEVEL	POST-DOCTORAL LEVEL	POST-DOCTORAL LEVEL	YOUNG DOCTOR	ESTABLISHED RESEARCHER
Up to doctoral degree	**Up to 3 years after obtaining a doctorate degree**	**Up to 5 years after obtaining a doctorate degree**	**Up to 10 years after successfully defending the first doctorate**	
+ INTERNATIONAL COOPERATION (INCLUDING INTERNATIONAL PROJECTS)				
	ERC New Horizons Public call for (co)funding of ERC New Horizons research projects	**ERC New Horizons** Public call for (co)funding of ERC New Horizons research projects	**ERC New Horizons** Public call for (co)funding of ERC New Horizons research projects	**ERC New Horizons** Public call for (co)funding of ERC New Horizons research projects
	ERC PoC Potential Public call for (co)funding of ERC PoC Potential research projects	**ERC PoC Potential** Public call for (co)funding of ERC PoC Potential research projects	**ERC PoC Potential** Public call for (co)funding of ERC PoC Potential research projects	**ERC PoC Potential** Public call for (co)funding of ERC PoC Potential research projects
	Visits to ERC grantees Public call	**Visits to ERC grantees** Public call	**Visits to ERC grantees** Public call	**Visits to ERC grantees** Public call
	Lead Agency Scheme Public call with an individual agency call for PROJ	**Lead Agency Scheme** Public call with an individual agency call for PROJ	**Lead Agency Scheme** Public call with an individual agency call for PROJ	**Lead Agency Scheme** Public call with an individual agency call for PROJ
MSCA Seal of Excellence Public call	**MSCA Seal of Excellence** Public call	**MSCA Seal of Excellence** Public call	**MSCA Seal of Excellence** Public call	**MSCA Seal of Excellence** Public call
	Reimbursement of expenses – Horizon Europe Public call	**Reimbursement of expenses – Horizon Europe** Public call	**Reimbursement of expenses – Horizon Europe** Public call	**Reimbursement of expenses – Horizon Europe** Public call
	Bilateral cooperation projects Public call with partner countries	**Bilateral cooperation projects** Public call with partner countries	**Bilateral cooperation projects** Public call with partner countries	**Bilateral cooperation projects** Public call with partner countries
COST actions	**COST actions**	**COST actions**	**COST actions**	**COST actions**

Information on other available (co)funding mechanisms is available at **https://www.aris-rs.si/sl/razpisi/** (only in Slovene).

Public tenders and calls, published in 2024

Number of published public tenders, public calls and applications based on direct contracts by month of publication

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL 2024
Domestic			2	2	2				1	4		1	**12**
International	6	2	3	2	2	1			2	2	4	1	**25**

Overview of domestic calls and tenders

	Publication date
Public call for reimbursement of costs for scientific publications published in open access (for 2024)	15 March, 2024
Public call for (co)funding of the publishing of scientific monographs in 2024	15 March, 2024
Public call for (co)funding of the purchase of international scientific literature in 2024	15 April, 2024
Public call for the selection of research projects under the »Our food, rural areas and natural resources« Targeted Research Programme for 2024	19 April, 2024
Public call for (co)funding of Gravity	7 May, 2024
Public call for the selection of research projects under »CRP 2024« Targeted Research Programme for 2024	10 May, 2024
Public call for (co)funding of the purchase of research equipment (Package 23)	27 September, 2024
Public call for (co)funding of publishing of Slovenian science periodicals in 2025 and 2026	1 October, 2024
Public call for (co)funding of publishing of Slovenian popular science periodicals in 2025	1 October, 2024
Public call for (co)funding of Gravity and Strategic Projects	30 October, 2024
Public call for (co)funding of research projects in 2025	30 October, 2024
Public call for (co)funding of the implementation of citizen science activities in 2024 (funding in 2025 and 2026)	2 December, 2024

Overview of international calls and tenders

	Publication date
Public call for (co)funding of ERC New Horizons research projects	1 January, 2024
Public call for (co)funding of Framework Programme Projects – ERC Perspective projects	1 January, 2024
Public call for (co)funding of ERC Potential research projects	1 January, 2024
Public call for (co)funding scientific research cooperation between the Republic of Slovenia and the French Republic under the PROTEUS Programme in 2025 and 2026	26 January, 2024
Public call for post-doctoral research scholarships in Japan for researchers from the Republic of Slovenia in 2024	8 March, 2024
Public call for (co)funding scientific research cooperation between the Republic of Slovenia and the partner country in 2025–2027	11 March, 2024
Public call for (co)funding of science popularisation activities 2024	15 March, 2024
Public call for (co)funding of science and research cooperation between the Republic of Slovenia and the French Commissariat for alternative and atomic energy (CEA) in 2025–2026	19 April, 2024
Public call for (co)funding of ERC – PoC – Potential research projects (project for assessing innovation potential)	13 May, 2024
Public call for (co)funding scientific research cooperation between the Republic of Slovenia and the partner countries Japan and the Republic of Turkey in 2025–2027	14 June, 2024
Application for the (co)funding of Marie Skłodowska-Curie Seal of Excellence research projects – 2024	10 September, 2024
Public call for (co)funding of ERC New Horizons research projects for the period from 1 October, 2024 to 30 September, 2025	1 October, 2024
Public call for (co)funding ERC Perspective research projects for the period from 1 October, 2024 to 30 September, 2025	1 October, 2024
ERC Focus public call	1 November, 2024
Public call for (co)funding scientific research cooperation between the Republic of Slovenia and China in 2025–2028	4 November, 2024
Public call for post-doctoral research scholarships in Japan for researchers from the Republic of Slovenia in 2024	26 November, 2024

Overview of international calls and tenders – applications based on direct contracts

	Publication date
Application for (co)funding of the Slovenian section of joint research project with FWF (Fonds zur Förderung der wissenschaftlichen Forschung) as the lead agency – 2024	1 January, 2024
Application for (co)funding the Slovenian section of joint research project with Research Foundation – Flanders (FWO) as the lead agency – 2024	29 January, 2024
Application for (co)funding the Slovenian section of joint research project with SNSF (Swiss National Science Foundation) as the lead agency – 2024	9 February, 2024
Application for (co)funding the Slovenian section of joint research project with GA ČR (The Czech Science Foundation) as the lead agency – 2024	9 February, 2024
Application for (co)funding the Slovenian section of joint research project with HRZZ (Hrvatska zaklada za znanost) as the lead agency – 2024	17 April, 2024
Application for (co)funding the Slovenian section of joint research project with NKFIH (National Research, Development and Innovation Office) as the lead agency – 2024	15 May, 2024
Application for (co)funding the Slovenian section of joint research project with NCN (Narodowe Centrum Nauki) as the lead agency – 2024	16 September, 2024
Application for (co)funding the Slovenian section of joint research project with DFG (Deutsche Forschungsgemeinschaft) as the lead agency – 2024	5 November, 2024
Application for (co)funding the Slovenian section of joint research project with FNR (Luxembourg National Research Fund) as the lead agency – 2024	20 December, 2024

Promotion and dissemination of scientific knowledge

The basic goal of public communication of the Agency is to contribute to more comprehensive, objective and credible reporting and public debate on scientific research and innovation activities in the Republic of Slovenia.

In 2024, the Agency strengthened its activities in science promotion, recognising that successful communication with stakeholders and target audiences is based on a well-designed communication strategy that defines core communication goals and activities. In accordance with the ARIS Public Communication Strategy, the Agency implemented planned communication activities in 2024, such as information days, on-line workshops, expert consultations, and the like. As part of the RRP implementation, the Agency carried out all planned communication activities within the framework of the organisation and implementation of four training and networking events, and in November it held the **»ARIS Day: Supporting Excellence«** event for the seventh time. In December 2024, we also held our first Open Doors Day for more direct communication with interested users regarding the implementation of ARIS activities.

More about promoting science: **https://www.aris-rs.si/sl/promocija** (only in Slovene).

ARIS Day 2024: Supporting Excellence

ARIS Day 2024: Supporting Excellence took place on November 18, 2024 at the National Gallery in Ljubljana. The event, which was intended to strengthen cooperation between science and industry, brought together representatives of the scientific research and business sectors, decision-makers from both fields, and the interested general public.

Dr. Špela Stres, the then-director of ARIS presented to the audience the latest developments in ARIS activities and initiatives aimed at enhancing cooperation between science and industry. The President of the National Council of the Republic of Slovenia, Marko Lotrič, emphasised that in this era of technological progress, the rapid rise of artificial intelligence, and the effects of globalisation, the potential has still not been fully exploited. He pointed out that opportunities for breakthrough projects can be found in the close and effective connection between science and industry. He also stressed that the state must provide an environment that, through appropriate incentives and legislation, will facilitate synergy between researchers and industry. Dr. Igor Papič, Minister of Higher Education, Science and Innovation, likewise highlighted the importance of investments in research, development and innovations while dedicating particular attention to the planned public calls for proposals in these areas.

The programme continued with a discussion on bridging the gap between science and industry where participants highlighted key obstacles and challenges that hinder cooperation and sought solutions to facilitate a smoother transition of ideas from research and educational institutions to the market.

Two content workshops took place in the afternoon. The first enabled researchers to gain knowledge for successful communication of scientific research projects while the second addressed challenges and opportunities for companies that innovate.

The final part of the programme included round-table discussions on Excellent in Science 2024, where participants explored the most prominent research achievements across seven scientific domains (natural sciences, engineering, medicine, biotechnology, social sciences, humanities, and interdisciplinary research).

This was followed by the Excellent in Science 2024 awards ceremony which was attended also by some of this year's winners of Zois awards and prizes. Excellent in Science is a project that ARIS has implemented as part of the promotion of science for the 13th consecutive year. 25 outstanding research achievements were selected as the Excellent in Science 2024.

The event concluded with a ceremonial reception honouring the new generation of young researchers. The gathering was addressed by 2024 Zois Lifetime Achievement Award recipient Prof. Dr. Željko Knez who delivered a motivational speech.

The event was attended by more than 250 young and established researchers, mentors, and representatives from industry, educational institutions, innovation organisations, and research facilities.

The event was also included in the Science Month 2024 programme, an initiative organised by the Ministry of Higher Education, Science and Innovation.

ARIS Day 2024 was carried out under the Recovery and Resilience Plan of the 3rd area of development »Smart, sustainable and inclusive growth«, RDI components – »Research, development and innovation«. The event was funded by the European Union – NextGenerationEU.

ARIS Day 2024 in numbers:

- **4** round-tables
- **2** workshops
- more than **250** participants
- **25** awards for Excellent in Science selected achievements
- **2,588** views of the live morning broadcast from the Ceremonial Hall on STA streaming platform

Open Doors Day

The Agency successfully held the first ARIS Open Doors Day on December 12, 2024.

Held as part of the Science Month 2024, the event was designed to showcase the Agency's operations to the general public and highlight its role in promoting excellence in research, development and innovation (RDI).

The event programme included a presentation of ARIS's activities in the following areas:

- (co)funding of research projects and the progress of current public calls for proposals for 2025,
- (co)funding of innovation projects and planned public calls for 2025,
- international cooperation with an emphasis on co-funding of bilateral cooperation and promoting researcher mobility,
- stable funding and evaluation of research organisations,
- open science and analysis,
- establishing an RDI Hub and enhanced communication as well as preparing networking and connection events,
- legal and general matters, and
- financial business matters and business IT content of Agency.

The event attracted 82 participants, who, in a relaxed atmosphere and through direct discussions with employees, gained valuable insights about the Agency's activities and department-specific activities, including updates on ARIS initiatives.

1

ANNUAL REPORT

ABOUT THE AGENCY

AGENCY ACTIVITY

FINANCIAL REPORT

INTERNATIONAL COMPARISONS

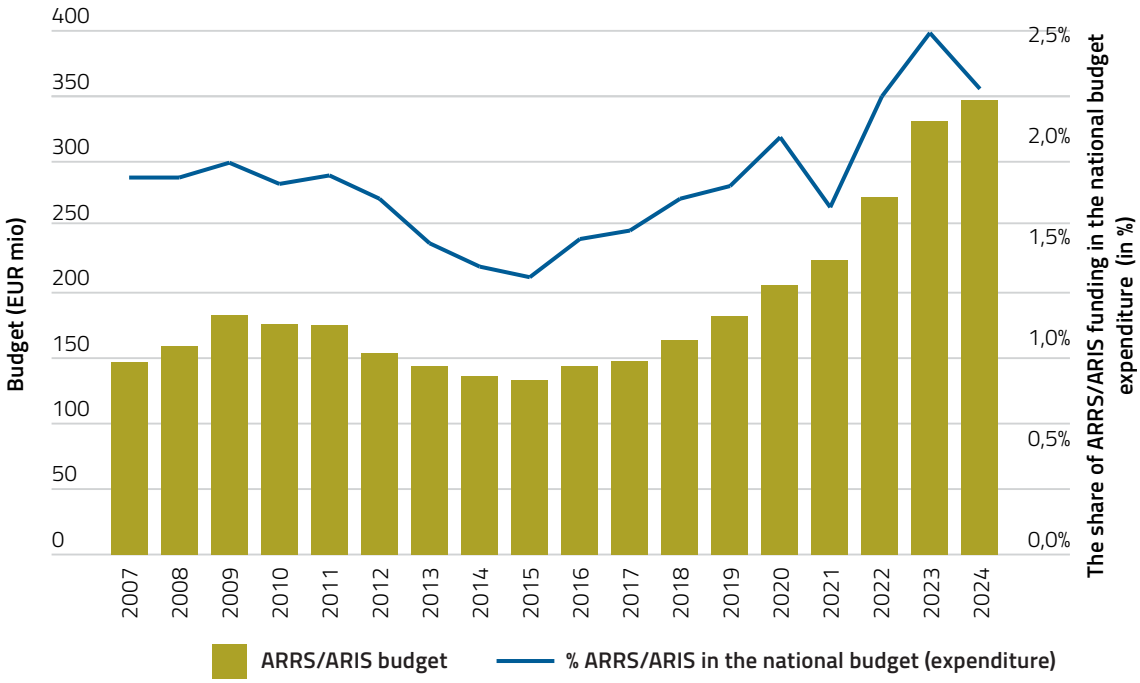
Financing structure

In 2024, ARIS focused its efforts on creating optimal conditions for scientific research and innovation activities and monitoring the relevance and impact of scientific research implementation. A substantial portion of activities involved the implementation of stable funding mechanisms for scientific research, including basic, applied, and post-doctoral projects.

In 2024, EUR 346.5 million was allocated from the Slovenian national budget through the Slovenian Research and Innovation Agency to fund scientific research - representing a EUR 15.0 million (4.5%) increase over 2023, though this growth was significantly smaller than the previous year's increase. The Agency's budget for funding scientific research activities has shown consistent growth since 2015.

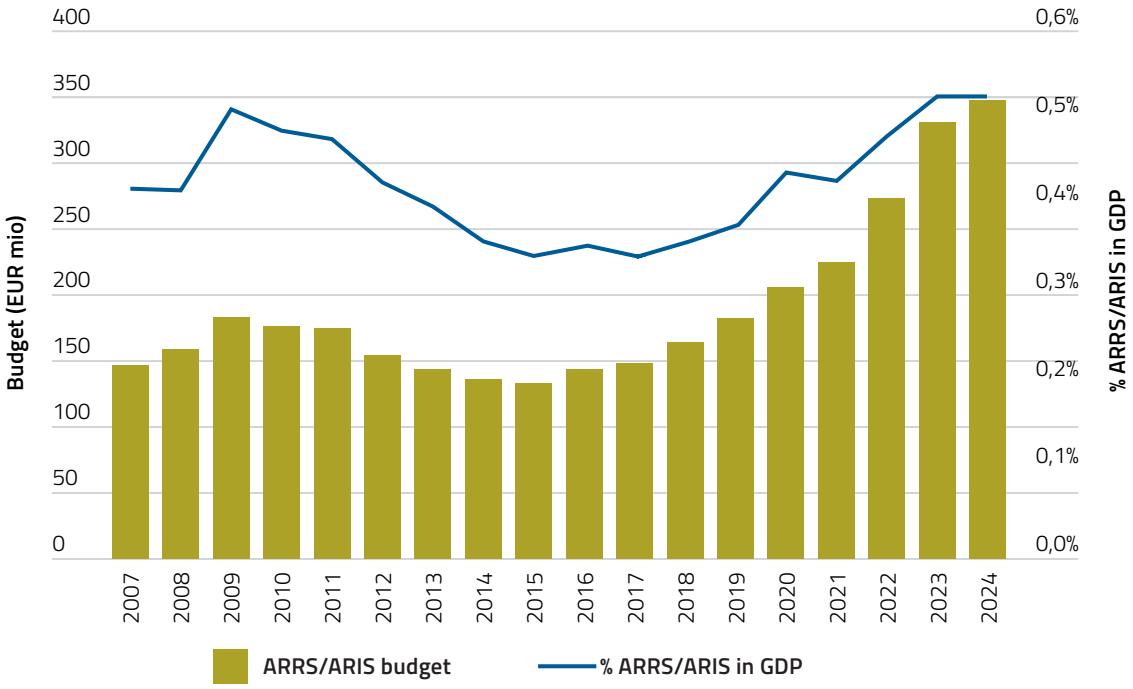
In 2024, after two years of growth, the Agency's share of Slovenia's national budget expenditures for funding scientific research decreased from 2.48% (in 2023) to 2.23% (in 2024), remaining slightly above the 2022 level of 2.17%.

Agency resources for funding scientific research activities and their corresponding share in the budget of the Republic of Slovenia in the 2007–2024 period



In 2024, the ARIS's share of GDP remained unchanged from the previous year (0.5%). This marked the end of an upward trend that had persisted since 2017, with the sole exception of 2021 when the share experienced a slight pandemic-related decline.

Agency resources for funding scientific research activities and their corresponding share in the GDP in the 2007–2024 period



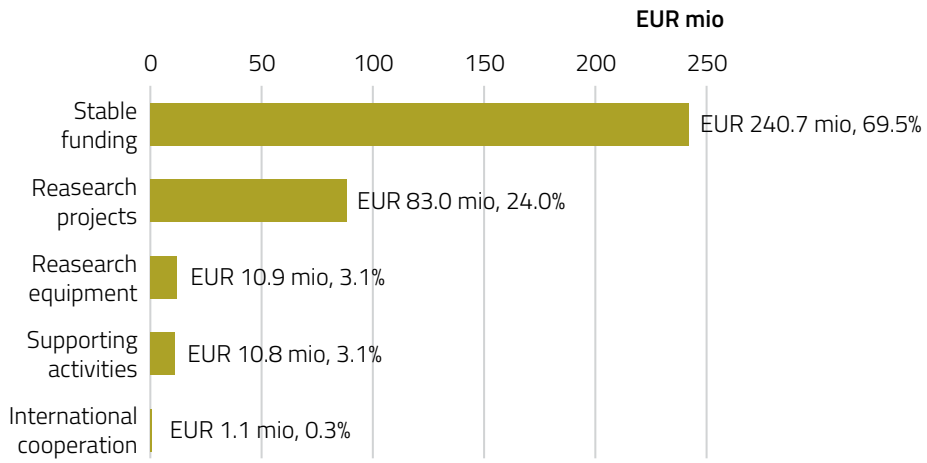
A detailed overview of the funding of research activities by year is available at: **https://www.arrs.si/sl/finan/letpor/** (only in Slovene).

More data and charts on the scope and structure of funding received by the Agency from the national budget are available at: **https://www.aris-rs.si/en/analize/obseg01/index.asp**.

Agency funds in 2024

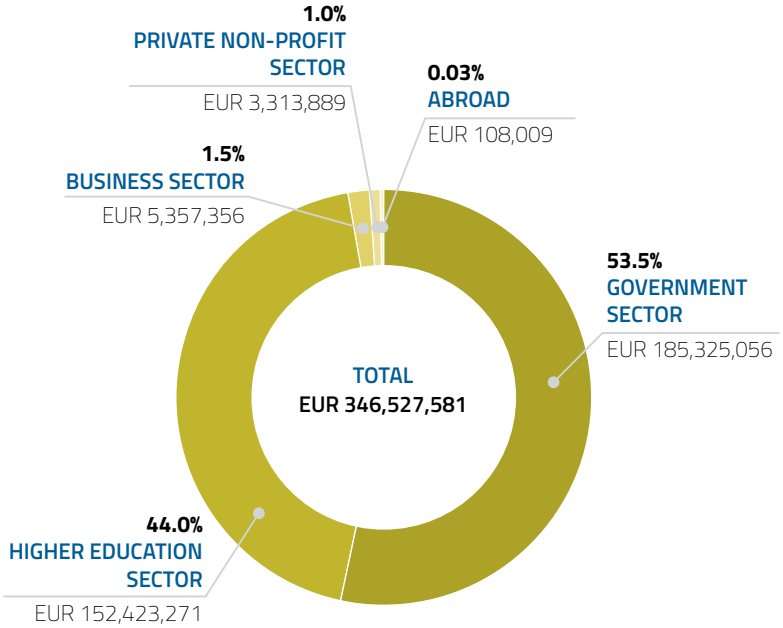
In 2024, the largest portion of the Agency's funding – EUR 240.7 million (69.5% of total resources) – was allocated to stable funding. EUR 83.0 million, or 24.0% of the funds, was allocated to research projects. Research equipment and supporting activities received EUR 10.9 and 10.8 million respectively, representing 3.1% of total funds. International scientific research cooperation received EUR 1.1 million or 0.3% of total funds.

Agency funds per mechanism set in 2024

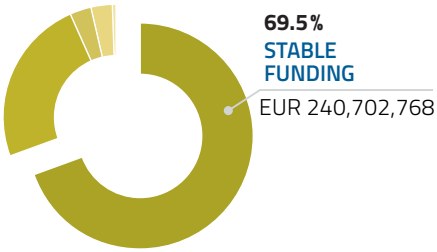


By sector of activity, 53.5% of funds were allocated to the government sector and 44.0% to the higher education sector.

Distribution of Agency funds by activity sector in 2024



Stable funding



The Agency allocated the majority of its funds in 2024 to stable funding. The EUR 240.7 million allocated for stable funding represented 69.5% of the Agency's total resources.

In 2024, stable funding of scientific research activities comprised resources from three of the four pillars financed this year, namely the institutional (ISF), programme (PSF) and development pillar (RSF).

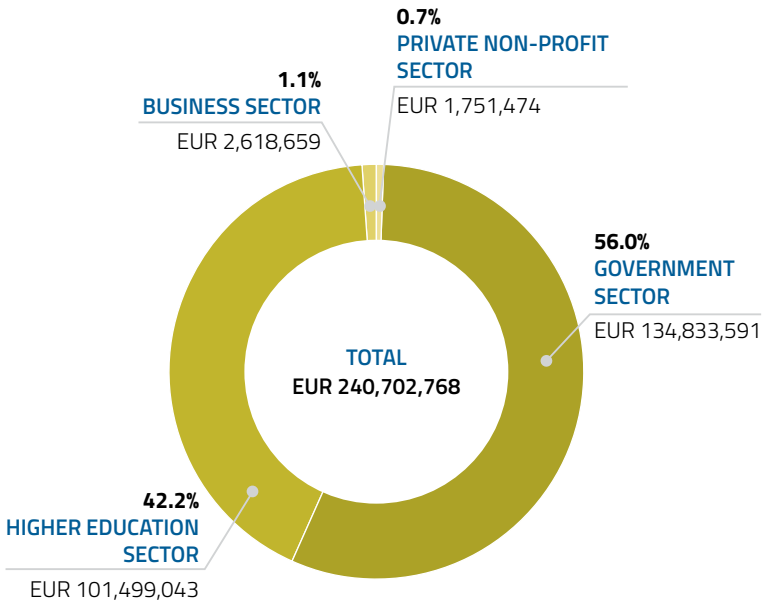
In 2024, also the (co)funding of research and infrastructure programmes and priority projects from the Research Infrastructure Roadmap (NRRI), which did not transition to stable funding, was carried out. For the purposes of this report we list them within the framework of stable funding (research programmes, infrastructure programmes – material costs and infrastructure programmes – salaries, founding obligations for the PRI – operation of the newly established public research institutes ZIS Pomurje and Rudolfovo and partial salary compensation for the trade union representative).

In 2024, research programmes accounted for the largest share of stable funding (43.7%), followed by management and supporting activities of stable funding recipients (23.9%) and young researchers (15.9%).

Funds for stable funding in 2024

PSF – research programmes	EUR 105.14 million
ISF – management and supporting activities	EUR 57.51 million
PSF – young researchers	EUR 38.34 million
ISF – infrastructure activity	EUR 19.16 million
RSF – development funding pillar	EUR 13.10 million
Infrastructure programmes – material costs	EUR 2.98 million
Founder obligations for PRI	EUR 1.93 million
Infrastructure programmes – salaries	EUR 1.58 million
Research programmes	EUR 0.95 million

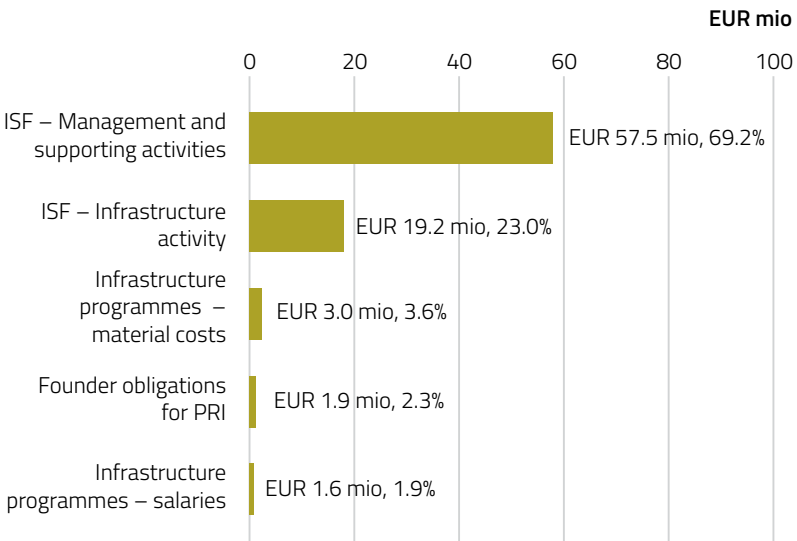
Funds for stable funding by activity sector in 2024



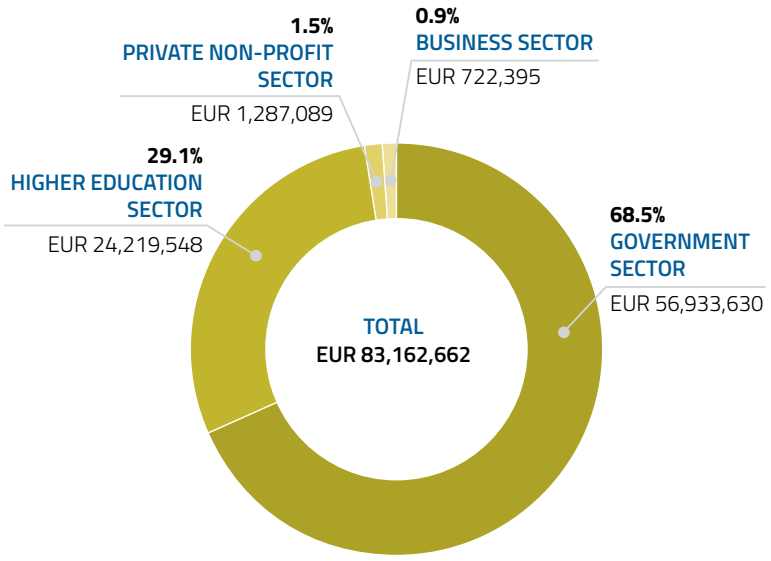
Institutional funding pillar

The institutional funding pillar covers funding the infrastructure, management and supporting activities for recipients of stable funding and other institutional infrastructure. In 2024, EUR 1.9 million was allocated for the operation of two newly established public research institutes, which are not in the stable funding system, while EUR 4.6 million was allocated in 2024 for (co)funding infrastructure programmes and priority projects from Research Infrastructure Roadmap (NRRI) that have not transitioned to stable funding.

Funding mechanisms included in the Institutional funding pillar in 2024



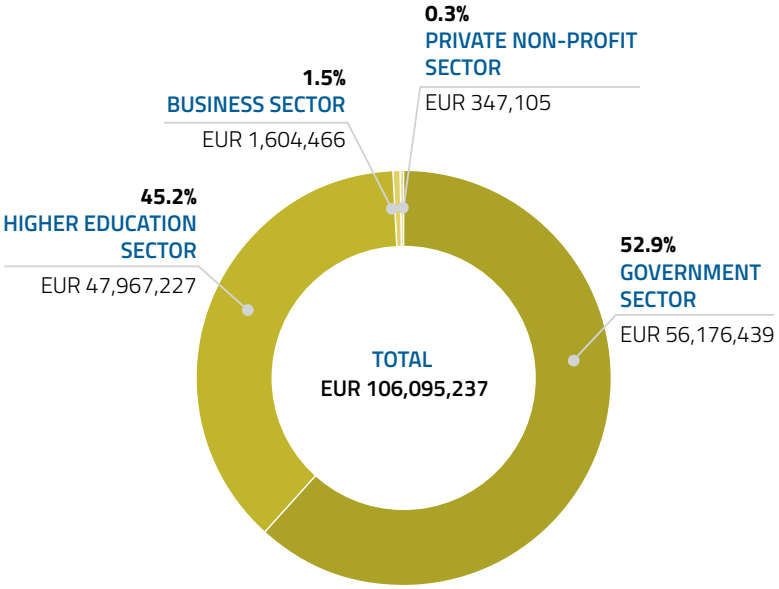
Funding of the Institutional pillar by activity sector in 2024



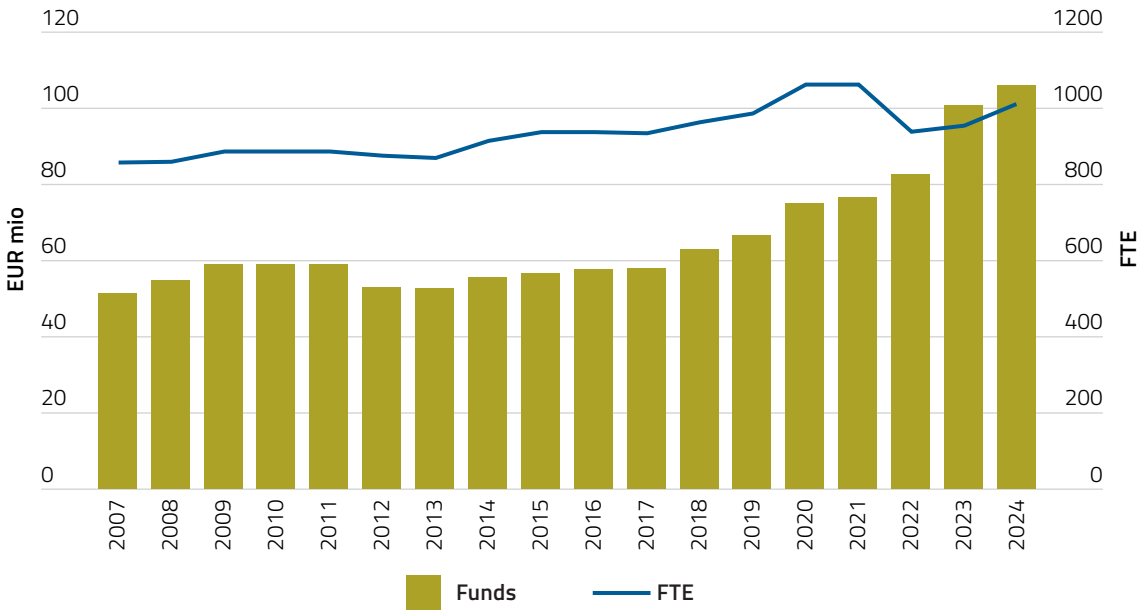
Research programmes

Research programmes represent comprehensive scientific domains where work is expected to remain relevant and applicable over the long term. In 2022, they became part of the programme funding pillar, except for the part implemented in commercial enterprises during the first contractual period. Recipients of stable funding determine the content, scope, implementation method of the research programmes, including the appointment of programme leaders, taking into account government-established norms and standards, ARIS's general act, and the recipient institution's governing statutes. In 2024, there were 70 recipients of research programme funding. In 2024, the Agency paid EUR 106.1 million for the co-funding of research programmes which represents 30.62% of the total budget for scientific research activity.

Funds for research programmes by activity sector in 2024



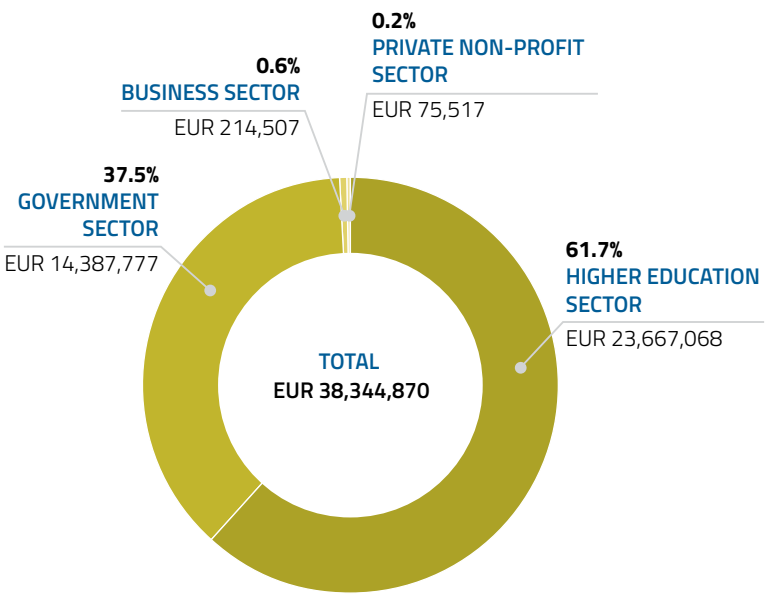
Funds and FTE (full-time researchers) for research programmes in the 2007–2024 period



Young researchers

Young researchers are doctoral students who are employed by stable funding recipients to obtain their doctoral degree. In 2022, funding for the training of young researchers was transitioned to the programme pillar of stable funding. Through participation in research programmes and projects under mentor supervision young researchers develop independent research and development capabilities while earning their academic degrees. Funding for young researchers serves three objectives: renewing the research and teaching staff in research organisations, enhancing research capacity of groups for implementing public service programmes in basic, applied, and developmental projects, and strengthening human capital for the Slovenian economy and other socially important areas. Funding for

Funds for young researchers by activity sector in 2024



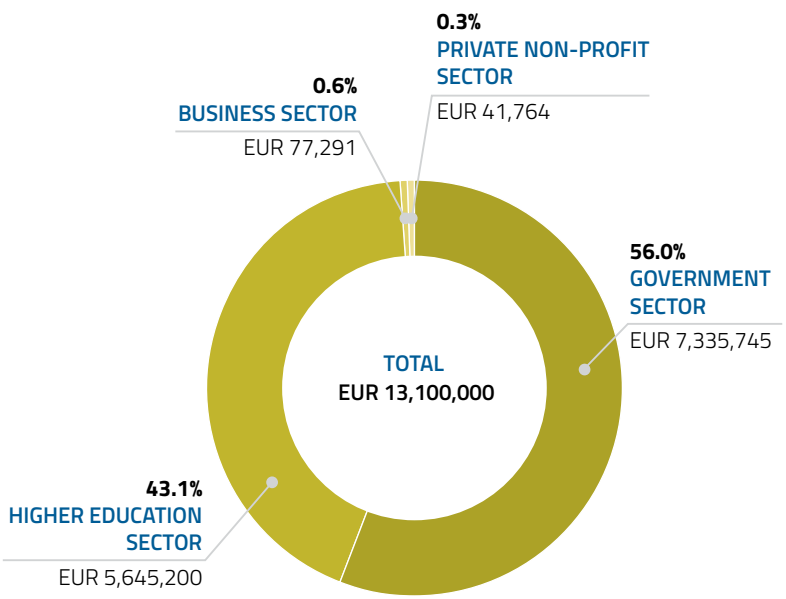
young researchers shows consistent annual growth. In 2024, EUR 38.3 million was allocated for the training of young researchers which is EUR 2.7 million more than the previous year.

By integrating the training of young researchers in the programme pillar of stable funding, the established arrangement ensures that the publication of calls, the selection of mentors, and the selection of candidates for young researchers fall under the responsibility of the stable funding recipient. The recipient of stable funding determines in its act the number of positions for doctoral students, mentors, training programmes, criteria, evaluation method and selection of candidates for young researchers.

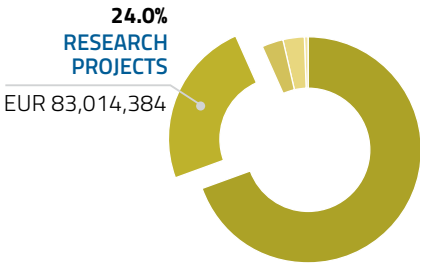
Development funding pillar

The development funding pillar is intended to promote the development of scientific research and infrastructure activities. Funds for the development funding pillar were first allocated to recipients of stable funding in 2023, with a total amount of EUR 13.1 million. This amount remained unchanged in 2024 as well, representing 5.4% of all funds allocated to stable funding.

Funds for the development funding pillar by activity sector in 2024



Research projects



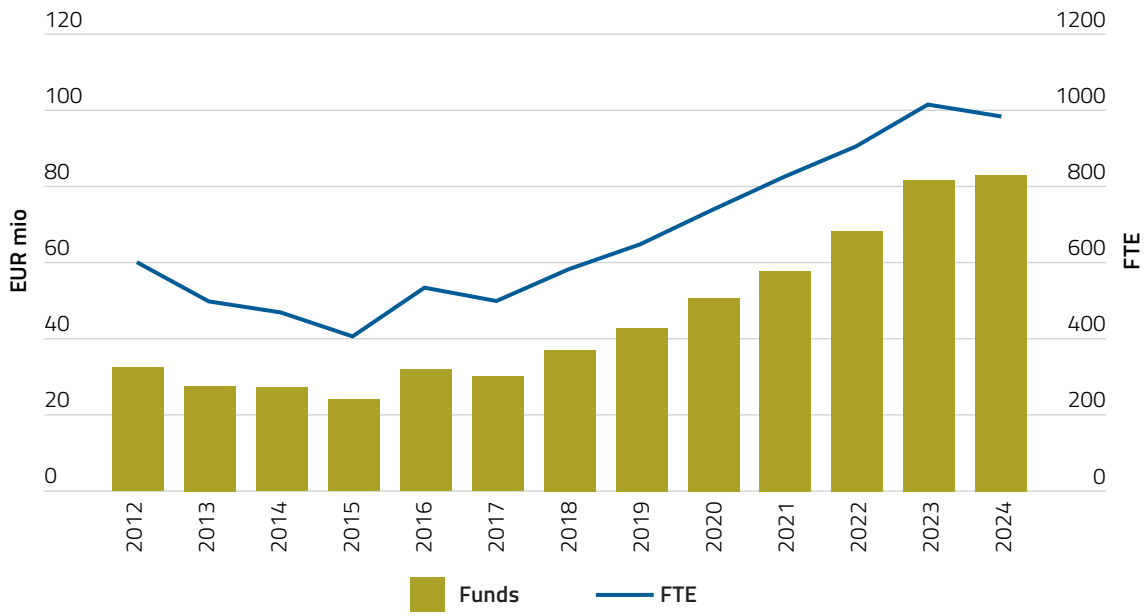
In 2024, the Agency allocated EUR 83.0 million or 24.0% of Agency's total funds to research projects.

In 2024, a randomised reviewer selection system was piloted for research project evaluations, using a specially developed computer application for this purpose. This ensures an independent reviewer selection process with the suitability of selected reviewers subsequently verified by an External Expert Panel appointed by the ARIS Scientific Council.

The acquisition and (co)funding of a research project are subject to a public call. Successful project proposals that meet all stipulated requirements and are selected based on reviews from international reviewers and recommendations from the Agency's expert bodies will receive co-funding for the period specified in the call.

The upward trend in research project funding has continued since 2017. In 2024, funds for research projects increased by EUR 1.4 million compared to 2023 (EUR 81.6 million).

Funds and FTE (full-time researchers) for research projects in the 2012–2024 period

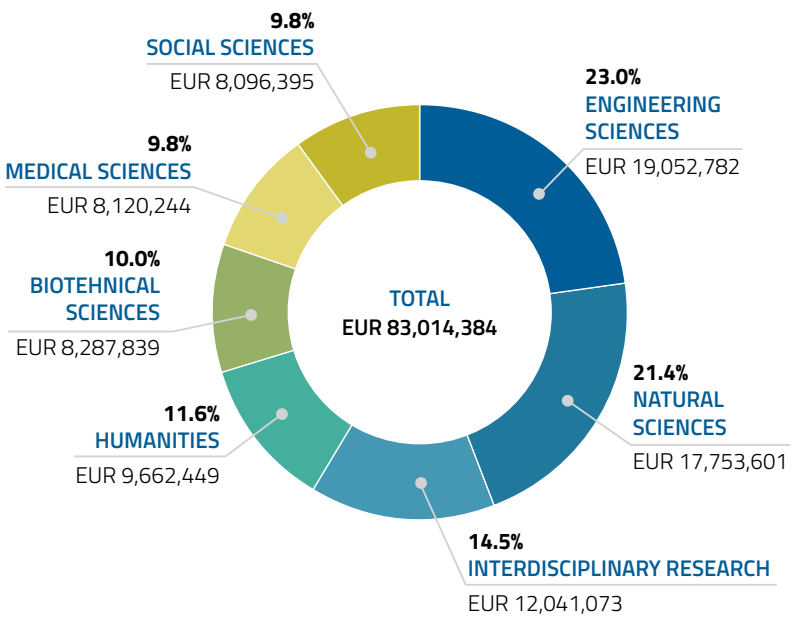


Research projects include basic research projects, applied research projects, post-doctoral research projects, Targeted Research Programme (CRP) projects, international cooperation projects, and from 2024 onwards, Gravity projects.

Funds for research projects by project type in 2024

Basic research projects	EUR 50.1 million
International cooperation projects	EUR 14.2 million
Applied research projects	EUR 8.0 million
Targeted Research Programme projects	EUR 5.4 million
Post-doctoral research projects	EUR 4.7 million
Gravity projects	EUR 0.6 million

Funds for research projects by discipline[1] in 2024

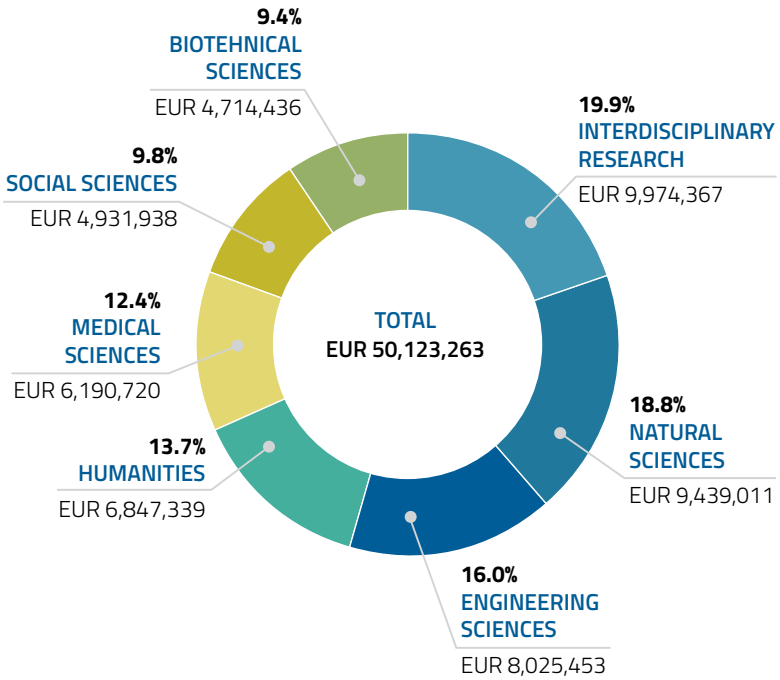


1 Research disciplines according to Classification of ARRS: **https://www.aris-rs.si/en/gradivo/sifranti/sif-vpp.asp**.

Basic and applied research projects

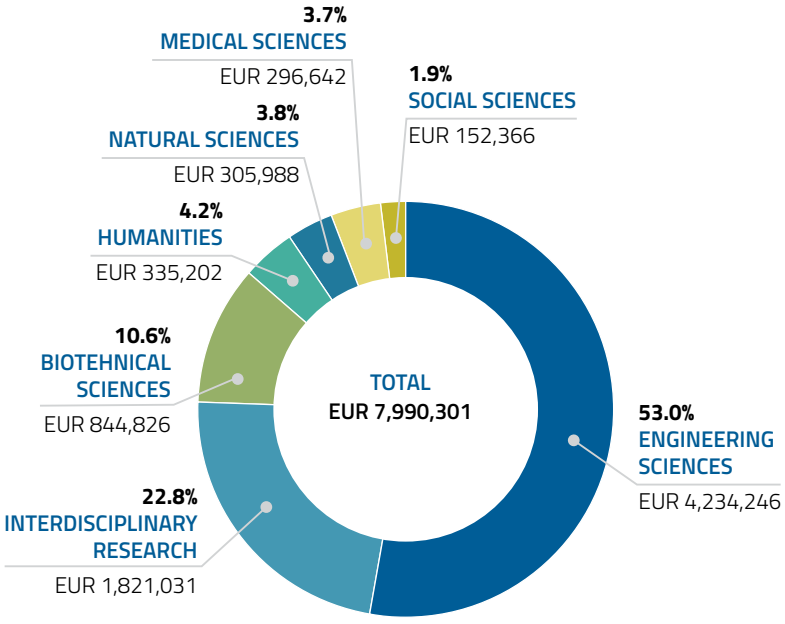
Basic research projects involve original experimental or theoretical work aimed primarily at acquiring new knowledge about the underlying principles of phenomena and perceptual facts. In 2024, the Agency funded basic research projects with state budget funds amounting to EUR 50.1 million.

Funds for basic research projects by discipline in 2024



Applied research projects involve original research conducted to acquire new knowledge and are primarily directed toward practical objectives or purposes. In 2024, the Agency co-funded applied research projects with state budget funds amounting to EUR 8.0 million.

Funds for applied research projects by discipline in 2024



Basic and applied research projects by research discipline with shares for projects led by female and junior researchers. Data about the share of funding for projects lead by young female researchers are presented in the last column.

RESEARCH DISCIPLINE	BASIC AND APPLIED PROJECTS IN EUR MILLIONS	FEMALE RESEARCH LEADERS (share of projects managed by female leaders)	JUNIOR LEADERS	
			JUNIOR LEADERS (share of junior leaders)	JUNIOR FEMALE RESEARCH LEADERS (share of women among junior leaders)
Natural sciences	9.74	30.7%	23.6%	29.8%
Engineering sciences	12.26	26.7%	18.9%	25.5%
Medical sciences	6.49	46.6%	29.2%	32.7%
Biotechnical sciences	5.56	44.9%	22.8%	45.2%
Social sciences	5.08	42.2%	28.6%	38.1%
Humanities	7.18	44.4%	24.5%	62.2%
Interdisciplinary research	11.80	41.4%	20.7%	39.6%
Total	**58.11**	**38.3%**	**23.4%**	**37.7%**

International cooperation projects

The first pillar of international activity is represented by international cooperation projects of a research nature and are therefore presented within this chapter on research projects. The second and third pillars of international activity are presented in the chapter International scientific research cooperation.

International cooperation projects include the Lead Agency scheme (where ARIS acts as a partner agency), ERC supporting instruments (ERC Perspective, ERC Potential, ERC New Horizons, ERC PoC Potential), Marie Skłodowska-Curie Seal of Excellence research projects and international partnerships (PRIMA, DUT, CHANSE, JPI EU).

Funds for international projects in 2024

Lead Agency scheme	EUR 8,09 million
ERC supporting instruments	EUR 4,17 million
MSCA Seal of Excellence	EUR 1,62 million
DUT	EUR 0,14 million
PRIMA	EUR 0,09 million
CHANSE	EUR 0,06 million
JPI EU	EUR 0,03 million

The **Lead Agency scheme** enables researchers to submit a joint research project proposal through one agency (the lead agency) which is responsible for conducting the evaluation process of the joint research project application. Cooperation according to this principle can occur with the agency acting either as the lead agency or as a partner agency. In 2024, the Agency allocated EUR 8.09 million to (co)fund the Lead Agency scheme (with ARIS as a partner agency), thus (co)funding 113 international research projects.

Support instruments to encourage applications to European Research Council (ERC) calls: To enhance the success rate of researchers submitting applications with Slovenian research organisations as host institutions in ERC calls, the Agency offers applicants the following support measures: ERC Perspective, ERC Potential, ERC New Horizons and ERC PoC Potential.

The ERC Perspective research project application is open to applicants for researchers who applied to ERC calls (Starting Grant, Consolidator Grant, Advanced Grant) with a Slovenian host research institution and have reached the funding threshold specified in the relevant ERC call during the evaluation process, but have not been selected for ERC (co)funding. The ERC Perspective research project must enable the realisation of research that will lead to the main objectives

of the original ERC call for which the applicant applied. The purpose of the call is to provide applicants with the conditions to refine their own scientific excellence and the original research idea, enabling the ERC Perspective project leader to reapply to the ERC call with an increased likelihood of becoming an ERC grantee.

Applications for an ERC Potential research project may be submitted by host research institutions in Slovenia on behalf of researchers who have been successful in ERC calls (Starting Grant, Consolidator Grant, Advanced Grant or Synergy Grant) with their ERC project proposals. The purpose of the (co)funding call for ERC Potential research projects is to provide initial support for preparatory work prior to implementing the awarded ERC project, covering the interim period between the ERC (co)funding notification and the actual project start. The ERC project must be implemented at a host research organisation in Slovenia.

Applications for the ERC New Horizons research projects may be submitted by research organisations on behalf of researchers who are ERC grant holders (Starting Grant, Consolidator Grant, Advanced Grant, Synergy Grant). The applicant must have participated in the specified ongoing or completed ERC calls as the host research organisation in Slovenia. The purpose of the (co)funding call for ERC New Horizons research projects is to sustain the core of an already established research group for implementing the ERC project, to prepare for a mandatory reapplication to an ERC call or an application to the European Union Framework Programme for Research and Innovation as a project co-ordinator and at the same time to encourage cooperation and knowledge transfer between Slovenian research organisations, requiring the inclusion of at least one additional participating research organisation alongside the primary host institution.

In 2024, ARIS introduced (co)funding under the Seal of Excellence scheme for ERC Proof of Concept applications that received positive evaluations across all assessment criteria and were awarded the Seal of Excellence, but are not be funded by the ERC due to budget constraints. The scheme is called ERC PoC Potential. Its aim is to enhance the value of excellent ERC-funded research by (co)funding additional innovation-oriented work (activities not covered by the original ERC (co)funding). Completed ERC projects may be submitted for advancement to ERC Proof of Concept (ERC PoC) calls.

For all of the above-mentioned ERC support instruments, the Agency allocated EUR 4.17 million for (co)funding in 2024. In 2024 there were 66 projects of this type.

Slovenia participates in European Commission **Marie Skłodowska-Curie (MSCA)** research projects and schemes for which it allocated a total of EUR 1.62 million in 2024.

Marie Skłodowska-Curie – Seal of Excellence: The Agency (co)funds research projects for foreign junior researchers and Slovenian researchers who meet the MSCA mobility rules, have submitted their MSCA project through a Slovenian research organisation, have been awarded the Seal of Excellence by the European Commission, and are implementing their research project in Slovenia. The Agency (co)funds the above-mentioned research projects for periods ranging from six months to three years.

The Agency (co)funds the Marie Skłodowska-Curie COFUND – Seal of Excellence schemes for doctoral and post-doctoral studies, awarded to research organisations that received the European Commission's Seal of Excellence during the evaluation process for implementing Marie Skłodowska-Curie COFUND doctoral or post-doctoral programmes. The purpose of the doctoral studies scheme is to enhance the quality of doctoral studies at regional, national, and international levels. The (co)funding of the post-doctoral training scheme is intended for individual research training and professional career development of post-doctoral researchers.

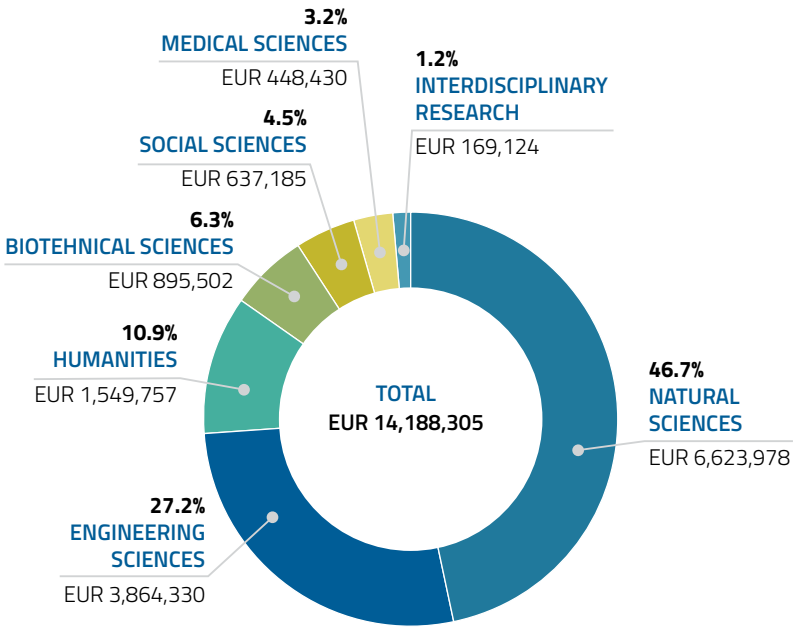
European partnership **Driving Urban Transitions towards a Sustainable Future – DUT** is one of the 49 European partnerships under the Horizon Europe framework programme. It brings together 67 partners from 28 countries, including national and regional policy-makers, research and innovation funders and agencies operating in urban policy. The partnership builds on the achievements of the Joint Programming Initiative Urban Europe – JPI UE and is closely linked to the European mission of 100 climate-neutral and smart cities. In 2024, the Agency (co)funded three DUT research projects totalling EUR 135,384.56.

PRIMA is a partnership of 19 countries in Mediterranean research and innovation, operating through joint scientific, financial, and administrative management via a unified secretariat. The partnership operates across three key priority areas focused on the Mediterranean region: water management, agricultural systems, and agri-food chains. Activities related to Slovenia's participation in the PRIMA programme are co-ordinated by the MVZI. The Agency follows the guidelines of the relevant ministry and (co)funds the Slovenian part of joint PRIMA research projects in accordance with its legal framework. Funding is allocated to projects that received positive evaluations in the PRIMA call's international peer-review process and were recommended for co-funding. In 2024, the agency (co)funded 6 PRIMA research projects with a total value of EUR 85,670.65.

The **CHANSE** consortium – Collaboration of Humanities and Social Sciences in Europe was jointly created by the HERA and NORFACE networks. Its purpose is to connect and support research in humanities and social sciences, respectively; this joint initiative is supported by 24 research funding organisations. In 2024, the Agency (co)funded two projects totalling EUR 64,713.56. Under the Wellbeing 2023 call, one project with a Slovenian partner was selected for (co)funding in October 2024 with implementation beginning in 2025.

JPI UE (Joint Programmatic Initiative Urban Europe) and **NORFACE** are networks that launched joint international calls (ERA-Net) prior to the launch of the Horizon Europe programme. With the new Horizon Europe framework programme, the European Commission has discontinued co-funding individual calls (ERA-Net) and transitioned to co-funding long-term partnerships. Within JPI Urban Europe, the DUT partnership was established, while NORFACE created the CHANSE partnership. Within JPI EU, ERA-Net projects continue under the old system, but no new calls will be organised by these networks.

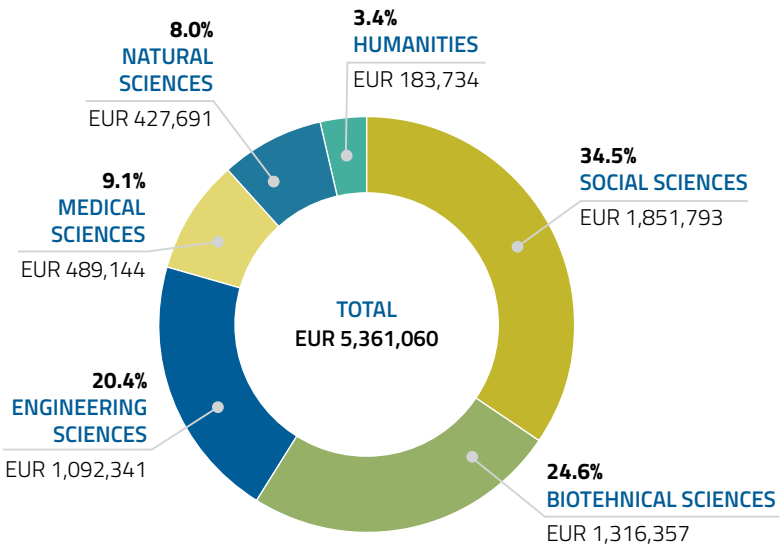
Funds for international cooperation projects by discipline in 2024



Targeted Research Programme projects (CRP)

The CRP is a strategic implementation mechanism of Slovenia's Development Strategy and its Research and Innovation Strategy. Designed as a co-ordination instrument, it connects government needs, the research community, and the wider public around specifically defined priority themes. The primary purpose of the CRP is to create research bases for decision-making in developing, adopting and implementing public interest policies, as well as for monitoring and evaluating their implementation. Compared to the previous year, the funds for (co)funding the CRP increased in 2024 and amounted to EUR 5.4 million.

Funds for CRP projects by discipline in 2024



Funds for CRP projects by discipline with shares for projects led by female researchers

RESEARCH DISCIPLINE	FUNDS IN EUR	FEMALE RESEARCH LEADERS (share of projects managed by female leaders)
Natural sciences	427,691	56.1%
Engineering sciences	1,092,341	28.8%
Medical sciences	489,144	76.7%
Biotechnical sciences	1,316,357	40.0%
Social sciences	1,851,793	63.3%
Humanities	183,734	42.9%
Total	**5,361,060**	**52.2%**

In 2024, two public calls for CRP selection were published:

- Public call for the selection of research projects under the »Our food, rural areas and natural resources« for 2024,
- Public call for the selection of research projects under »CRP 2024« Targeted Research Programme.

Under the CRP »Our food, rural areas and natural resources«, the Agency, in agreement with the Ministry of Agriculture, Forestry and Food, prepared the 2024 public call for selecting research projects for this Targeted Research Programme. The subject of the CRP public call »Our food, rural areas and natural resources« comprised thematic clusters and topics within the following focus areas:

- Focal point 1: Smart, resilient and competitive agriculture, forestry, fisheries and food processing sector,
- Focal point 2: Environmental protection and sustainable management of natural resources,
- Focal point 3: Quality of life, safe and healthy food, strengthening economic activity in rural areas,
- Focal point 4: Knowledge creation and transfer as well as evidence-based policy.

28 research projects were selected for (co)funding.

In 2024, in co-ordination with 22 stakeholders, the Agency prepared the public call for selecting research projects under the »CRP 2024« Targeted Research Programme in 2024. The subject of the CRP public call comprised thematic clusters and topics within the following focus areas:

- Focal point 1: Inclusive, healthy, safe, and responsible society,
- Focal point 2: A highly productive economy that creates added value for all,
- Focal point 3: Learning for life and lifelong learning,
- Focal point 4: A preserved healthy natural environment,
- Focal point 5: High level of cooperation, competence and management efficiency.

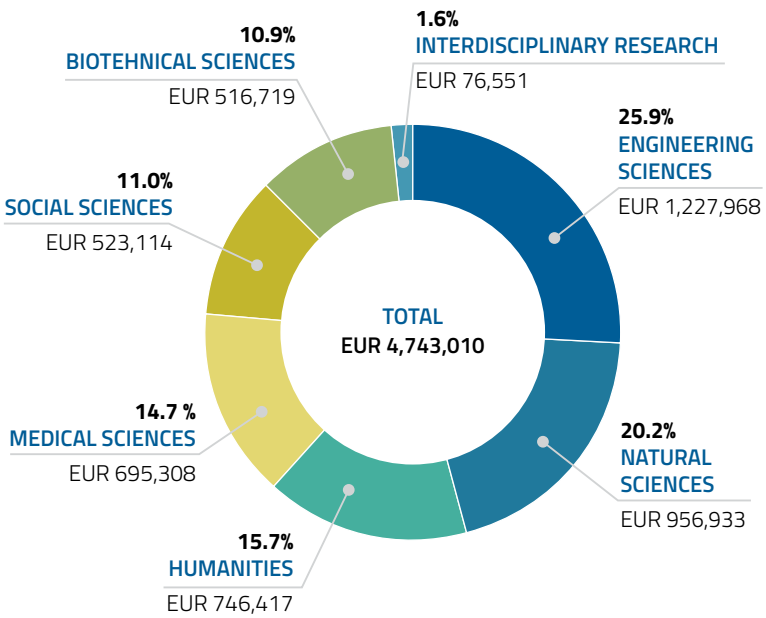
77 research projects were selected for (co)funding.

Post-doctoral research projects

As an important instrument for networking, mobility and researcher exchange, the Agency also co-funds post-doctoral research projects using state budget funds. These may be basic or applied, enabling researchers to gain additional research experience and knowledge after completing their doctorate.

Both the number and total value of projects decreased compared to 2023. In 2023, the Agency funded 112 post-doctoral projects worth EUR 5.6 million from the state budget, compared to 81 post-doctoral projects worth EUR 4.7 million in 2024.

Funds for post-doctoral projects by discipline in 2024



Funds for post-doctoral projects by discipline with shares for projects led by female researchers in 2024

RESEARCH DISCIPLINE	FUNDS IN EUR	FEMALE RESEARCH LEADERS (share of projects managed by female leaders)
Natural sciences	956,933	47.1%
Engineering sciences	1,227,968	38.1%
Medical sciences	695,308	63.6%
Biotechnical sciences	516,719	88.9%
Social sciences	523,114	66.7%
Humanities	746,417	69.2%
Interdisciplinary research	76,551	100.0%
Total	**4,743,010**	**58.0%**

Gravity projects and Strategic projects

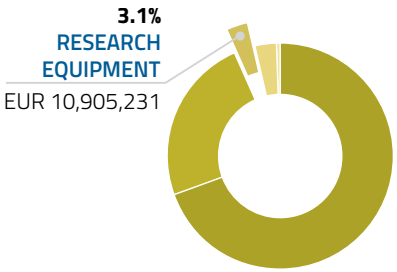
2024 marked the first public call for Gravity projects. Gravity projects are basic or applied cooperation initiatives involving several outstanding researchers. Their purpose is to enhance cooperation and pool knowledge/resources for addressing ambitious research challenges, modelled after the ERC Synergy Grant or the Dutch Gravitation scheme.

The Gravity project brings together excellent researchers from one or several disciplines to form consortia, enable innovations and provide excellence, and consolidate the international position of the Slovenian research. The consortia either rank among the world's leading groups in their research field or demonstrate potential to reach such elite status. The proposed research project focuses on promoting innovative research, significantly contributes to research at the highest global level, and demonstrates a clear potential to make scientific breakthroughs. Research projects also contribute to the implementation of the Slovenian national research agenda. The call specifies predetermined scientific areas addressing key developmental challenges.

In 2024, projects under the Gravity public call for (co)funding in the fields of artificial intelligence, semiconductors, and language technologies were approved and funding has already begun. In 2024, the Agency paid out EUR 0.6 million to these projects, with all funds within the disciplines allocated to engineering sciences.

In 2024, a second call was published (Public call for (co)funding of Gravity and Strategic projects) covering the remaining areas: environmental science with energy solutions for climate change mitigation; medical technologies (from genetic identification to advanced diagnostics/therapies); advanced GIS technologies in the context of past and contemporary social challenges; quantum technologies. The completion of project selection is scheduled for 2025.

Research equipment

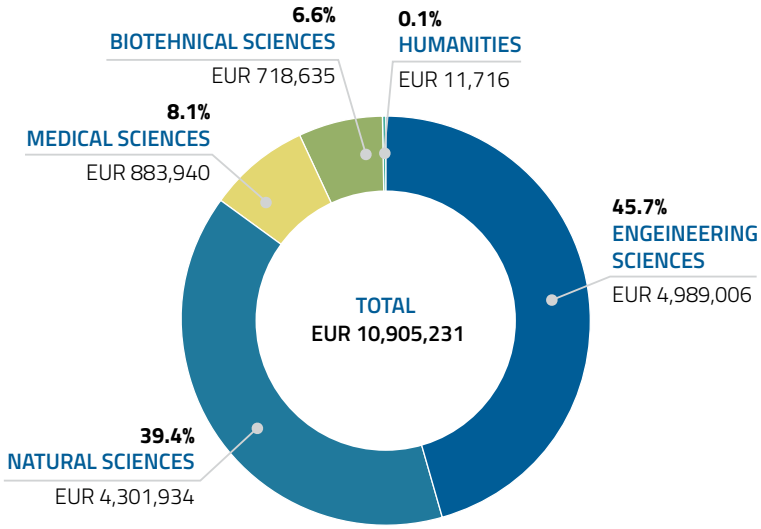


In 2024, the Agency co-funded equipment purchases totalling EUR 10.9 million, representing 3.1% of the Agency's total funds.

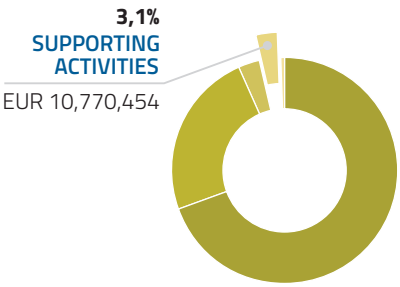
ARIS co-funds the purchase of high-value research equipment. Research equipment provides essential scientific and infrastructural support to researchers conducting scientific research activities in research and development projects and programmes.

Applicants to the public call for co-funding research equipment purchases may be public research organisations performing public service in the field of scientific research through the programme pillar for stable funding of scientific research activity or infrastructure activity under the institutional pillar for stable funding of scientific research activity.

Funds for research equipment by discipline in 2024



Supporting activities



In 2024, the Agency allocated EUR 10.8 million to supporting activities, representing 3.1% of the Agency's total funds.

Supporting activities include (co)funding the purchase of scientific literature and databases, (co)funding the publication of Slovenian scientific and popular science literature, supporting OSIC operation, popularisation and communication of science, and open science initiatives.

Open science represents a modern approach to conducting and disseminating scientific research outcomes (knowledge, findings) in a transparent and collaborative manner. Opening up science through rapid information and knowledge exchange among researchers accelerates scientific progress. Open science represents part of comprehensive, large-scale transformations in European Community's scientific research practices. It is a set of policies, directives, recommendations, processes, methods, practices, and technologies that define the fundamental principles and essential characteristics of open science.

The Agency co-funds **OSIC activity programmes** or special/academic libraries that develop Slovenia's researcher bibliographic database system. The OSIC's objective is to monitor and supervise the proper classification of researchers' bibliographic records in COBISS according to the valid typology, organise arbitration for disputed classifications, correct bibliographic entries when improperly categorized, and contribute to developing and maintaining a unified controlled vocabulary for the COBISS system.

The Agency co-funds the **purchase of international scientific literature and electronic access to the latest global scientific databases**, ensuring the necessary inflow and accessibility of foreign academic and professional information for the needs of scientific research, education, and development activities. The literature is publicly available through all research organisation libraries and the COBISS system.

Funds for supporting activities in 2024

IT support, international literature	EUR 7.2 million
Journals and textbooks[2]	EUR 2.2 million
Open science	EUR 1.4 million

2 The allocated funds cover domestic popular science periodicals, domestic scientific periodicals, and academic monographs.

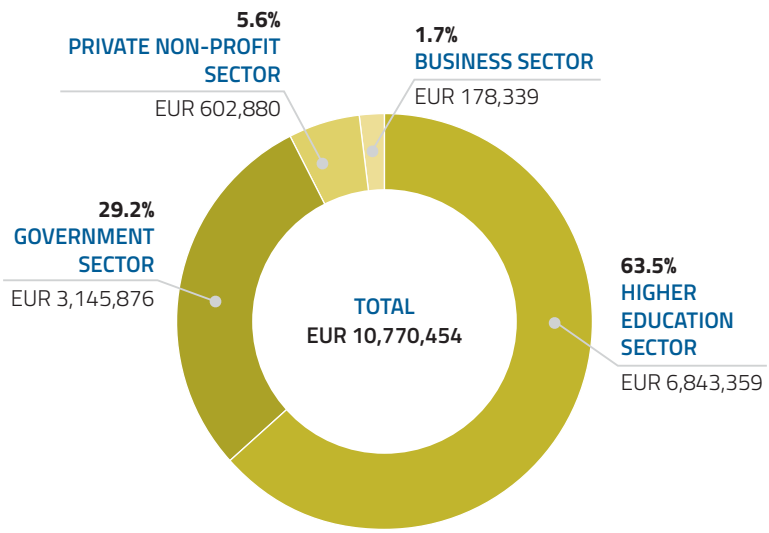
In 2024, ARIS allocated EUR 7.2 million for information support and the purchase of international literature, EUR 2.2 million for publishing periodicals and books, and EUR 1.4 million for open science (reimbursing open-access publication costs).

Co-funding of the scientific press, including domestic science and popular science publications, commanded a sum of EUR 1.9 million in 2024, while EUR 0.3 million was paid for scholarly monographs.

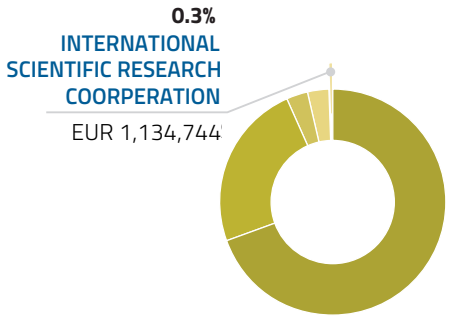
The Agency also co-funds publication of both popular science and academic content on the basis of a public call, with the aim of enabling the publication of those popular science publications which are important for the promotion of interest in science and technology among the general public, particularly among young people.

The Agency also co-funds the publication of scientific monographs that are important for the development of Slovenian scientific terminology, intended for presenting scientific achievements and findings in Slovenia and abroad, and for promoting scientific culture.

Funds for supporting activities by activity sector in 2024



International scientific research cooperation



In 2024, the Agency allocated EUR 1.1 million to international scientific research cooperation, representing 0.3% of the Agency's total funds.

Science and research are increasingly embedded in the international arena, while simultaneously creating inseparable, complementary connections across diverse fields. To foster international cooperation and networking, the Agency's international activities are focused on three main pillars: international research projects, international mobility, and other international activities.

The first pillar of international activity comprises international research projects, as detailed in the section Research projects, International cooperation projects.

The second and third pillars of international activities – also comprising international scientific cooperation – are presented in this chapter.

The second pillar of the Agency's international activities comprises **international mobility:** bilateral cooperation activities, bilateral projects, ERC hosting, COST, JSPS scholarships and the hosting of researchers from third countries.

Funds for international mobility in 2024

International projects – bilateral cooperation	EUR 0.513 million
Scientific research cooperation: CEA and China	EUR 0.324 million
Visits to ERC project leaders	EUR 0.002 million

In bilateral cooperation the competent ministry decides on intergovernmental agreements and determines active bilateral partnerships, and negotiates all conditions with partner countries (when these fall outside the Agency's legal framework). The agency acts as an implementing body that (co)funds bilateral cooperation with the aim of strengthening scientific research cooperation with partner countries, establishing new, sustainable international partnerships, and increasing the participation of young researchers in international research consortia. The Republic of Slovenia has established international agreements with 36 countries while active cooperation was maintained with 16 countries in 2024. For the co-funding of 319 bilateral cooperation activities, the Agency allocated over EUR 512,000.

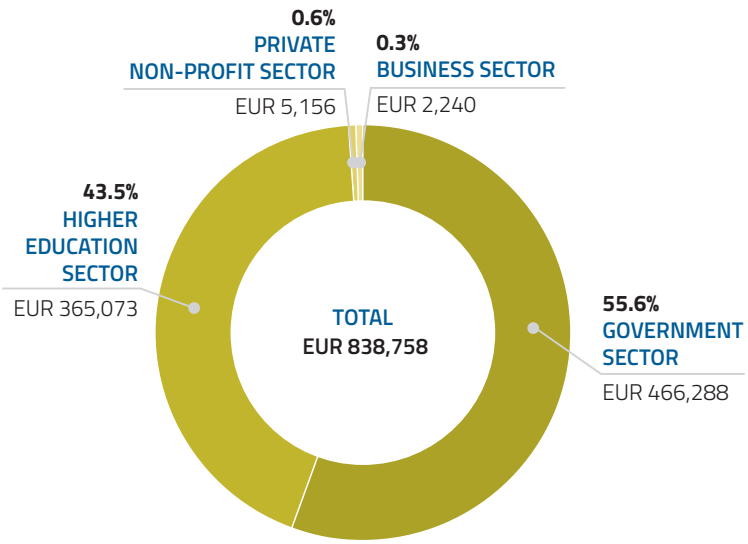
The (co)funding of bilateral research projects in 2024 continued to operate through co-ordinated cooperation between the ministry and the Agency. In 2024, the Agency (co)funded ten bilateral research projects with the French Republic's Commission for Alternative Energies and Atomic Energy (CEA). For the (co)funding of ten bilateral research projects in 2024, the Agency allocated over EUR 324,000.

In 2024, a public call was announced for the (co)funding of scientific research cooperation (bilateral research projects) between the Republic of Slovenia and the People's Republic of China for the 2025–2028 period. The subject of this public call is the (co)funding of collaborative scientific research work involving researchers from both countries.

International mobility also includes the ERC Hosting scheme (ERC Focus) which enables researchers to visit former and current ERC project leaders abroad. The purpose of the scheme is to train applicants in ERC proposal preparation and enhance their chances of securing ERC grants. The Agency recognises the potential of the aforementioned scheme, as several researchers who initially received (co)funding from this title later succeeded in obtaining ERC grants. In 2024, one new hosting arrangement with ERC project leaders was approved.

International mobility also includes the COST instrument, an intergovernmental framework for cooperation between research organisations from different European countries in the field of science and technology. It enables the co-ordination of nationally funded research at the European level by the research organisations themselves working in the same field. While the Agency does not (co)fund activities under this instrument, it actively encourages the Slovenian researchers' participation in COST actions, including by appointing members of the so-called COST action management boards.

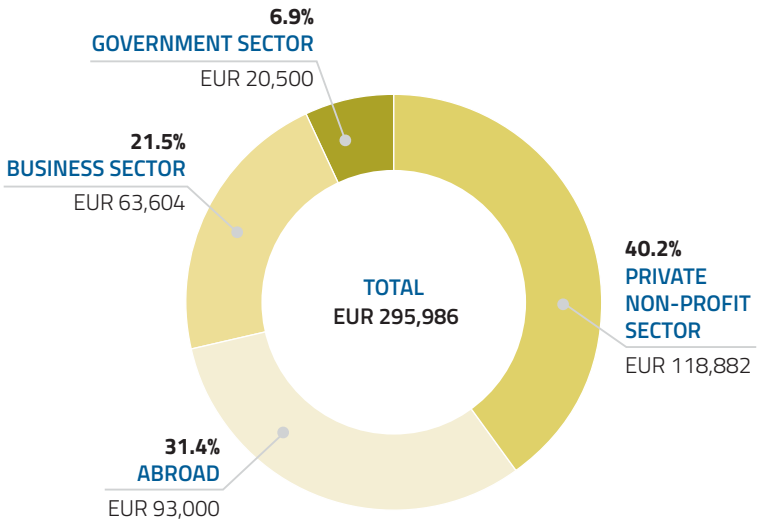
Funds for international mobility by activity sector in 2024



The third pillar of the Agency's international activities comprises **other international activities** – specifically, the promotion of international science.

Through its public call for promoting Slovenian science abroad, the Agency promotes Slovenian science abroad and supports the integration of scientific achievements by which appropriate international and professional participation is ensured. The programme facilitates cooperation with Slovenian research organisations and researchers from neighbouring states as well as cooperation with Slovenian researchers working abroad. For promoting Slovenian science abroad, the Agency allocated nearly EUR 300,000 in 2024.

Funds for other international activities by activity sector in 2024



Overview of financing in 2024 by programme item in accordance with the accrual principle and comparison with 2023

	2023 (in EUR)	2024 (in EUR)	Index	% in the budget of ARIS (2024)
ARIS budget	**331,480,037**	**346,527,581**	**105**	**100.0%**
Stable funding	225,754,997	240,702,768	107	69.5%
Research programmes	100,719,430	106,095,236	105	30.6%
Young researchers	35,600,907	38,344,870	108	11.1%
Infrastructure activity	22,500,001	23,715,793	105	6.8%
Development funding pillar	13,099,524	13,100,000	100	3.8%
Management and supporting activity	53,835,136	59,446,869	110	17.2%
Research projects	81,640,576	83,014,384	102	24.0%
Basic projects	50,224,781	50,123,263	100	14.5%
Applied projects	8,811,024	7,990,301	91	2.3%
Post-doctoral projects	5,560,395	4,743,010	85	1.4%
CRP	3,984,545	5,361,060	135	1.5%
Gravity projects		608,445		0.2%
International cooperation projects	13,059,831	14,188,305	109	4.1%
Research equipment	11,825,174	10,905,231	92	3.1%
Research equipment	11,825,174	10,905,231	92	3.1%
Supporting activities	10,572,062	10,770,454	102	3.1%
Open science	1,264,034	1,436,245	114	0.4%
IT support, international literature	7,120,172	7,160,657	101	2.1%
Journals and textbooks	2,187,856	2,173,552	99	0.6%
International cooperation	1,687,228	1,134,744	67	0.3%
International cooperation	1,687,228	1,134,744	67	0.3%

1

ANNUAL REPORT

ABOUT THE AGENCY

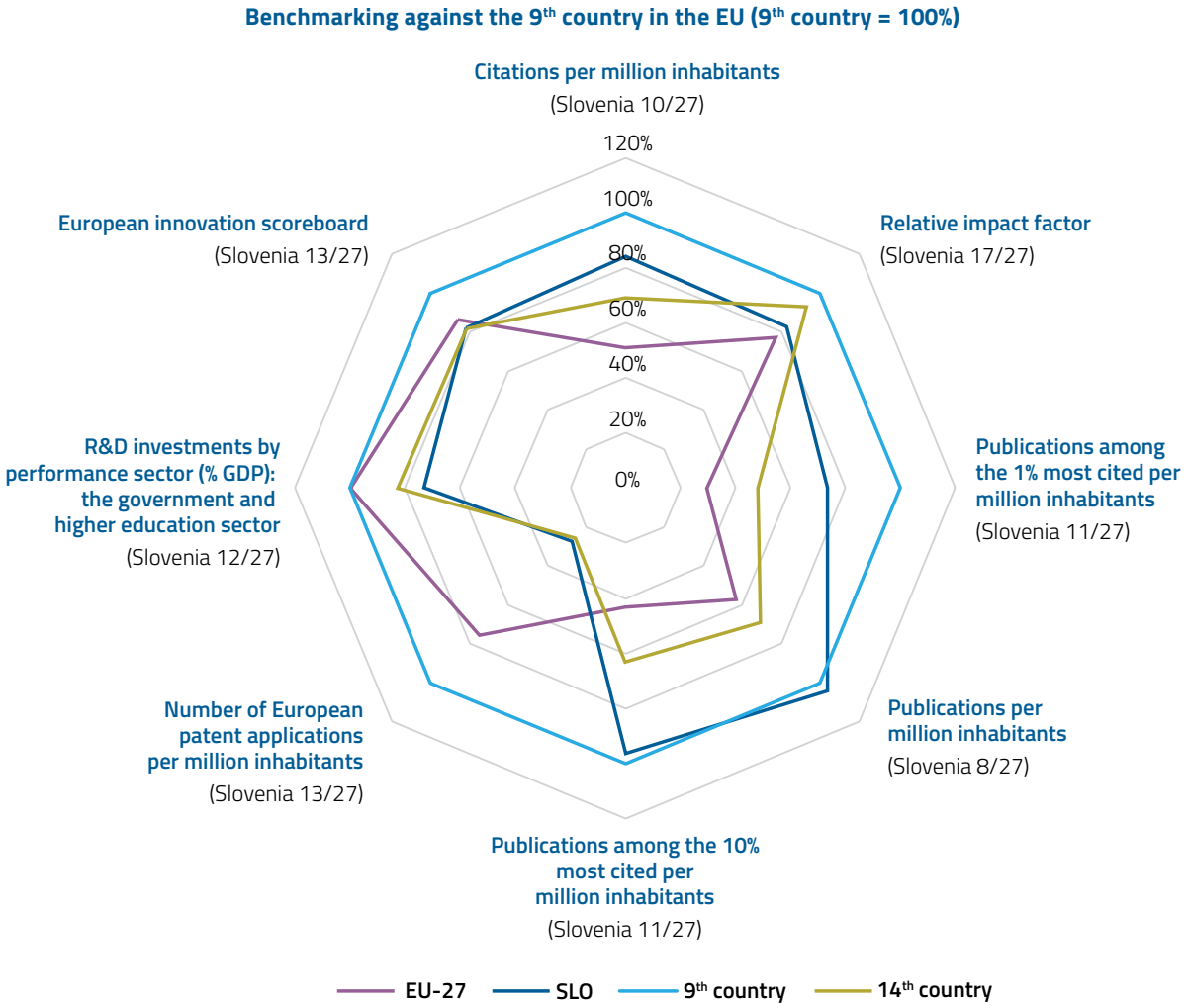
AGENCY ACTIVITY

FINANCIAL REPORT

INTERNATIONAL COMPARISONS

Benchmarking against the 9th country in the EU

The chart displays most standard bibliometric and other quantitative indicators used globally to monitor research activities, some of which are incorporated in Slovenia's new Resolution on the Slovenian Scientific Research and Innovation Strategy 2030. The scores for Slovenia are displayed relative to EU's 9th-ranked country (top third of EU countries). For comparison, data for the EU country ranking 14th (top half of the countries) is also given. Each indicator shows Slovenia's ranking position among the 27 EU member states. Slovenia ranks in the top third of countries for publications per million inhabitants while placing in the second third of countries for all other indicators.

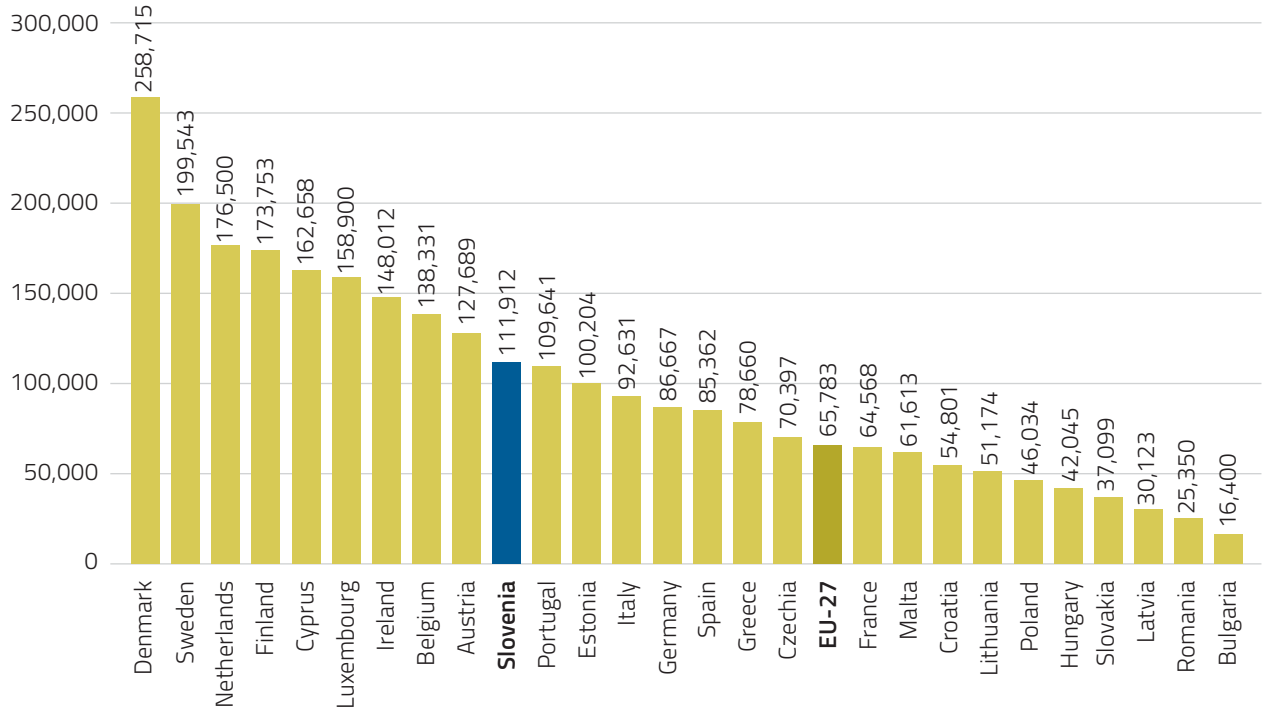


Source: InCites, SciVal, EIS, Eurostat, European Patent Office

Citations

Slovenia ranks 10th in the number of citations per million inhabitants in the period 2020–2024 which is above the EU average. In the observed period, the number of citations per million inhabitants was the highest in Denmark, followed by Sweden, the Netherlands and Finland.

Number of citations per million inhabitants (2020–2024)

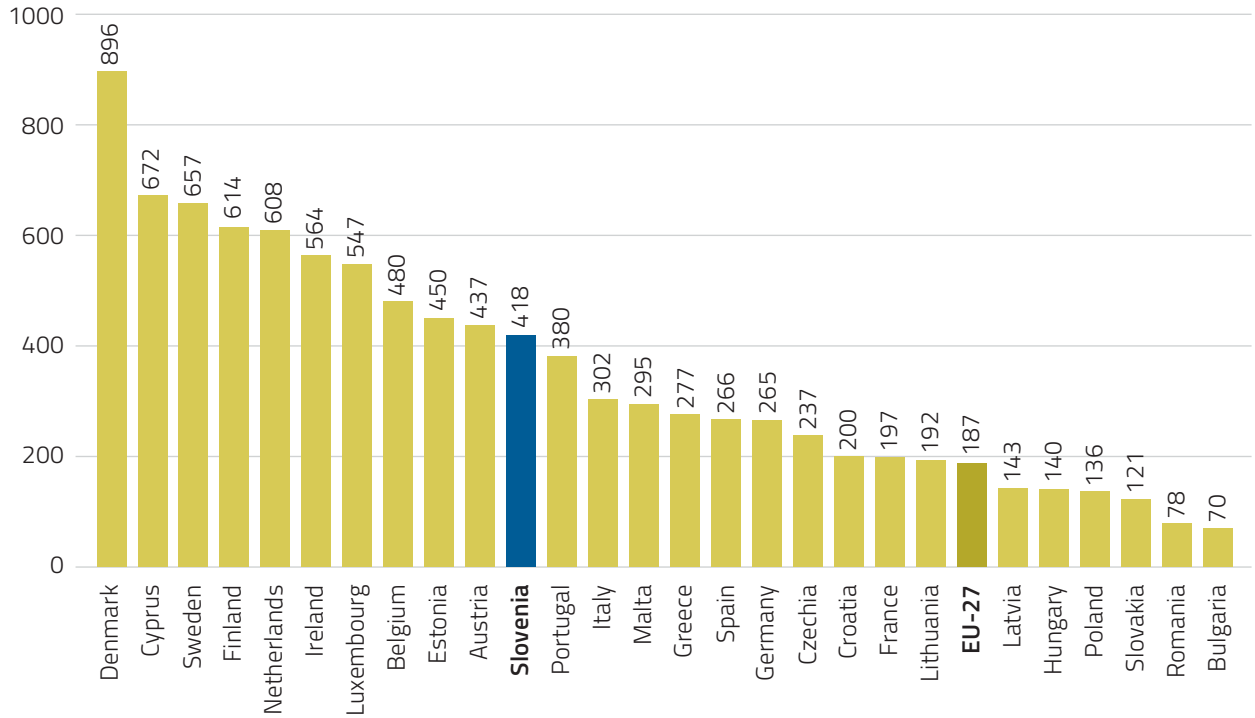


Source: InCites

Published works among the 10% most cited

An established bibliometric indicator for international comparisons is the number of published works that rank among the 10% most cited works in the world for a given field of research. This encompasses works published in journals indexed in the Scopus bibliographical database. A four-year citation window is taken into account, including the year of publication and three subsequent years. Since 2004, Slovenia has exceeded the EU average in terms of the 10% most cited published works per million inhabitants. According to the latest data for 2021, Slovenia ranks 11th among EU member states.

Publicitations among the 10% most cited per million inhabitants (2021)

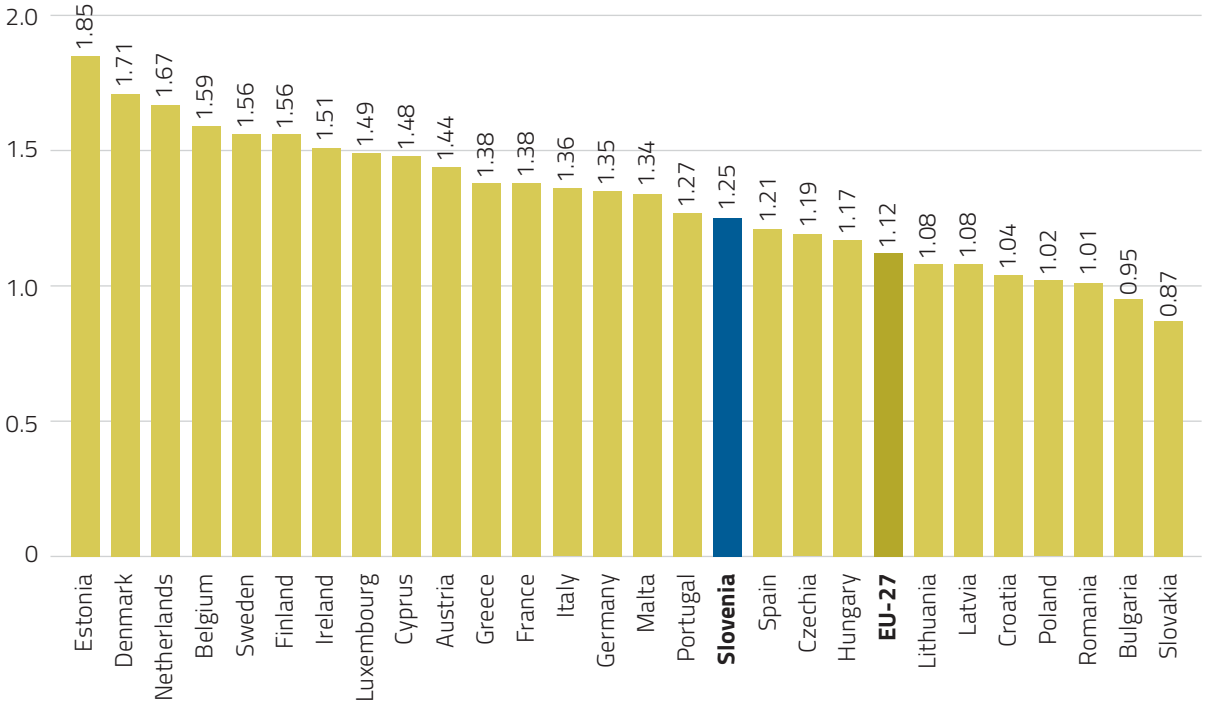


Source: SciVal

Relative impact factor

The relative impact factor is the standard international bibliometric indicator measuring the ratio between the number of received citations and the number of published works in a given country compared to the global average impact factor for an individual field of research. Among EU member states, Slovenia ranks 17th in relative impact factor during the latest observed period – maintaining the same position as the previous year.

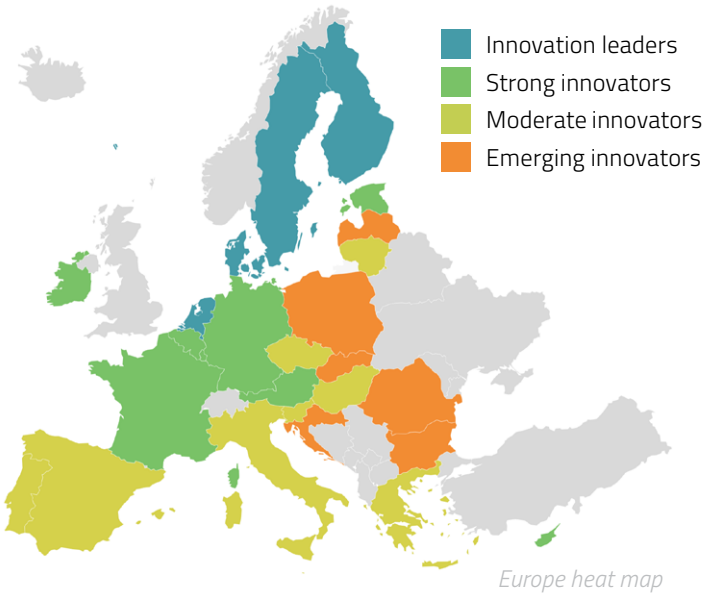
Relative impact factor (2020–2024)



Source: InCites

Joint innovation scoreboard for EU countries in 2024

The European innovation scoreboard provides an overview of the innovation activities of individual countries. It is comprised of 32 indicators that include data on the educational structure, openness and excellence of the research system, financing, support and investment, connections, entrepreneurship and intellectual capital.

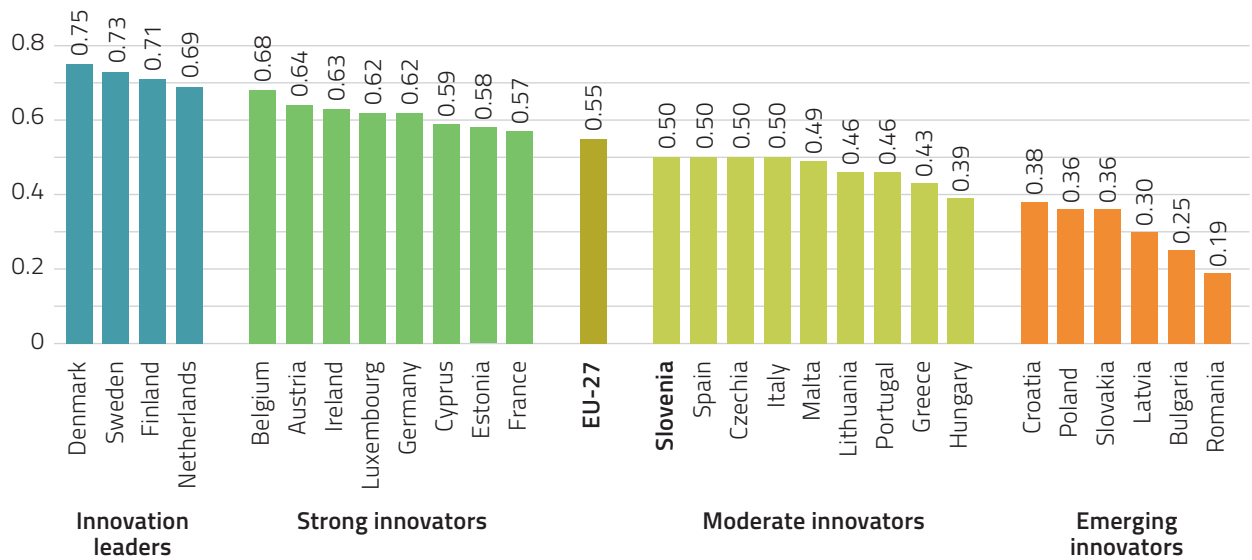


Europe heat map

In terms of the level of innovativeness, the countries are divided into four groups: the first group being innovation leaders, the second being group strong innovators, the third being moderate innovators, and the fourth being emerging innovators.

In 2024, Slovenia again ranked 13th on the European innovation scoreboard. Achieving 91% of the EU average score, Slovenia maintains its classification as a moderate innovator.

Joint innovation scoreboard (2024)

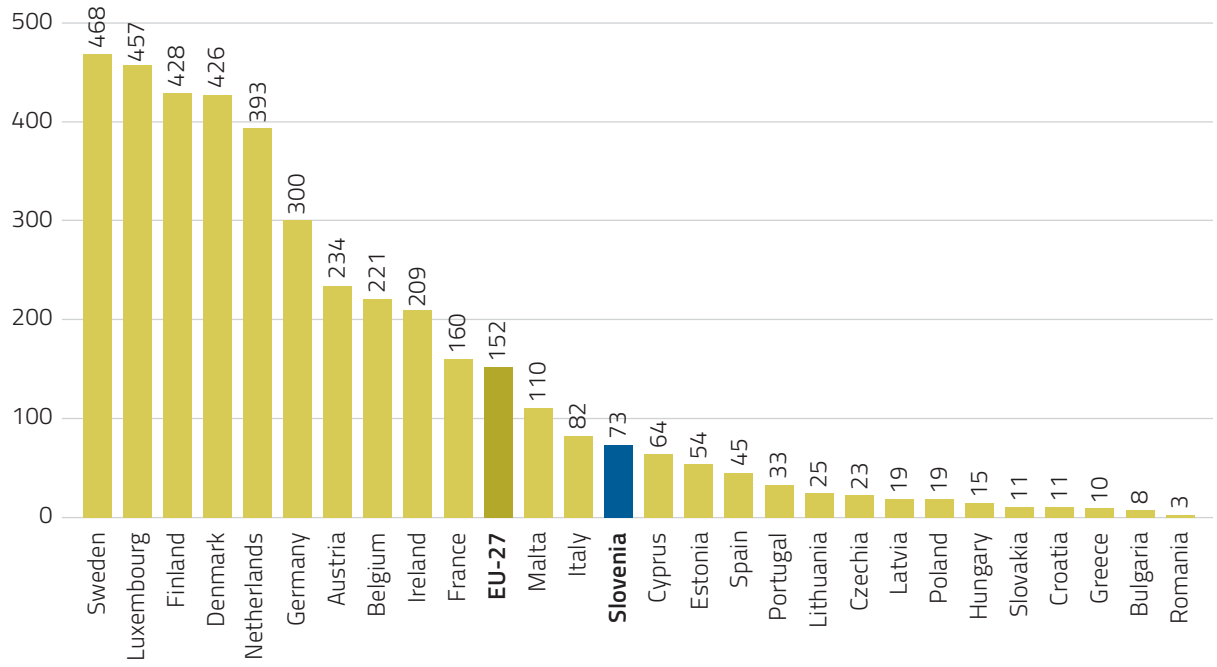


Source: EIS

Patent applications

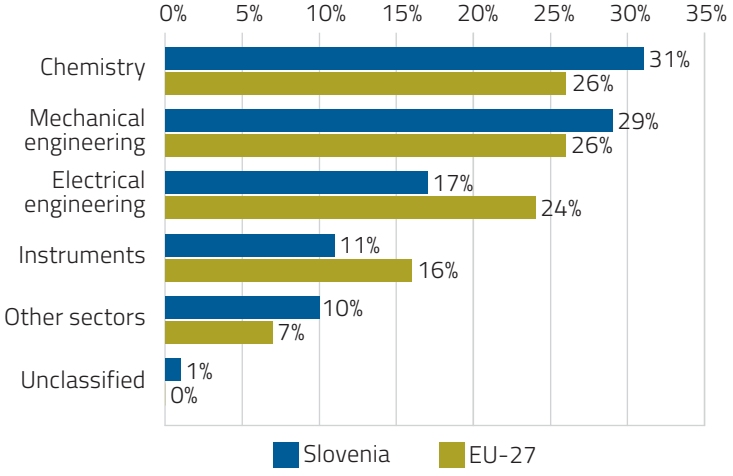
Slovenia ranks 13th in European Patent Office applications per million inhabitants. In 2024, Slovenia achieved a rate of 73 patent applications per million inhabitants. This places us below the European average. The structure of applications at the sector level is dominated by chemistry (31%) and mechanical engineering (29%), while at the field level, electrical machinery, devices and energy (12%) and transport (11%) are most prominent.

Patent applications per million inhabitants (2024)



Source: Eurostat, European Patent Office

Share of patent applications by sector in 2024

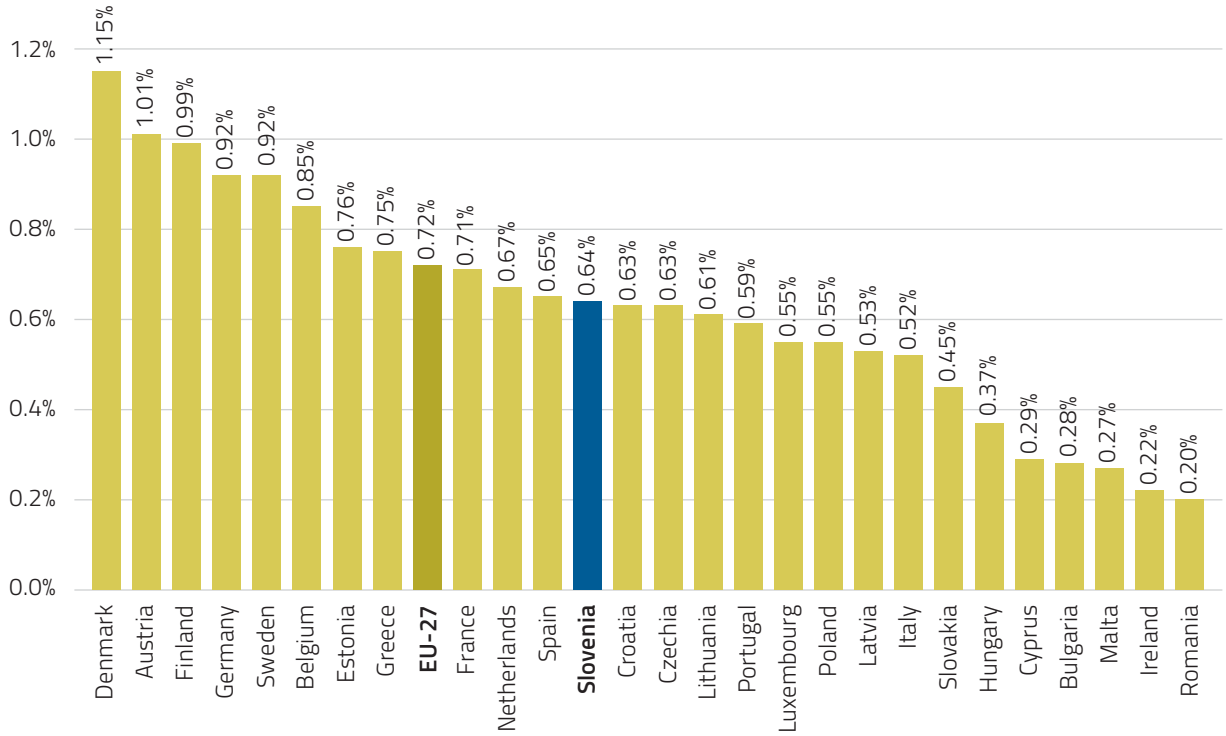


Vir: Eurostat, European Patent Office

Investments in research and development by sector of performance

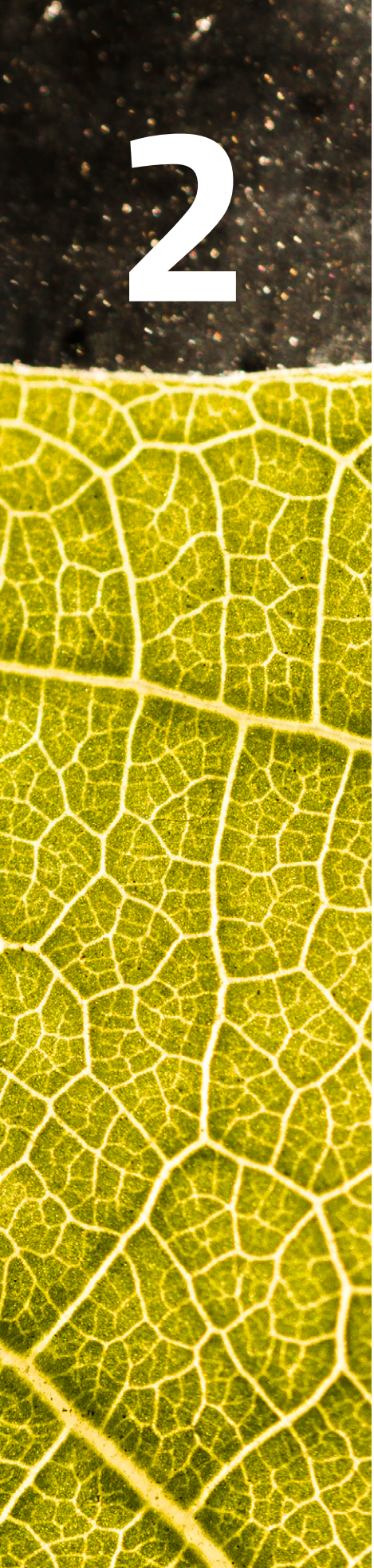
Slovenia ranks 12th in research and development investment intensity (government and higher education sectors) as a percentage of GDP. In 2024, Slovenia's R&D expenditure reached 0.64% of GDP.

Research and development investments by performance sector (% GDP): the government and higher education sector (2023)



Source: Eurostat

International comparisons and other analyses are available at: **https://www.arrs.si/en/analize/odlicnost/index.asp**.



2

EXCELLENT IN SCIENCE

Excellent in science is a project carried out by the ARIS as part of the agency's endeavours to promote science. The project presents a selection of the most prominent achievements from the past or current year.

For the seventh consecutive year, a selection of achievements was presented at the **national event titled ARIS Day 2024: Supporting Excellence**, held on 18 November 2024. The selection of achievements was proposed by the members of the Scientific Research Councils for each scientific discipline and was confirmed by the agency's Scientific Council.

The Excellence in Science 2024 project selected **25 of the most outstanding research achievements**.

ARIS
Odlični v ZNANOSTI

Ranks of linear matrix pencils separate simultaneous similarity orbits

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Hyperlinks:
https://dx.doi.org/10.1016/j.aim.2023.108888

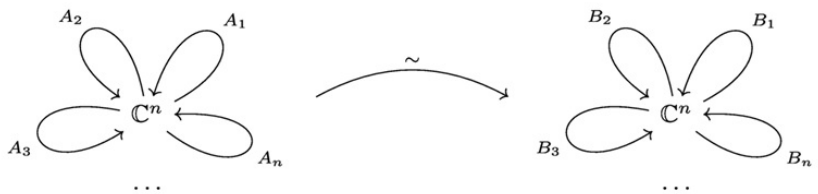
https://arxiv.org/abs/2109.09418

DOI:
10.1016/j.aim.2023.108888

One of the main known "hopeless" open problems in linear algebra and matrix theory is the classification of matrix tuples, e.g. pairs, up to similarity. Roughly speaking, we ask when two tuples of matrices are essentially identical, even though their appearance suggests otherwise.

By solving the conjecture of Hadwin and Larson from 2003 (itself an adaptation of the conjecture of Curto and Herrero from 1985), the 2023 paper of Derksen, Klep, Makam and Volčič, published in the prestigious journal Advances in Mathematics, took a crucial step towards solving this problem. It identifies a new family of natural invariants that distinguish different matrix tuples in an efficient way. This means that each matrix tuple is assigned a set of numerical invariants, and matrix tuples are similar if and only if their invariants coincide.

To establish the main result, the 2023 paper combines advances in several branches of mathematics, such as representation theory, group theory, computational complexity theory and algebraic geometry.



Each matrix tuple gives rise to an algebraic structure called a module. In the figure, this is illustrated by a graph with loops. One of the key steps in the proof of our main theorem is the observation that two tuples of matrices are similar if and only if the corresponding modules are "equal".

Source: DERKSEN, Harm, KLEP, Igor, MAKAM, Visu, VOLČIČ, Jurij, KLEP, Igor. Ranks of linear matrix pencils separate simultaneous similarity orbits. *Advances in mathematics.* Feb. 2023, vol. 415, art. 108888 (20 pp.). ISSN 0001-8708.

Polarisation patterning in ferroelectric nematic liquids via flexoelectric coupling

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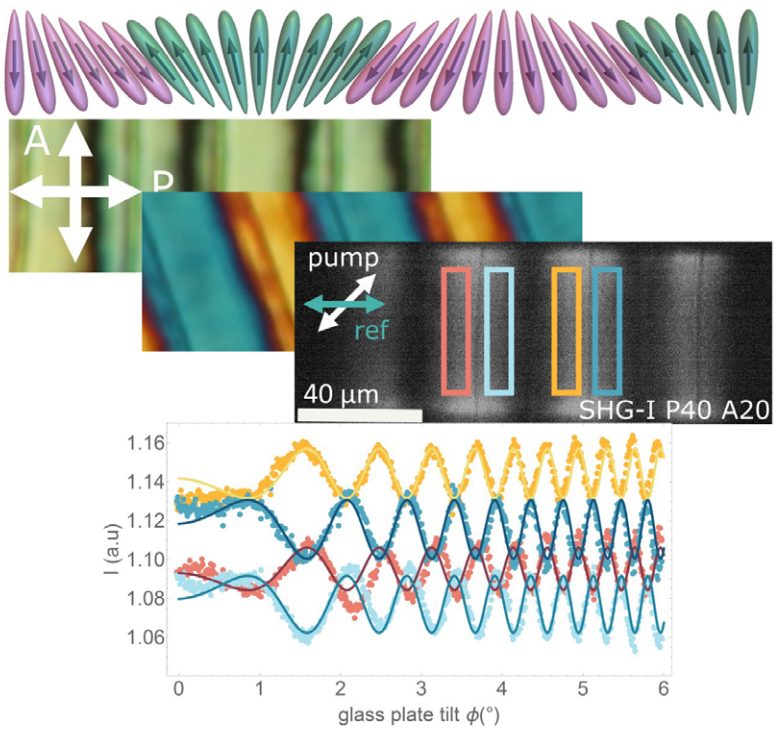
https://www.nature.com/articles/s41467-023-38749-2

DOI:
10.1038/s41467-023-38749-2

The recently discovered ferroelectric nematic liquids add to the functional combination of fluidity, processability and anisotropic optical properties of nematic liquids, an astonishing range of physical properties derived from the phase polarity. Among them, the remarkably large values of second order optical susceptibility encourage the exploitation of these new materials for non-linear photonic applications. Here we show that photopatterning of the alignment layer can be used to structure polarisation patterns. To do so, we take advantage of the flexoelectric effect and design splay structures that geometrically define the polarisation direction. We demonstrate the creation of periodic polarisation structures and the possibility of guiding polarisation by embedding splay structures in uniform backgrounds. The demonstrated capabilities of polarisation patterning, open a promising new route for the design of ferroelectric nematic-based photonic structures and their exploitation in new photonic devices.



Source: SEBASTIÁN UGARTECHE, Nerea, LOVŠIN, Matija, OSTERMAN, Natan, PETELIN, Andrej, DREVENŠEK OLENIK, Irena, MERTELJ, Alenka, et al. Polarization patterning in ferroelectric nematic liquids via flexoelectric coupling. *Nature communications.* 2023, vol. 14, pp. 3029-1-3029-10. ISSN 2041-1723.

Jellyfish detritus supports niche partitioning and metabolic interactions among pelagic marine bacteria

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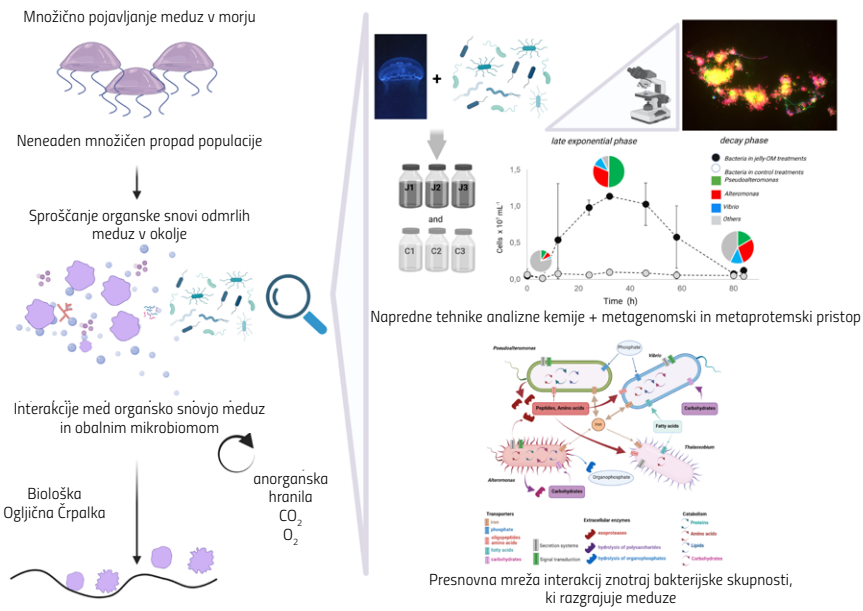
https://microbiomejournal.biomedcentral.com/articles/10.1186/s40168-023-01598-8

DOI:
10.1186/s40168-023-01598-8

We combined advanced analytical chemistry techniques with metagenomics, endo- and exo-metaproteomic approaches to obtain a mechanistic understanding of the metabolic network operated by the jellyfish detritus degrading bacterial consortium. Our findings indicate that specific chemical and metabolic fingerprints associated with decaying jellyfish blooms are substantially different to those previously associated with decaying phytoplankton blooms, potentially altering the functioning and biogeochemistry of marine systems. We show that decaying jellyfish blooms are associated with enrichment in extracellular collagenases, which could act as virulence factors in human and marine organisms' disease, with possible implications for marine ecosystem services. Our study provides novel insights into niche partitioning and metabolic interactions among key jelly-OM degraders operating a complex metabolic network in a temporal cascade of biochemical reactions to degrade pulses of jellyfish-bloom-specific compounds in the water column. Our research represents an important step towards understanding the role that jellyfish play in the biological carbon pump process that substantially contributes to the sequestration of carbon dioxide from the atmosphere into the ocean. Our research contributes to understanding the role of jellyfish in the oceanic biological carbon pump.



Source: TINTA, Tinkara, ZHAO, Zihao, BAYER, Barbara, HERNDL, Gerhard J. Jellyfish detritus supports niche partitioning and metabolic interactions among pelagic marine bacteria. *Microbiome.* 2023, vol. 11, art. No. 156, pp. [1]-22, ilustr. ISSN 2049-2618.

Fuzzy recognition by the prokaryotic transcription factor HigA2 from *Vibrio cholerae*

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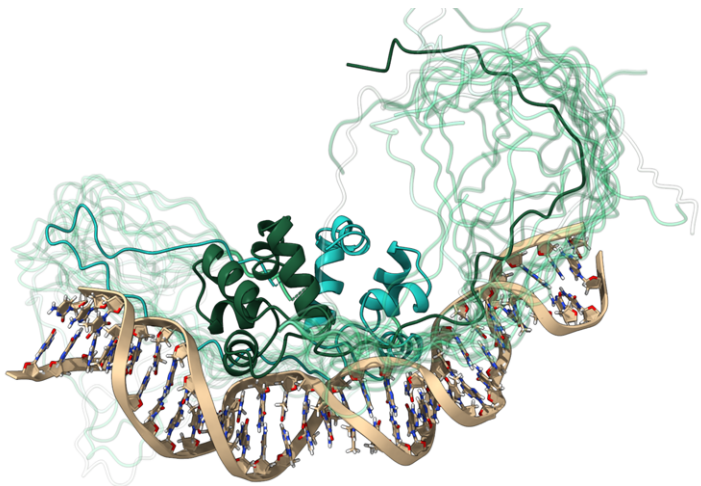
https://www.nature.com/articles/s41467-024-47296-3

DOI:
10.1038/s41467-024-47296-3

The survival of bacterial cells despite the presence of antibiotics leads to major difficulties in the treatment of bacterial infections. Their survival is made possible by mutations (change in genotype - resistance) or by interruption of growth and development (change in phenotype), which puts the bacterial cells into the so-called "dormant" state with suspended metabolism. When the concentration of antibiotic drops, the bacteria "wake up" and multiply, causing many recurrent and chronic diseases. A very likely mechanism for disrupting cell metabolism is the activation of smaller genetic systems called toxin-antitoxin (TA) modules. The article makes an important contribution to clarifying the regulation of the TA module, which occurs at multiple levels, mainly through the binding of the antitoxin to the toxin and through the regulation of gene expression. Based on physical, structural and *in vivo* experiments, the authors discovered a mechanism by which the disordered region of the antitoxin protein regulates the transcription of TA module genes through specific binding to DNA. The research results explain how the same amino acid sequence of the antitoxin encodes two completely different types of molecular recognition: a dynamic, fuzzy binding to DNA and a strong binding to the protein toxin, which represents an extension of the general paradigm about the relationship between sequence, structure and function of proteins.



Structural model of the protein bound to the target DNA sequence. The globular domain recognises the specific nucleotide sequence, the disordered region (light part of the structure in the figure) floats above the DNA and increases binding affinity.

Source: HADŽI, San, ŽIVIČ, Zala, KOVAČIČ, Matic, ZAVRTANIK, Uroš, HAESAERTS, Sarah, CHARLIER, Daniel, PLAVEC, Janez, VOLKOV, Alexander N., LAH, Jurij, LORIS, Remy. Fuzzy recognition by the prokaryotic transcription factor HigA2 from Vibrio cholerae. *Nature communications.* 10 Apr. 2024, vol. 15, article No. 3105, pp. 1-12, ilustr. ISSN 2041-1723.

Load-bearing prefabricated double-skin façade timber wall element: European Patent specification EP3985191 (B1), 2024-02-07, Munich: European Patent Office, 2024

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https://worldwide.espacenet.com/patent/search/family/078087241/publication/SI26095A?q=pn%3DSI26095A

http://www3.uil-sipo.si/PublicationServer/documentpdf.jsp?iDocId=50529&iepatch=.pdf

https://register.epo.org/application?number=EP21202038&lng=en&tab=main

DOI:
/

The proposed development constitutes an internationally granted European patent for a load-bearing DSF timber façade element. The patented wall element consists of a timber frame and two layers of glazing, the outer layer of which is single glazed and the inner layer of which is thermal insulation and triple glazed. The element was first conceptualised on the basis of a number of experimental studies and later mathematically modelled and further parametrically numerically analysed for the influence of a number of variable parameters which have a significant influence on its load-bearing capacity. The patented element represents an important challenge for further application in multi-storey prefabricated timber buildings designed according to the latest standards of modern timber construction. Its horizontal load-bearing capacity, which can significantly reduce the torsional effects on individual floors due to the asymmetrical positioning of glazed elements around the building envelope, also makes it possible to erect tall timber buildings which are more environmentally friendly due to the increased proportion of transparent elements, but which can also provide the highest possible standard of living comfort in the interior spaces of the building.

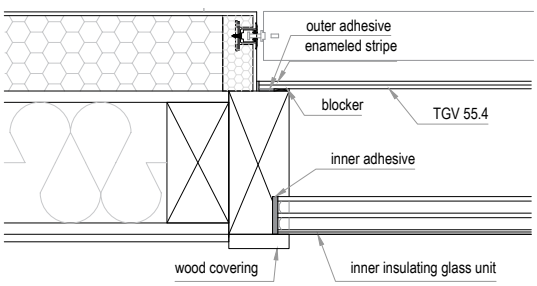

Figure 1: Presentation of a DSF load-bearing structural wall element.

Figure 2: Presentation of the fracture mechanism of the timber DSF wall element in experimental testing.

Source: PREMROV, Miroslav, ŽEGARAC LESKOVAR, Vesna, KOZEM ŠILIH, Erika, BER, Boštjan. Load-bearing prefabricated double-skin façade timber wall element: European Patent specification EP3985191 (B1), 2024-02-07 = Lasttragendes vorgefertigtes zweischaliges Fassadenholzwandelement = Élément de mur de façade en bois porteur préfabriqué à double peau. Munich: European Patent Office, 2024. 6, 2 pp., ilustr.

Degradation and toxicity of bisphenol A and S during cold atmospheric pressure plasma treatment

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Hyperlink:
https://www.sciencedirect.com/science/article/pii/S0304389423007616?via%3Dihub

DOI:
10.1016/j.jhazmat.2023.131478

The authors of the article from the Department of Gas Electronics (F6), the Department of Environmental Sciences (O2) at the "Jožef Stefan" Institute and the Department of Genetic Toxicology and Biology at the National Institute of Biology, in collaboration with international partners from the University of York (UK) and the University of Thessaloniki (Greece) have published the results of research conducted as part of the J5-50047 project. The paper addresses the critical issue of removing bisphenol molecules (BPA and BPS) from wastewater. These chemicals, commonly used in the production of various plastic materials have been proven harmful to living organisms due to their estrogenic, genotoxic, and cytotoxic effects. Of particular concern is the fact that classic biological methods of wastewater treatment fail to remove bisphenols to a satisfactory extent. In this study, the authors exposed BPA and BPS molecules to gas plasma, which proved to be an effective method for removal, described the degradation mechanisms, determined the transformation products and evaluated their toxic potential.

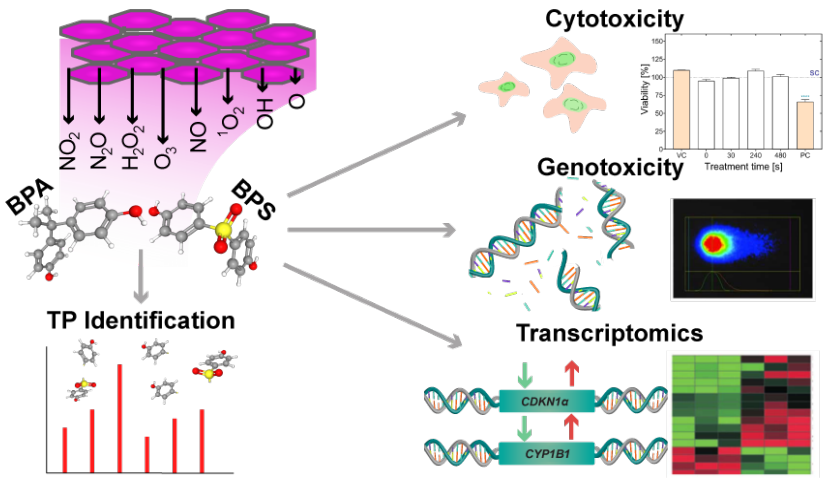

Figure 1: Plasma-assisted degradation of BPA and BPS molecules, detection and description of transformation products and determination of their toxiy potential (Kovačič et al. 2023).

Source: KOVAČIČ, Ana, MODIC, Martina, HOJNIK, Nataša, ŠTAMPAR, Martina, GULIN, Martin Rafael, NANNOU, Christina, KORONAIOU, Lelouda-Athanasia, HEATH, David John, WALSH, James L., ŽEGURA, Bojana, LAMBROPOULOU, Dimitra A., CVELBAR, Uroš, HEATH, Ester. Degradation and toxicity of bisphenol A and S during cold atmospheric pressure plasma treatment. *Journal of Hazardous Materials.* [Online ed.]. 2023, vol. 454, [article No.] 131478, pp. [1]-12, ilustr.

A novel method for few-shot object counting

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Hyperlinks:
https://openaccess.thecvf.com/content/ICCV2023/html/Dukic_A_Low-Shot_Object_Counting_Network_With_Iterative_Prototype_Adaptation_ICCV_2023_paper.html

https://openaccess.thecvf.com/content/CVPR2024/papers/Pelhan_DAVE_-_A_Detect-and-Verify_Paradigm_for_Low-Shot_Counting_CVPR_2024_paper.pdf

DOI:
10.1109/ICCV51070.2023.01730

We proposed a class of new low-shot object counting methods. Classical methods require large annotated training sets and struggle in dense scenarios. On the other hand, our proposed methods comfortably count even without providing exemplars by autonomously identifying the majority class instances.

The first version, LOCA, was presented at a prestigious conference ICCV2023 (acceptance rate 26.15%) and was cited 16 times within 8 months of publication, while the GITHUB code received 36 stars and 3 forks. On the Papers With Code portal, it occupied the first place for nearly a year and a half, which is a remarkable achievement, given the fast advancement cycles in computer vision. Another testament of its impact is that FRI-UL has recently signed a contract with the Mathworks company, which plans to include LOCA in Matlab. We recently reformulated LOCA into a detection method DAVE, which counts with few or no exemplars, or even by text-prompting, and substantially surpasses LOCA. DAVE was accepted to the most prestigious computer vision conference CVPR2024 (acceptance rate 23.6%, h-index: 422), while the GITHUB code received 12 stars within 5 days of release.

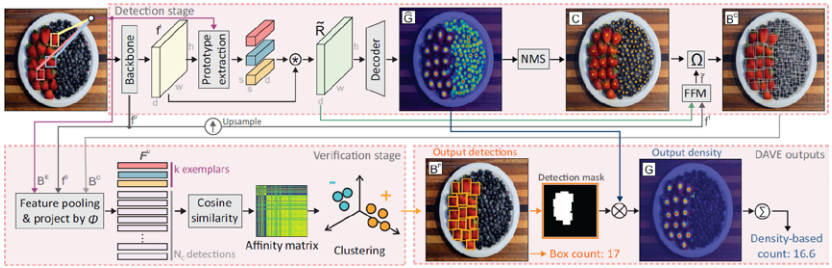

Figure: The DAVE architecture enables robust object counting and localisation.

Source: (1) Nikola Đukić, Alan Lukežič, Vitjan Zavrtanik, Matej Kristan. A low-shot object counting network with iterative prototype adaptation. V: 2023 IEEE/CVF International Conference on Computer Vision: ICCV 2023: Paris, France, 2-6 October 2023: proceedings. Los Alamitos (CA); Washington; Tokyo: IEEE Computer Society, cop. 2023. pp. 18826-18835, ilustr. Proceedings (IEEE International Conference on Computer Vision. Online). ISBN 979-8-3503-0718-4. ISSN 2380-7504.

(2) Jer Pelhan, Alan Lukežič, Vitjan Zavrtanik, Matej Kristan. DAVE – A Detect-and-Verify Paradigm for Low-Shot Counting. V: CVPR 2024: 2024 IEEE/CVF Conference on Computer Vision and Pattern Recognition: Seattle, USA, 17-21 June 2024: proceedings.

Granted US patent titled "Method and device for disinfection of liquid" and scientific article titled "Cold plasma within a stable supercavitation bubble – A breakthrough technology for efficient inactivation of viruses in water"

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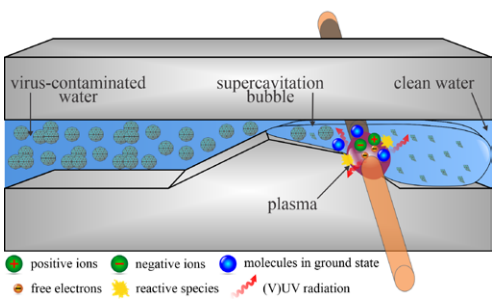
Patent:
https://worldwide.espacenet.com/patent/search/family/072801332/publication/US11807555B2?q=US11807555B2

We have developed a unique, environmentally friendly device for water decontamination that combines supercavitation with cold plasma. Low pressure in liquid water was created by hydrodynamic cavitation, which, within a limited range of parameters, enables the sustenance of supercavitation, i.e. water vapour at room temperature and saturated vapour pressure. We installed electrodes in the vapour created by supercavitation to maintain a gas discharge. The discharge enables a low-pressure plasma, which is a rich source of reactive species, UV and VUV radiation. The reactive species enter water, where they effectively inactivate viruses and thereby disinfect water without the use of chemicals, energetic particles or heating. With that, we have developed an innovative device that contradicts the established opinion that it is not possible to create low-pressure gaseous plasma in liquid water, because water is always at atmospheric pressure. The device consumes a negligible amount of energy, which is why many users from agriculture, pharmacy and small waste water plants are interested in the innovative solution.

Water treatment with a novel combination of plasma and supercavitation



Source: Patent: PRIMC, Gregor, ZAPLOTNIK, Rok, MOZETIČ, Miran, FILIPIĆ, Arijana, GUTIÉRREZ-AGUIRRE, Ion, DOBNIK, David, DULAR, Matevž, PETKOVŠEK, Martin. Method and device for disinfection of liquid: United States Patent US 11,807,555 B2, 2023-11-07. Alexandria: United States Patent and Trademark Office, 2023.

Article: FILIPIĆ, Arijana, DOBNIK, David, GUTIÉRREZ-AGUIRRE, Ion, RAVNIKAR, Maja, KOŠIR, Tamara, BAEBLER, Špela, ŠTERN, Alja, ŽEGURA, Bojana, PETKOVŠEK, Martin, DULAR, Matevž, MOZETIČ, Miran, ZAPLOTNIK, Rok, PRIMC, Gregor. Cold plasma within a stable supercavitation bubble - a breakthrough technology for efficient inactivation of viruses in water. *Environment International*. [Print ed.]. 2023, vol. 182, pp. 108285-1-108285-10. ISSN 0160-4120.

Article:
https://www.sciencedirect.com/science/article/pii/S0160412023005585?via%3Dihub

DOI:
10.1016/j.envint.2023.108285

High burden of clonal mast cell disorders and hereditary α-tryptasemia in patients who need *Hymenoptera* venom immunotherapy

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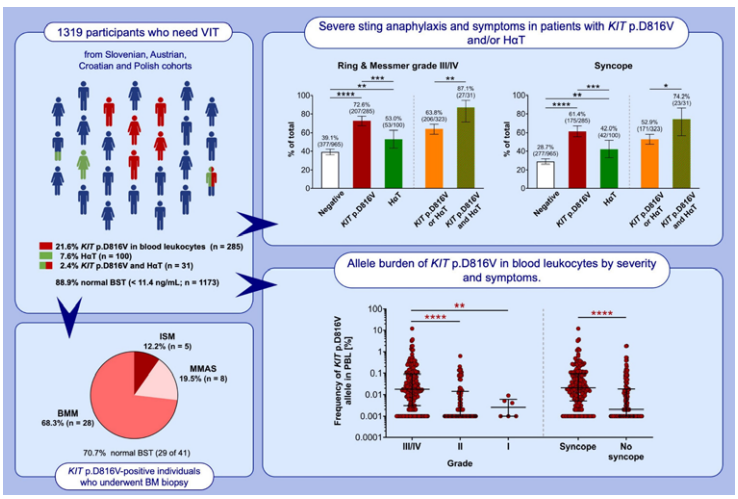
https://onlinelibrary.wiley.com/doi/10.1111/all.16084

DOI:
10.1111/all.16084

1319 individuals with *Hymenoptera* venom allergy (HVA) who needed venom immunotherapy (VIT) from referral centres in Slovenia, Austria, Croatia and Poland underwent examination for somatic activating *KIT* p.D816V mutation and tryptase genotyping. We also included 183 sensitised controls who did not need VIT. In this multicentre study, we have demonstrated that *KIT* p.D816V and hereditary α-tryptasemia (HαT: inherited replications of α-tryptase–encoding gene copies at *TPSAB1*) are more prevalent among individuals who need VIT; one or both was found in 27% (354 of 1319) of individuals overall. Both diagnoses were highly concentrated among individuals with severe anaphylaxis, where prevalence increased to approximately 40% (233 of 610) compared to approximately 15% among those with moderate reactions (121 of 709) and 5% in controls. These findings expand our understanding of how mast cell-related disorders affect HVA and will improve our ability to target those at greatest risk with the most effective strategies to prevent anaphylaxis. Furthermore, this multicentre prospective study illustrates the utility and importance of performing these genetic screening assays routinely and demonstrates how doing so can have a direct impact on the clinical management of these patients.



Source: KOROŠEC, Peter, STURM, Gunter, LYONS, Jonathan J., PIRC MAROLT, Tinkara, SVETINA, Manca, KOŠNIK, Mitja, ZIDARN, Mihaela, KAČAR, Mark, FRELIH, Nina, LALEK, Nika, DEMŠAR LUZAR, Ajda, ZVER, Samo, ŠKERGET, Matevž, CZARNOBILSKA, Ewa, DYGA, Wojciech, POPOVIĆ-GRLE, Sanja, SAMARŽIJA, Miroslav, ARZT-GRADWOHL, Lisa, ČERPES, Urban, POREBSKI, Grzegorz, PEVEC, Branko, SCHADELBAUER, Eva, KOPAČ, Peter, ŠELB, Julij, RIJAVEC, Matija. High burden of clonal mast cell disorders and hereditary α–tryptasemia in patients who need Hymenoptera venom immunotherapy. *Allergy.* [Online ed.]. Sep. 2024, vol. 79, iss 9, pp. 2458-2469, ilustr. ISSN 1398-9995.

Phenylalanine-tRNA aminoacylation is compromised by ALS/FTD-associated C9orf72 C4G2 repeat RNA

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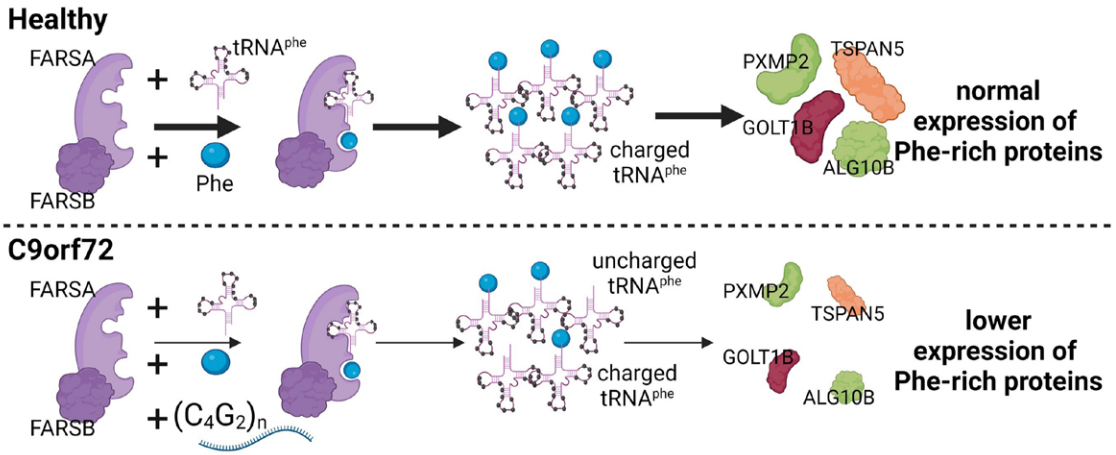
Hyperlink:
https://www.nature.com/articles/s41467-023-41511-3#Abs1

DOI:
10.1038/s41467-023-41511-3

The proposed study presents a novel mechanism linked to mutation in the C9orf72 gene, which is the most common mutation in neurodegenerative diseases ALS (amyotrophic lateral sclerosis) and FTD (frontotemporal dementia). It describes a new interaction between toxic antisense RNA repeats and the protein phenylalanine-tRNA synthetase. Most research focuses on sense RNA repeats, and the failure of therapies targeting them has highlighted the importance of antisense repeats. Our mechanism is one of the few that demonstrates the toxicity of antisense RNA repeats and, for the first time, shows the involvement of aminoacyl-tRNA synthetases in ALS and FTD. We have shown that this interaction affects the expression of phenylalanine-rich proteins, opening up new therapeutic targets and biomarker potential. We also developed a method for observing RNA repeat interactions in the cytoplasm of cells, which is more sensitive than current diagnostic methods. This can improve the diagnosis of diseases associated with the C9orf72 mutation, allowing for earlier detection leading to more effective treatment, which would improve the quality of life for patients with ALS and FTD.



Source: MALNAR, Mirjana, ČERČEK, Urša, YIN, Xiaoke, TIN HO, Manh, REPIČ-LAMPRET, Barbka, NEUMANN, Manuela, HERMANN, Andreas, ROULEAU, Guy, SUTER, Beat, MAYR, Manuel, ROGELJ, Boris. Phenylalanine-tRNA aminoacylation is compromised by ALS/FTD-associated C9orf72 C4G2 repeat RNA. *Nature communications.* 2023, vol. 14, article No. 5764, pp. 1-15, ilustr. ISSN 2041-1723.

Characterisation of two distinct immortalised endothelial cell lines, EA.hy926 and HMEC-1, for *in vitro* studies: exploring the impact of calcium electroporation, Ca^{2+} signalling and transcriptomic profiles

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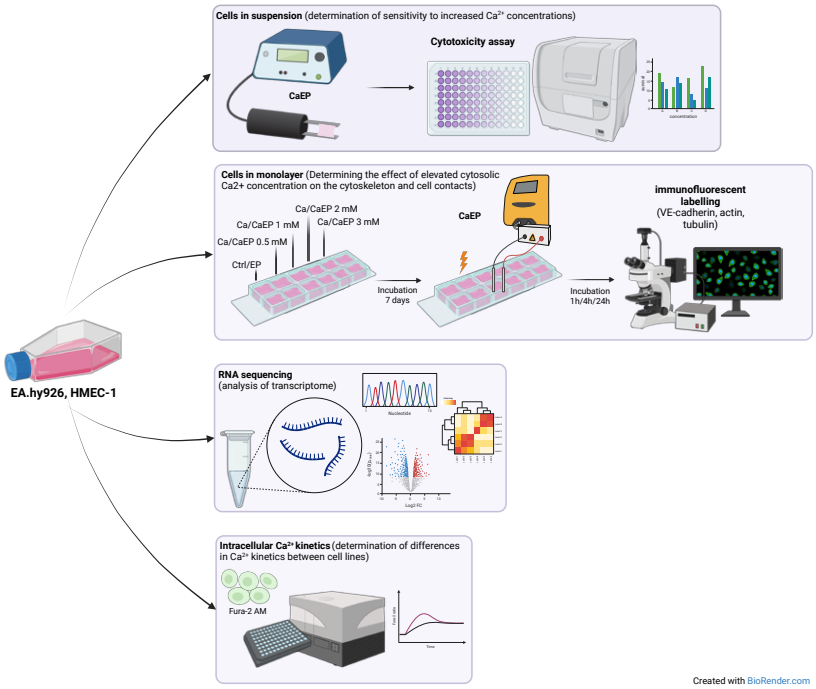
https://biosignaling.biomedcentral.com/articles/10.1186/s12964-024-01503-2

DOI:
10.1186/s12964-024-01503-2

Calcium electroporation (CaEP) disrupts intracellular Ca^{2+} homeostasis in tumour cells, enhancing the anti-tumour effect, but with different effects on healthy tissues, including blood vessels. The aim of our study was to develop an *in vitro* vascular model with two endothelial cell lines, EA.hy926 and HMEC-1, and to use the model to investigate differences in Ca^{2+} kinetics, gene expression and cytoskeletal changes after CaEP. We analysed intracellular Ca^{2+} kinetics under different stimuli by spectrofluorometric measurements. RNA sequencing showed differential expression of genes related to the cytoskeleton and Ca^{2+} signalling pathways in untreated cells. A dose-dependent decrease in cell survival and changes in the cytoskeleton were observed after CaEP, with EA.hy926 cells showing higher sensitivity compared to HMEC-1 cells. Overall, this study provides new results on commonly used endothelial cell lines, in particular on Ca^{2+} homeostasis. These results could also be relevant for other research groups investigating Ca^{2+} signalling in the endothelium and provide a basis for the selection of *in vitro* endothelial cell models.



Source: LISEC, Barbara, BOŽIČ, Tim, ŠANTEK, Iva, MARKELC, Boštjan, VRECL, Milka, FRANGEŽ, Robert, ČEMAŽAR, Maja. Characterization of two distinct immortalized endothelial cell lines, EA.hy926 and HMEC-1, for in vitro studies: exploring the impact of calcium electroporation, Ca^{2+} signaling and transcriptomic profiles. *Cell communication and signaling*. 2024, vol. 22, [article No.] 118, pp. 1-24. ISSN 1478-811X.

Novel 3D printed polysaccharide-based materials with prebiotic activity for potential treatment of diaper rash

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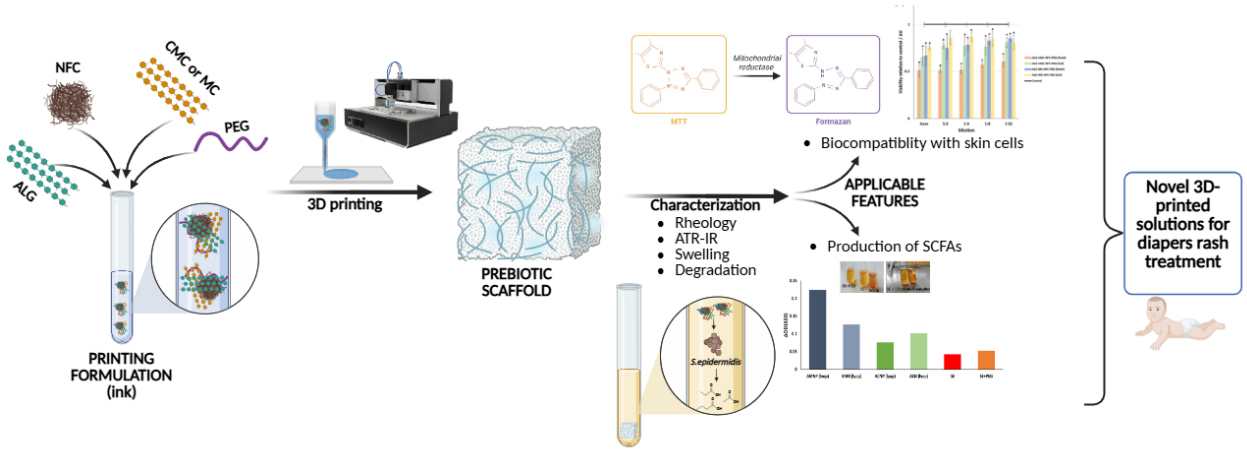
Hyperlink:
https://www.sciencedirect.com/science/article/pii/S0141813024027636?via%3Dihub

DOI:
10.1016/j.ijbiomac.2024.131958

This study presents the development of carbon-rich materials that could be used in the future for diaper applications aimed at treating diaper rash. Various formulations were created and optimised for extrusion-based 3D printing, incorporating widely used natural (alginate) and (semi)synthetic polymers such as carboxymethylcellulose, methylcellulose, nanofibrillated cellulose, and polyethylene glycol. These materials are already well-established in biomedical applications.

The selected components align with the principles of sustainable design and circular economy, as they are biodegradable and both technically and economically suitable for further development. In particular, the combination of polysaccharides and PEG showed a synergistic effect by promoting the growth of skin commensal *Staphylococcus epidermidis* and enhancing the production of antimicrobial short-chain fatty acids. These effects suggest the potential to reduce antibiotic usage, thereby mitigating the risks associated with antimicrobial resistance and adverse side effects.



Source: ZIDARIČ, Tanja, GRADIŠNIK, Lidija, FRANGEŽ, Tjaša, ŠOŠTARIČ, Mojca, KORUNIČ, Eva, MAVER, Tina, MAVER, Uroš. Novel 3D printed polysaccharide-based materials with prebiotic activity for potential treatment of diaper rash. *International journal of biological macromolecules*. [Online ed.]. 2024, vol. 269, [article No.] 131958, pp. 1-14, ilustr. ISSN 1879-0003.

Effects of prolonged cold storage in a vacuum package on dry-cured ham quality

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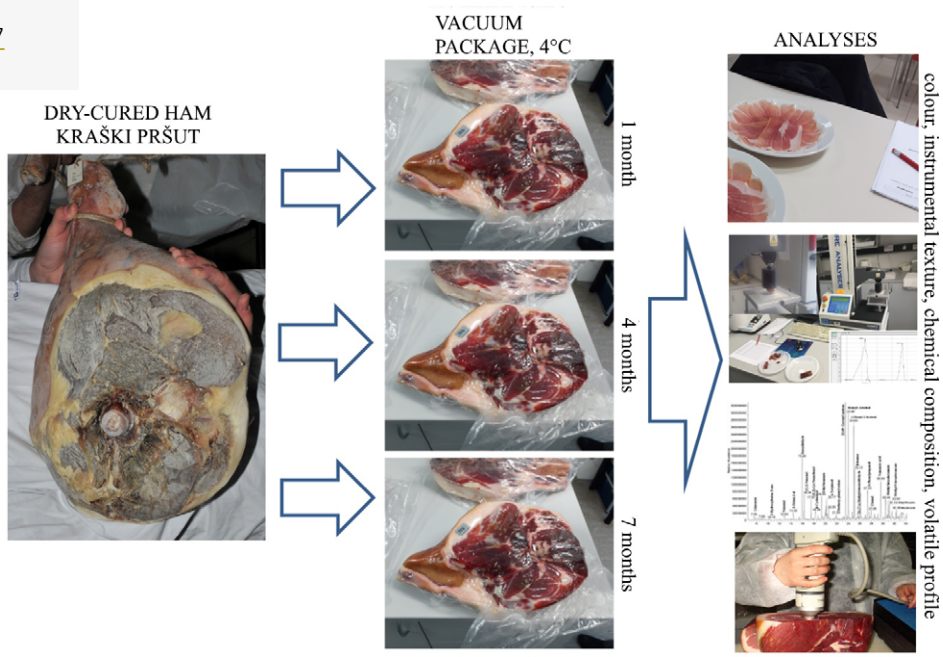
Hyperlink:
https://www.sciencedirect.com/science/article/pii/S221428942400022X?via%3Dihub

DOI:
10.1016/j.fpsl.2024.101257

By examining the effects of vacuum packaging storage at low temperatures on the characteristics of dry-cured ham such as texture, flavour, aromatic profile, and colour, we obtained key insights for optimising storage procedures, preserving quality, and reducing food waste. The results support improved planning of storage and distribution and contribute to a better understanding of the biochemical and physical changes occurring during storage, which is also relevant for other similar meat products. The study highlights the potential for determining storage duration based on the volatile profile and represents a comprehensive scientific and methodological approach to addressing practical challenges.



Source: ŠKRLEP, Martin, BABIČ, Katja, STROJNIK, Lidija, BATOREK LUKAČ, Nina, OGRINC, Nives, ČANDEK-POTOKAR, Marjeta. Effect of prolonged cold storage in a vacuum package on the quality of dry-cured ham. *Food packaging and shelf life.* [Online ed.]. Mar. 2024, [article no.] 101257, vol. 42, str. 11, ilustr. ISSN 2214-2894.

Compositional traits of grains and groats of barley, oat and spelt grown at organic and conventional fields

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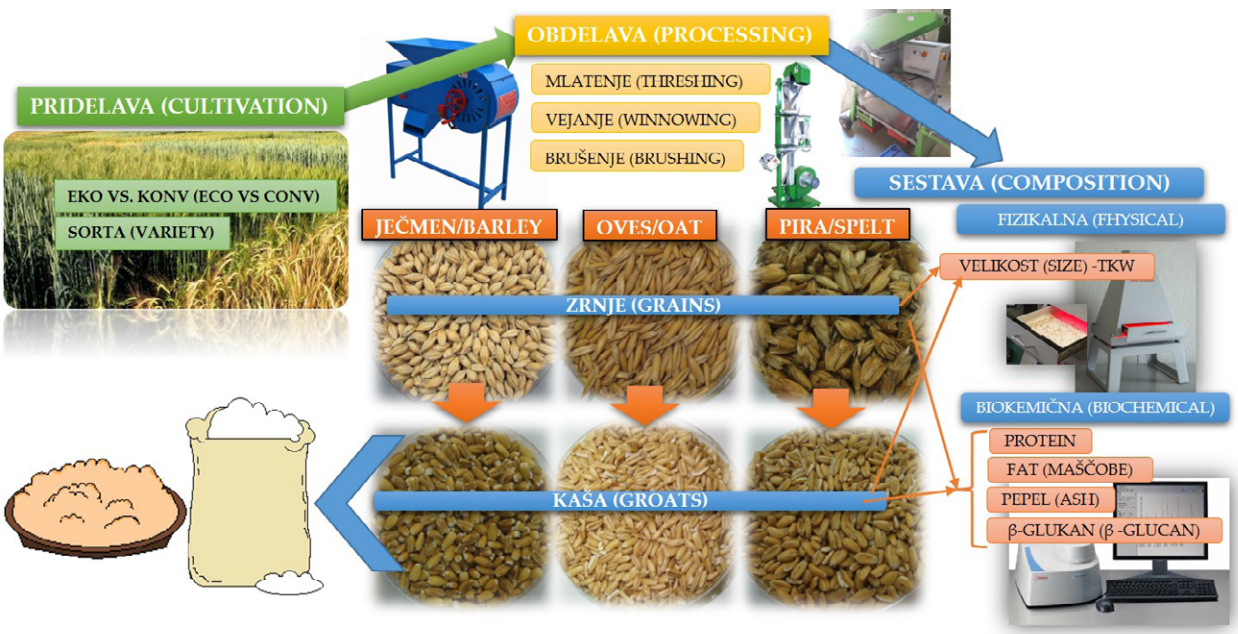
Hyperlink:
https://www.mdpi.com/2304-8158/12/5/1054

DOI:
10.3390/foods12051054

The compositional characteristics of the cereals analysed, such as barley, oats and spelt, showed large differences between the species, within the species, between organic and conventional farming systems and also between the processed fractions of the grain. The application of threshing, cleaning and/or brushing/polishing processes to harvested grains resulted in nutritious, ready-to-eat grain products suitable for cooking or further processing into flakes or wholemeal flour. Barley and oat groats had higher thousand kernel weight (TKW) and β-glucan, but lower crude fibre, fat and ash contents than the grains. The composition of the grains of the different species differed significantly for more traits (TKW, fibre, fat, ash and β-glucan) than that of the groats (TKW and fat), while field management affected only the fibre content of the groats and the TKW, ash and β-glucan content of the grains. The TKW, protein, and fat contents of the different species differed significantly under both conventional and organic farming, while the TKW and fibre contents of grains and groats differed between the two farming systems.



Source: SINKOVIČ, Lovro, RAKSZEGI, Marianna, PIPAN, Barbara, MEGLIČ, Vladimir. Compositional traits of grains and groats of barley, oat and spelt grown at organic and conventional fields: a preliminary study. *Foods*. 2023, vol. 12, iss. 5, pp. 1-13, preglednice. ISSN 2304-8158.

Okadaic acid as a major problem for the seafood safety *(Mytilus galloprovincialis)* and the dynamics of toxic phytoplankton in the Slovenian coastal sea (Gulf of Trieste, Adriatic Sea)

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Hyperlink:
https://www.sciencedirect.com/science/article/pii/S1568988324000660

DOI:
10.1016/j.hal.2024.102632

Connecting two fields of natural science – veterinary medicine and biology – has led to collaborative work that contributes to understanding the issue of marine biotoxins in shellfish in the Slovenian sea. Algal blooms are a natural and complex phenomenon enabled by a combination of numerous environmental factors. Understanding the causes is crucial for predicting increased levels of toxins in shellfish. Our study, which monitored algae in seawater and toxins in shellfish, showed a strong statistically significant correlation between *Dinophysis fortii* and okadaic acid. After several years of monitoring the occurrence of biotoxins in shellfish, we observed elevated values from September to November. We also found that some species of the genus *Pseudo-nitzschia*, appear in very large numbers in the Slovenian sea, making it necessary to monitor the occurrence of other toxins that have not yet been detected in our sea. With changes in legislation and the cessation of biological testing, chemical determination of toxins using LC-MS/MS and HPLC methods was introduced. This has shortened the closure periods of shellfish beds due to the precise quantification of toxin content. The results of our work contribute to a better understanding of the natural occurrence of toxins in our sea and serve as an important contribution to decision-making and planning for systematic monitoring of shellfish safety.

Our research has shown that the dinoflagellate Dinophysis fortii is most strongly associated with the presence of okadaic acid in mussels from the Slovenian sea (Photo: Janja Francé)

Source: HENIGMAN, Urška, MOZETIČ, Patricija, FRANCÉ, Janja, KNIFIC, Tanja, GREBENC, Stanka, DOLENC, Jožica, KIRBIŠ, Andrej, BIASIZZO, Majda. Okadaic acid as a major problem for the seafood safety *(Mytilus galloprovincialis)* and the dynamics of toxic phytoplankton in the Slovenian coastal sea (Gulf of Trieste, Adriatic Sea). *Harmful algae.* 2024, Vol. 135, no. 102632.ISSN 1568-9883.

Designed allosteric protein logic

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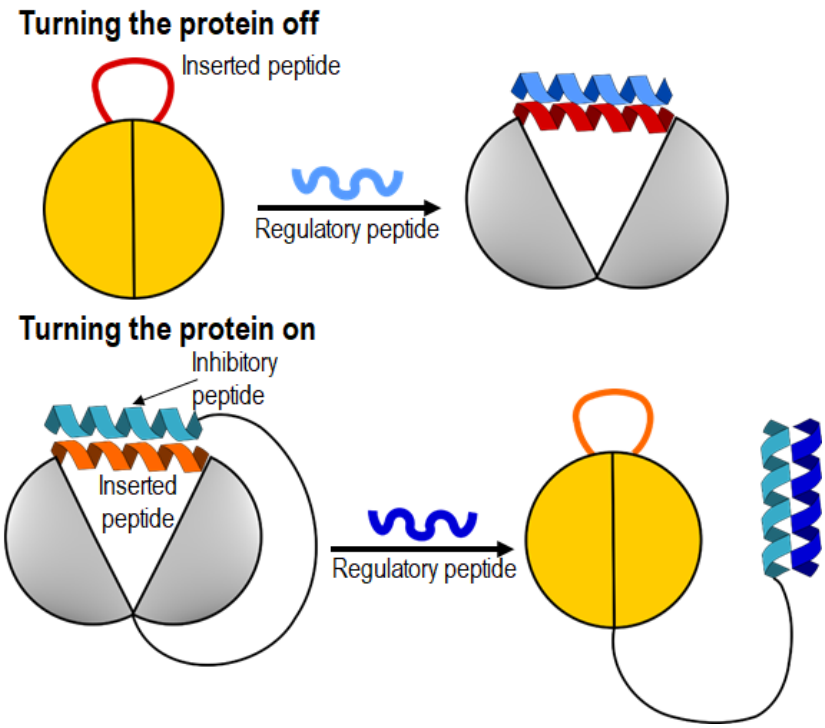
Hyperlink:
https://www.nature.com/articles/s41421-023-00635-y

DOI:
10.1038/s41421-023-00635-y

Researchers at the National Institute of Chemistry developed a new technology for regulating the function of proteins called INSRTR, which is based on the insertion of a short peptide into the target protein. The inserted peptide enables allosteric regulation of the protein, similar to transistors in electronic circuits. They have shown the function of a selected protein can be either turned on or off, and even combine them to perform logical operations in living cells. The study was published in the prestigious scientific journal Cell Discovery.

The new technology was demonstrated in human cells on more than 10 different proteins. These include enzymes, proteins in cell signalling, DNA binding domains, and antibodies used to target cancer immunotherapy. Collaborating with researchers from the Jožef Stefan Institute, they developed a web server which employs machine learning and enables researchers to customize settings for selected target proteins.



Source: PLAPER, Tjaša, MERLJAK, Estera, FINK, Tina, SATLER, Tadej, LJUBETIČ, Ajasja, LAINŠČEK, Duško, JAZBEC, Vid, BENČINA, Mojca, STEVANOSKA, Sintija, DŽEROSKI, Sašo, JERALA, Roman. Designed allosteric protein logic. *Cell discovery.* 16 Jan. 2024, vol. 10, article no. 8, str. 1-15, ilustr. ISSN 2056-5968.

Students' and teachers' perceptions of students' academic outcomes in Slovenia: evidence from REDS data

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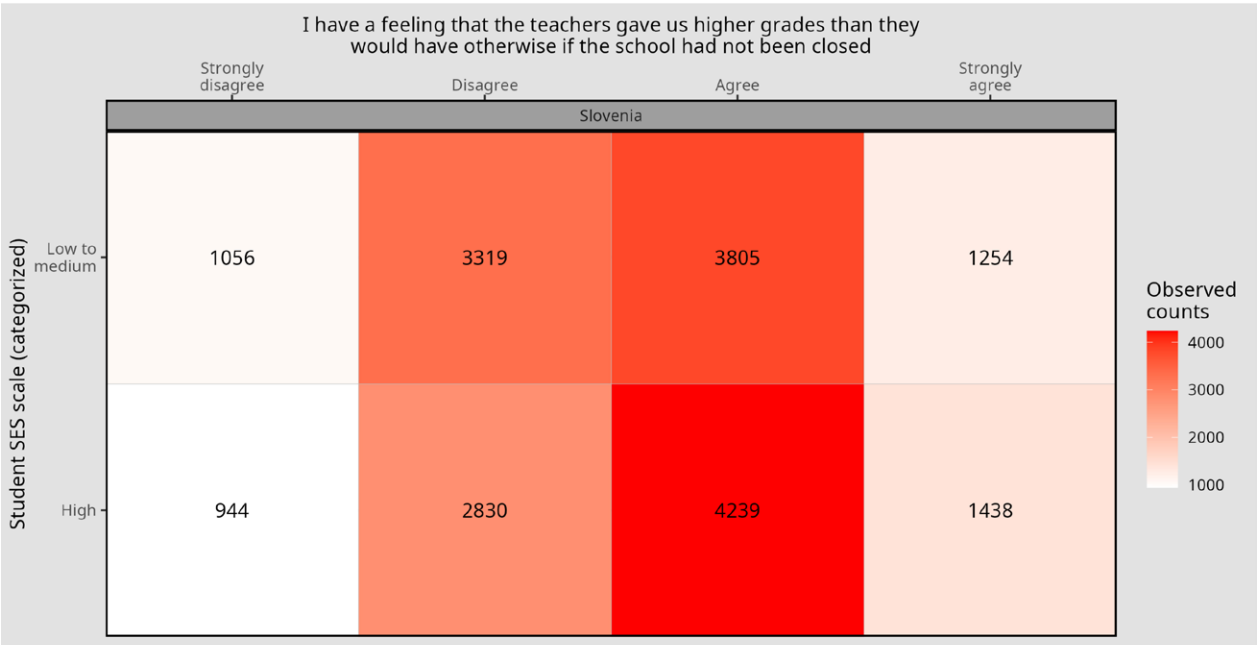
Hyperlink:
https://link.springer.com/article/10.1186/s40536-023-00173-9

DOI:
10.1186/s40536-023-00173-9

This article fills the gap in Slovenia - research through comprehensive (using representative sample) and in-depth analyses of Slovenian student (grade 8), school and teacher data from the International Responses to Educational Disruption Survey (REDS; 2020/2021); when usual teaching/learning was disrupted by the lockdown of schools. The results show that students' perception of their learning and academic outcomes during the school disruptions depend on their background characteristics, i.e. the disruptions did not affect all students equally. These results are also supported by findings from school principals' and teachers' data. In addition, the long-lasting issue of "grade inflation" in Slovenia has become even more severe, as shown by both student and teacher data. However, students and teachers are at contrasting opinions about student learning— while most of the students think they learnt more at home during the disruptions and have shown more progress, teachers are of the opposite opinion. Furthermore, teachers tended to grade students' academic outcomes higher during the disruptions which has increased the issue of "grade inflation" in Slovenia. All computations were done with the open-source programme RALSA, developed in Slovenia.



Heat plot of frequencies low to medium SES students responding to the question "I have a feeling that the teachers gave us higher grades than they would have otherwise if the school had not been closed."

Source: MIRAZCHIYSKI, Plamen, KLEMENČIČ MIRAZCHIYSKI, Eva. Students' and teachers' perceptions of students' academic outcomes in Slovenia: evidence from REDS data. *Large-scale assessments in education.* 2023, vol. 11, art. 23, str. 1-34, tabele. ISSN 2196-0739.

Feeling too low to be active: Physical inactivity mediates the relationship between mental and physical health

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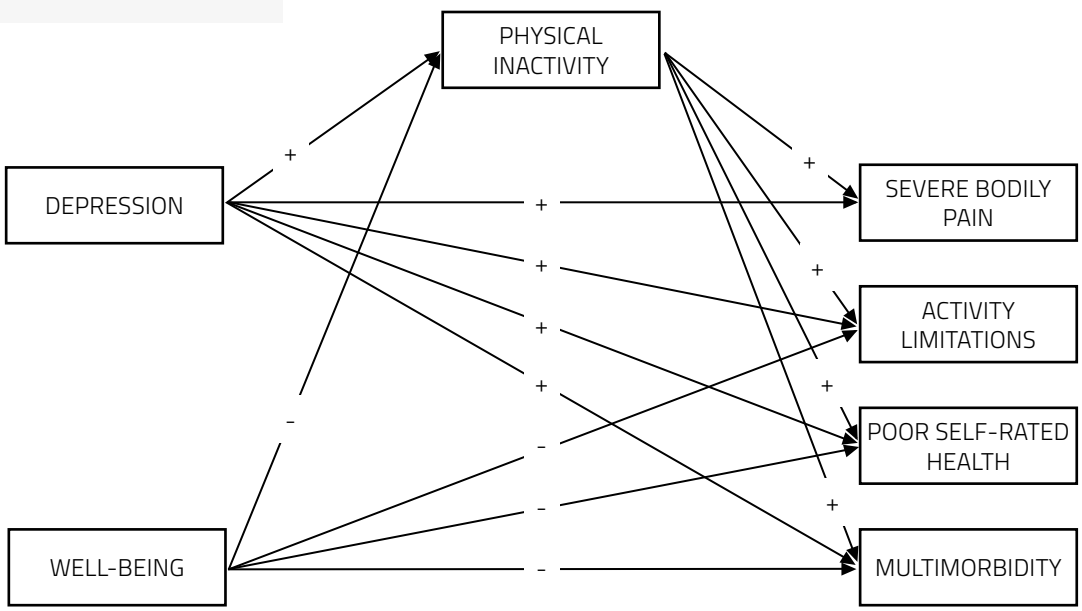
Hyperlink:
https://www.sciencedirect.com/science/article/pii/S0277953623009036

DOI:
10.1016/j.socscimed.2023.116546

Although the links between mental and physical health are bidirectional, much more attention has been paid in previous research to the impact of physical health on mental health. The aim of our study was to examine how mental health contributes directly and indirectly to concurrent physical health through physical inactivity, one of the most influential risk factors for health problems worldwide. The study was conducted in a large nationally representative sample of 9,900 Slovenian participants. It included both negative (i.e., depression) and positive (i.e., subjective well-being) indicators of mental health, as well as several subjective and objective self-reported measures of physical health. The results showed that depression contributes to increased physical inactivity and subjective well-being to decreased physical inactivity, which further predicts a higher likelihood of severe bodily pain, activity limitations, poor self-rated physical health, and multimorbidity. Poor mental health may therefore, be an early warning sign of physical health problems, pointing to the wider importance of mental health promotion for good public health.



Source: ZAGER KOCJAN, Gaja, AVSEC, Andreja, KAVČIČ, Tina. Feeling too low to be active: physical inactivity mediates the relationship between mental and physical health. *Social science & medicine.* Jan 2024, vol. 341, [article no.] 116546, str. 1-8, tabele, graf. prikazi. ISSN 1873-5347.

Reliability and validity of running step rate derived from a novel wearable smart patch

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Hyperlink:
https://ieeexplore.ieee.org/document/10458918

DOI:
10.1109/JSEN.2024.3370304

The EU Horizon SINTEC project has developed an advanced wearable smart patch featuring innovative, stretchable electronic components. The smart patch facilitates seamless application to anatomically challenging regions inaccessible to traditional wearable sensors and enables precise measurement of multiple physiological parameters, including gait cadence, heart rate, electrocardiogram (ECG) signals, and skin temperature. In our validation study, sensor outputs were validated against established gold-standard references and state-of-the-art technologies. The results demonstrated good to very-good test-retest reliability and high concurrent validity, evidenced by strong Pearson correlation coefficients for cadence during treadmill running. The design effectively minimises relative movement during vigorous activity, ensuring acquisition of high-quality data without compromising user comfort. This technological innovation marks a significant progression in wearable health and sports performance monitoring systems, supporting real-time physiological monitoring and enhanced analytical capabilities across sports, clinical, and healthcare domains. The SINTEC project exemplifies the integration of innovative materials with practical solution development to advance health monitoring.

Source: VERDEL, Nina, DROBNIČ, Miha, MAŠLÍK, Jan, GUMIERO, Alessandro, HJORT, Klas, HOLMBERG, Hans-Christer, SUPEJ, Matej. Reliability and validity of running step rate derived from a novel wearable smart patch. *IEEE sensors journal.* May 2024, vol. 24, no. 9, str. 14343-14351, ilustr. ISSN 1558-1748.

Daring dreams of the future: Slovenian mass migrations 1870–1945

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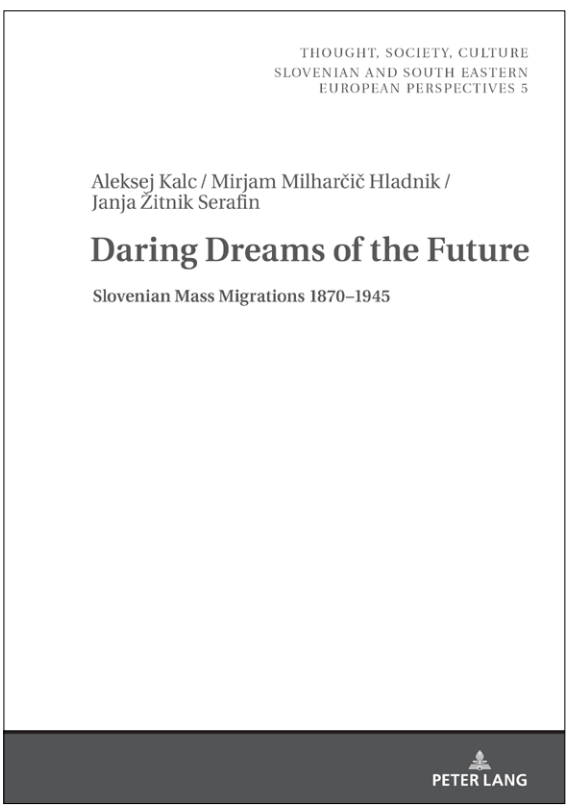
Hyperlink:
https://doi.org/10.3726/b21284

DOI:
10.3726/b21284

The monograph is the first book in English to offer a synthesis of knowledge on the history of mass migrations in Slovenia, comparable to foreign treatments of the migration phenomenon in a nationally defined territory. This is also the outstanding significance of Daring dreams of the future. The book's content has been conceived taking into account the fact that very little is known in the international scientific community about the history of migration in Slovenia. Even in those texts that deal with the Balkans, Central Europe or Yugoslavia, the information on migration on Slovenian territory is scarce and without long explanations. Often these data or shorter descriptions are grouped together in larger and broader population flows, most often with the Croatian population. The absence of migration from the Slovenian area in foreign books, where it would have belonged thematically, is due to the small number of texts on the subject in English, which are scattered and poorly accessible. This book enables the scholarly and research community to situate the Slovenian ethnic space in its historical and migratory complexity and intricacy in their own works.



Source: KALC, Aleksej, MILHARČIČ-HLADNIK, Mirjam, ŽITNIK SERAFIN, Janja. Daring dreams of the future: Slovenian mass migrations 1870-1945. Berlin [etc.]: P. Lang, cop. 2024. 457 str., ilustr. *Thought, society, culture,* vol. 5. ISBN 978-3-631-89897-0.

I Love Beautiful Letters: Correspondence by Women Authors of Slovenian "Moderna"

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Hyperlink:
https://ung.si/media/publishing/2025/06/19/14/59/39/PISMA_elektronika-2025.pdf

DOI:
/

The scientific monograph I Love Beautiful Letters: Correspondence by Women Authors of Slovenian "Moderna" comprises 646 pages or almost 190 thousand words, and results from more than two years of archival, scientific and collective work by five researchers. The publication represents the first transcription of correspondence between Slovenian women writers of the "moderna" period archived at the Manuscripts Department of the National and University Library (NUK). The first part of the publication, titled Letters, comprises more than 500 letters from the period between 1896 and 1940 (and more than 1,400 expert notes) sent by Slovenian women writers, playwrights, poets and editors Marica Nadlišek Bartol, Kristina Šuler, Ljudmila Poljanec, Vida Jeraj, Zofka Kveder, Elvira Dolinar, Marica Strnad, Ada Kristan and Ljudmila Roblek to various addresses and addressees. The second part of the publication, titled Discussions, comprises five original scientific studies of correspondence from the perspectives of literary history, literary science and cultural studies. The monograph was published in April 2024.

Source: MIHURKO, Katja et al. Ljubim lepa pisma: dopisovanja avtoric slovenske moderne. 1st printings. Nova Gorica, Založba Univerze, 2024. ISBN: 978-961-7025-36-1.

Monograph in two volumes: History of Slovene Literary Translation I and II.

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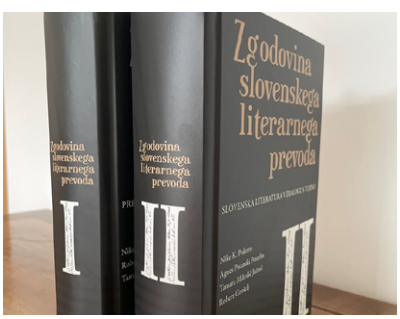
In 125 chapters and on 1371 pages, *The History of Slovene Literary Translation* sheds light on the role of translation in the development of Slovene literature, language and culture, examines the links between Slovene culture and foreign cultures, and thus contributes to the visibility and recognition of literary translators. The monograph presents the results of research by 64 leading Slovene and foreign scholars in the fields of translation studies, literary studies, literary history, publishing studies and the history of translation of religious texts in Slovenia. It is the first such extensive and comprehensive work in Slovenia, which highlights the importance of literary translation for the development of Slovene culture and Slovene identity, and at the same time shows the significant contribution of literary translators to the development and openness of Slovene society. The monograph is open access (licensed as Creative commons 4.0) and has a supporting website (www.zgoslip.si), which contains all chapter abstracts from the first and second books, a bibliography of Slovene translation studies research and a chronological display of short profiles of the main Slovene literary translators.



Sources: KOCIJANČIČ-POKORN, Nike (general editor), GROŠELJ, Robert (editor), MIKOLIČ JUŽNIČ, Tamara (editor). *Zgodovina slovenskega literarnega prevoda I: pregled zgodovinskega razvoja.* 1st ed. Ljubljana: Založba Univerze: Cankarjeva založba, 2023. 595 pp., illustr. ISBN 978-961-282-602-4.

KOCIJANČIČ-POKORN, Nike (general editor), PISANSKI PETERLIN, Agnes (editor), MIKOLIČ JUŽNIČ, Tamara (editor), GROŠELJ, Robert (editor). *Zgodovina slovenskega literarnega prevoda II: slovenska literatura v dialogu s tujino.* 1st ed. Ljubljana: Založba Univerze: Cankarjeva založba, 2023. pp. 601-1371, illustr. ISBN 978-961-282-613-0.

What's that smell? A philosophy of the olfactory

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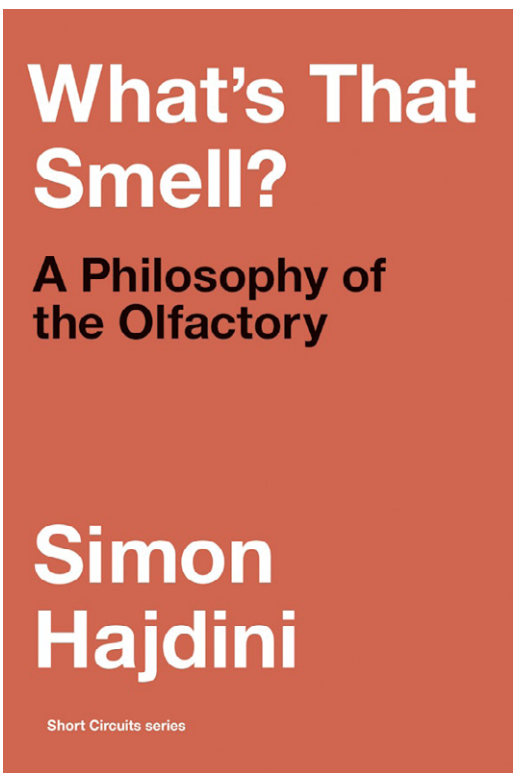
Why is it that, in Indo-European languages at least, we have no language to describe smells, leaving us (and famously Juliet) no choice but to call the scent of a rose simply "sweet"? In What's That Smell?, a ground-breaking exploration of the intersection between philosophy, psychoanalysis, and the oft-neglected sense of smell, Simon Hajdini sets out to answer this complex question. Through new readings of traditional and modern philosophical texts, Hajdini places smell at the very centre of a philosophical critique of the traditional notion of truth, challenging the idea that smell is the antiphilosophical sense par excellence.

Through fresh engagements with fundamental philosophical issues, original analyses of modern literature and film, and the novel use of scientific research into smell within a humanities context, Hajdini situates problems of olfaction at the very point of inception of cultural life. He proposes that ontology, civilization, and capitalist economy alike can be said to amount to "shit management." And only by following the philosophically most deplorable of the senses, the book argues, can we better understand the central philosophical, psychoanalytical, and political issues of truth, sex, and exploitation.



Source: HAJDINI, Simon. What's that smell?: a philosophy of the olfactory. Cambridge (Mass.); London: The MIT Press, cop. 2024. XIV, 200 str. *Short circuits.* ISBN 978-0-262-54756-7.

Exposure of children and adolescents from northeastern Slovenia to per- and polyfluoroalkyl substances

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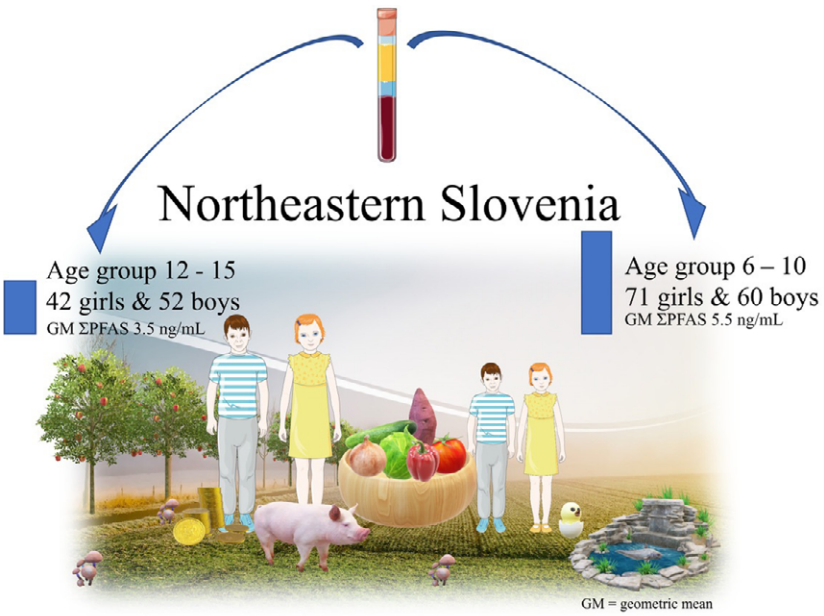
Per- and polyfluoroalkyl substances (PFAS) are of high concern for the environment, wildlife, and human health due to their persistence and toxicity. Despite global efforts to limit the exposure of populations, PFAS can be measured at commonly high detection frequencies in human samples. The Forever Pollution Project revealed 57 confirmed and suspected PFAS-contaminated sites in Slovenia. Thus, PFAS present a concern for public health in Slovenia.

We determined the concentrations of 12 PFAS in 225 girls and boys (ages 7–10 and 12–15) from northeastern Slovenia and identified potential sources of exposure. Nine out of 12 analytes were detected at detection frequencies above 30%, with the highest geometric means observed for PFOS (1.9 ng/mL) and PFOA (1.0 ng/mL). Exposure was influenced by participants' socio-economic status, age, sex, sampling region, public water supply, and the consumption of fish and seafood, cereals, and locally produced fruits, vegetables, and mushrooms.

In comparison with other studies, PFAS exposure in our pilot population is low. However, as this is the first study on PFAS exposure in Slovenia, it will be extended to a nationwide human biomonitoring (HBM) study.



Source: RUNKEL, Agneta Annika, STAJNKO, Anja, SNOJ TRATNIK, Janja, MAZEJ, Darja, HORVAT, Milena, PŘIBYLOVÁ, Petra, KOSJEK, Tina. Exposure of children and adolescents from northeastern Slovenia to per- and polyfluoroalkyl substances. *Chemosphere*. [Online ed.]. Apr. 2023, vol. 321, [article No.] 138096, pp. 1-11, ilustr. ISSN 1879-1298.

Entering voltage hysteresis in phase-separating materials: revealing the electrochemical signature of the intraparticle phase-separated state

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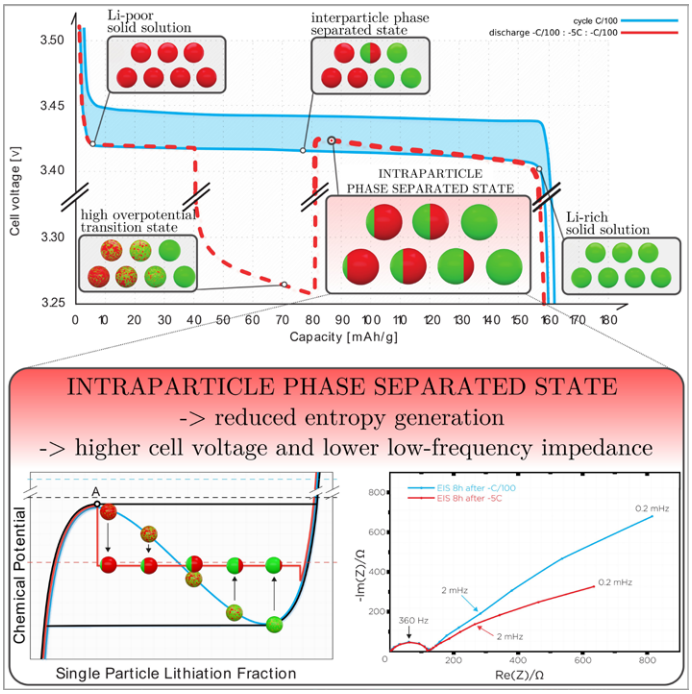
Our discovery pushes the boundaries of understanding electrochemical phenomena in phase-separating battery materials. Using innovative derivations of the fundamental thermodynamics of materials, electrochemical measurements, advanced microscopy and very advanced simulation models, we have revealed and explained, for the first time, intriguing electrochemical responses of the intra-particle phase-separated state of the $LiFePO_4$ material. We have discovered that the electrode exhibits different chemical potentials and, thus, also different electrical potentials at the same state of charge and at the same temperature if it is in an intra- or inter-particle separated state. As a specific example of entering the intra-particle separated state, we have additionally revealed that it is possible to enter voltage hysteresis during dynamic operation of the battery, which was until this publication considered as the area in which the battery cannot operate at finite currents. We have also revealed and confirmed using experimental and modelling techniques that the two states are characterised by a markedly different impedance response of the electrode. Our breakthrough discoveries, therefore, pave the way to more adequate use of these materials in advanced battery systems and their diagnostics.



Source: KATRAŠNIK, Tomaž, MOŠKON, Jože, ZELIČ, Klemen, MELE, Igor, RUIZ-ZEPEDA, Francisco, GABERŠČEK, Miran. Entering voltage hysteresis in phase-separating materials: revealing the electrochemical signature of the intraparticle phase-separated state. *Advanced materials.* [Online ed.]. Aug. 2023, vol. 35, iss. 31, [article No.] 2210937, pp. 1-18, ilustr. ISSN 1521-4095.

Slovenian Research and Innovation Agency

SHORT NAME:
ARIS

YEAR OF ESTABLISHMENT:
2023 (its predecessor Slovenian Research Agency 2004)

CORE ACTIVITY:
Performance of professional, development and executive tasks related to the implementation of the adopted resolution on the Slovenian Scientific Research and Innovation Strategy or its individual parts, and other tasks promoting scientific research activities in order to ensure permanent, professional and independent decision-making on the selection of scientific research activities financed from the national budget.

NUMBER OF EMPLOYEES AS OF 31 DECEMBER 2024 IN LINE WITH THE ESTABLISHMENT PLAN:
95

FUNDS RECEIVED FROM THE NATIONAL BUDGET ALLOCATED TO SCIENTIFIC RESEARCH ACTIVITIES IN THE 2024 FINANCIAL YEAR:
346.5 million EUR

BASIC DOCUMENTS:
Scientific Research and Innovation Activities Act (Official Gazette of the Republic of Slovenia, No. 186/21, 40/23 and 102/24)

Decision establishing the Public Scientific Research and Innovation Agency of the Republic of Slovenia (Official Gazette of the Republic of Slovenia, No. 48/23)

Resolution on the Slovenian Scientific Research and Innovation Strategy 2030 (Official Gazette of the RS, No. 49/22)

WEBSITE:
https://www.aris-rs.si/en/index.asp