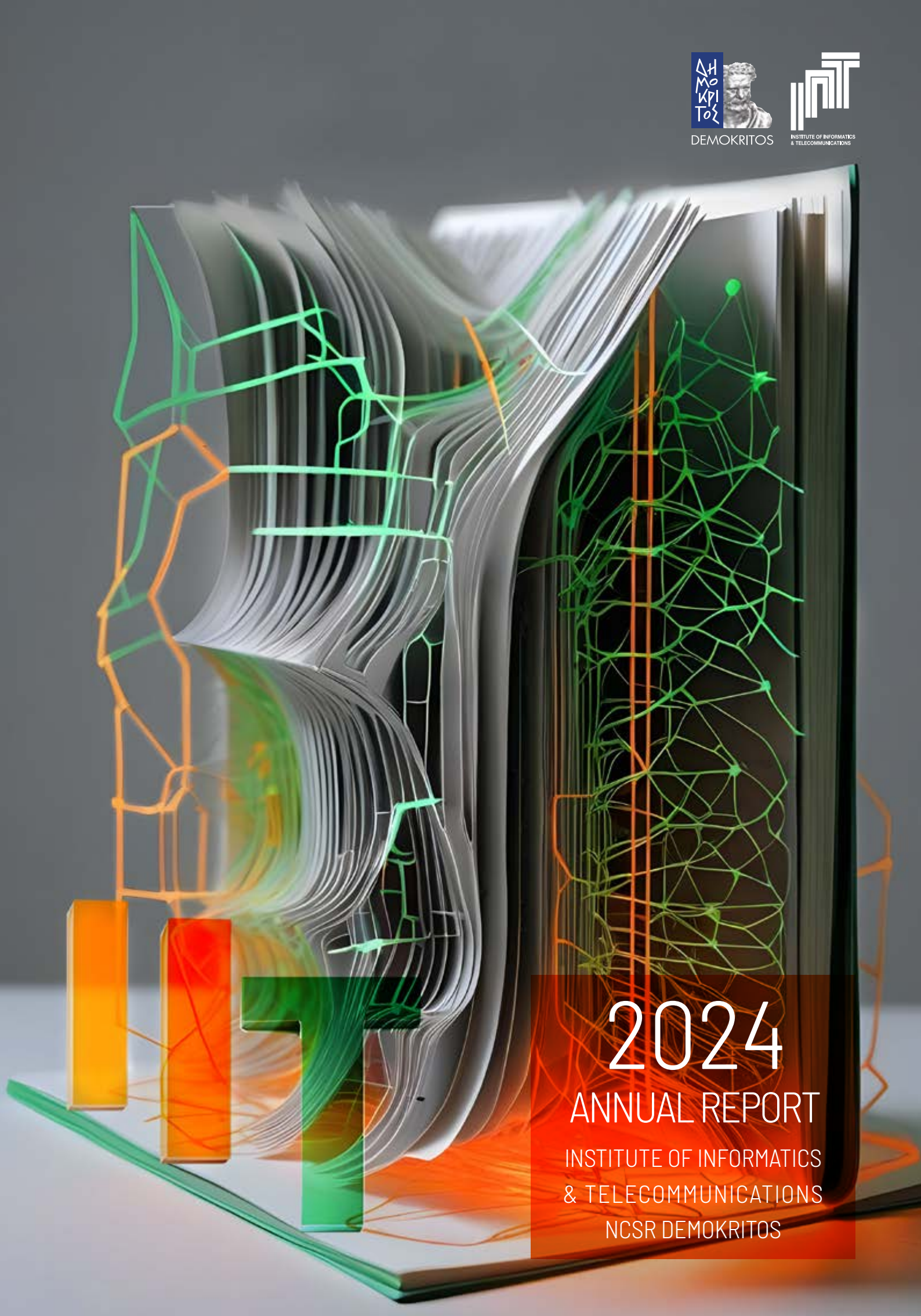

DEMOKRITOS
INSTITUTE OF INFORMATICS & TELECOMMUNICATIONS
2024
ANNUAL REPORT
INSTITUTE OF INFORMATICS
& TELECOMMUNICATIONS
NCSR DEMOKRITOS



Beyond Growth: IIT as a Strategic Engine for AI and Telecommunications

In 2024, the Institute of Informatics & Telecommunications (IIT) continued its rapid growth while entering a new phase of strategic maturity. We built on the 2023–2026 strategic plan by strengthening IIT's leadership in AI and Telecommunications, while also expanding our impact, refining our operations, and investing in our people and infrastructure. The year was marked by collaborative breakthroughs, high-impact initiatives, and the continued transformation of IIT into a dynamic ecosystem for science, innovation, and inclusion.

- **Advancing partnerships between our core divisions and other NCSR Demokritos (NCSRD) teams.** Our work in software-defined networks and AI-based systems shows how the convergence of AI and telecommunications can drive research and innovation. Beyond IIT, researchers collaborated with teams in energy, environmental research, advanced materials, and biosciences, launching new interdisciplinary projects across the Centre.
- **Growing Greece's digital innovation ecosystem.** ahedd, our Digital Innovation Hub, transitioned into a NCSRD spin-off at the end of 2024, broadening its capacity to support the digital economy. Smart Attica — the first European Digital Innovation Hub for AI in Greece — is now fully operational, empowering Small and Medium Enterprises (SMEs) and public organisations. By the end of 2024, we also laid the foundation for Pharos, the Greek AI Factory, with IIT overseeing its technical management.
- **Accelerating the digital transformation of NCSRD.** Building on the major infrastructure upgrades of 2023 and the launch of the DUA platform, we focused in 2024 on expanding NCSRD digital services. Our Network Operations Centre (NOC) oversaw the integration of upgraded systems across campus, while the eGovernance Department continued developing tools to enhance staff-facing services. These efforts will reach a milestone in 2025 with the launch of a Tier-3 Data Centre in the new IIT building and the operation of the DUA platform by the Centre.
- **Strengthening IIT role in the national and European AI strategy.** Following our work on GenAI Greece 2030, IIT continued to support national policymaking, contributing to the development of Greece's new AI strategy in 2024. This year, IIT also deepened its role in DeployAI, contributing to the evolution of the AI-on-Demand Platform and its rollout to support SMEs and public institutions across Europe.
- **Creating technology with public purpose.** AiTHERION, developed in partnership with the Greek Ministry of Culture, welcomed more than 5,000 visitors in 2024, offering tech-enhanced explorations of ancient Greek philosophy. We concluded the VAST project (Values in digital culture Across Space and Time), which explored how values are expressed and shaped in digital culture. We co-organised the first edition of The Lyceum Project — a global forum exploring AI ethics and philosophy. Meanwhile, our proposal for a new pavilion at the Lyceum of Aristotle archeological site was approved and will begin implementation in 2025.
- **Advancing inclusion and building a supportive work culture.** 2024 marked the pilot operation of the Human Resources Unit (HRU) at IIT, a significant step toward strengthening administrative organisation and fostering a culture that places people at the core of the Institute's strategy. We completed preparations for the new NCSRD Office for Workplace Environment, which was formally set up at the end of the year to support institutional well-being, inclusion, and a balanced work culture.
- **Adapting our structure for sustainable research leadership.** We established division boards to guide research strategy, introduced flexible research groups, and strengthened project administration by launching a Project Management Office. Eight new tenure-track researchers joined us in 2024, with four more arriving in 2025. We also renewed our focus on basic research through active pursuit of ERC, Marie Skłodowska-Curie, and other frontier funding opportunities.

Looking ahead

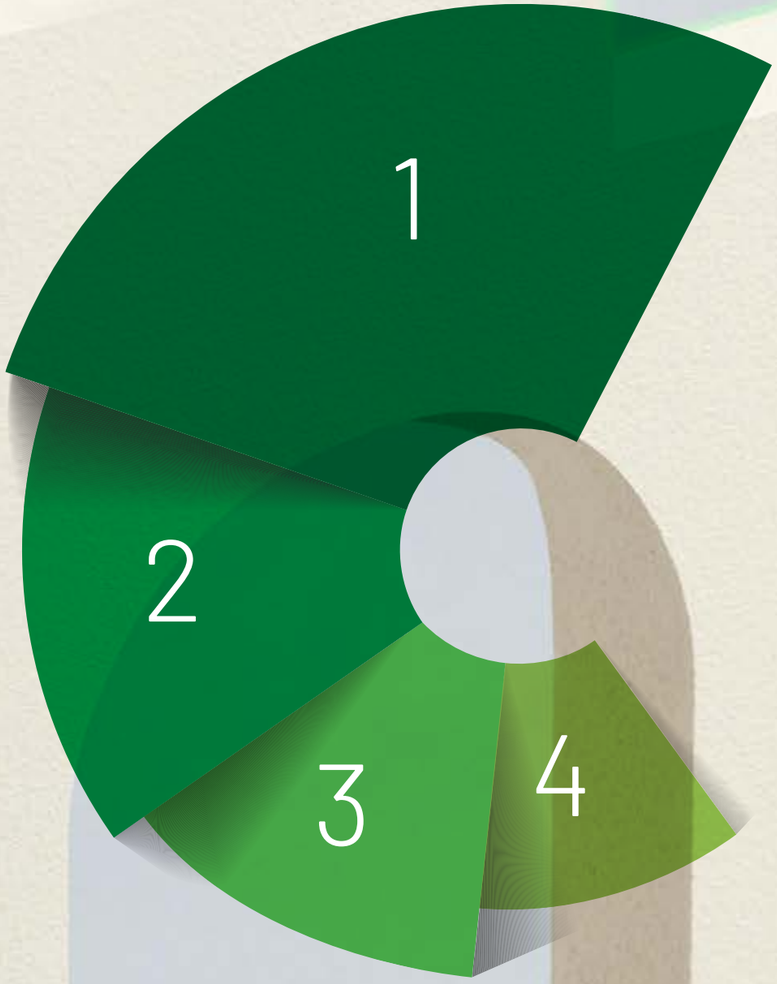
IIT is no longer just growing — it is evolving. As we enter the final stretch of our strategic plan, we remain focused on three core priorities: attracting top scientific talent, supporting foundational research and innovation, and reinforcing the infrastructures that enable excellence. We will keep developing tools and partnerships that support researchers, benefit citizens, and help shape a digital future for Greece and Europe.



Dr. Vangelis Karkaletsis
Director of the Institute of Informatics
& Telecommunications
NCSR Demokritos

Financials

€ 9.232.704 TOTAL



1. **€ 7.322.630** EU Research Grants
2. **€ 328.691** National Research Grants
3. **€ 633.052** Other Funding
4. **€ 948.331** Regular Public Budget

Year at a Glance

315 PEOPLE

90 PUBLICATIONS

19 PhD STUDENTS

23 NEW RESEARCH PROJECTS

6 SCHOLARSHIPS for PhDs & PostDocs

€9,2M TOTAL FUNDING

25 POSTDOCS

Culture for Societal Impact: Bridging Ancient Wisdom and Digital Technologies

The Institute of Informatics & Telecommunications (IIT) is at the forefront of cultural innovation through technology. From AiTHERION, an award-winning hub fostering technology-driven cultural experiences on ancient Greek philosophy, to the Aristotle's Lyceum initiative, which reimagines the philosopher's legacy with cutting-edge digital technologies deployed in the archaeological space, the Institute demonstrates its commitment to societal impact. Additionally, events like **The Lyceum Project:** AI Ethics with Aristotle emphasise the Institute's dedication to addressing contemporary ethical challenges by drawing from ancient Greek philosophical tradition.

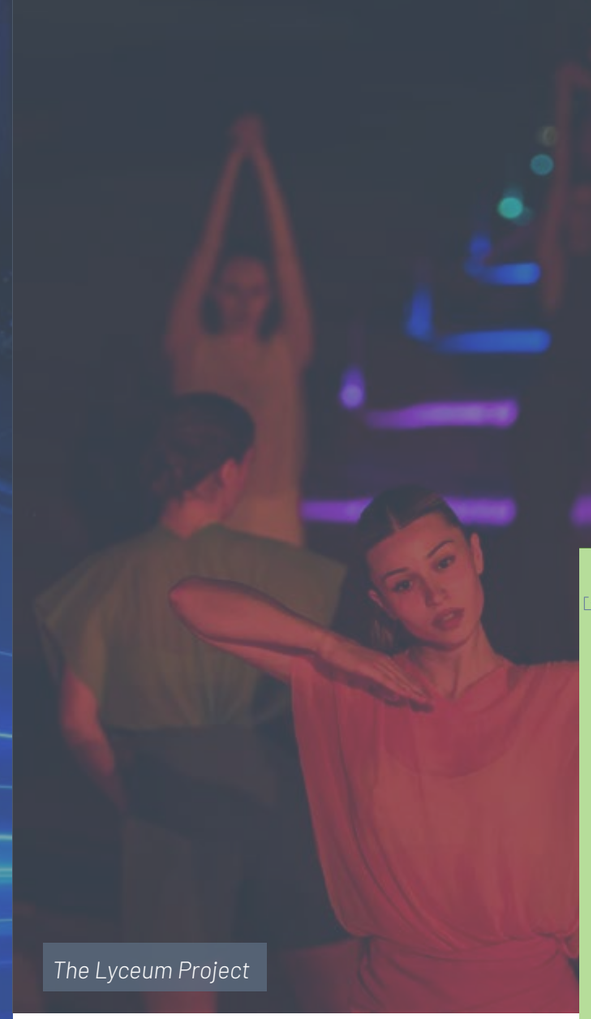


AiTHERION

AiTHERION

AiTHERION is an innovative cultural hub developed by NCSR Demokritos (NCSRD) and the Greek Ministry of Culture. The mission of AiTHERION is to foster technology-driven cultural experiences centred on ancient Greek philosophy, engaging visitors in exploring timeless human questions. The space serves as a platform for public dialogue, encouraging philosophical reflection in daily life and raising awareness of contemporary techno-ethical issues, while also functioning as an Open Lab. Located within the Athens Conservatoire, since its opening, AITHERION has welcomed over 5,000 visitors, 3,600 of whom were school students.

AiTHERION's inaugural exhibition, "Democracy and Eudaimonia," has garnered multiple awards within the past year, including the Gold Award in the Digital Applications category at the **ΕΒΓΕ** 2024 Awards, the Silver Award in the Place-Specific Experiences category at the Art Directors Club of Europe 2024 Awards, and the Best VR Film Award at the Bridges International Film Festival 2024.



The Lyceum Project

Aristotle's Lyceum: Re-engaging with a Timeless Legacy

NCSR Demokritos collaboration with Foster + Partners, The World Human Forum, and the Greek Ministry of Culture, has developed a groundbreaking proposal for the archaeological site of Aristotle's Lyceum, leveraging cutting-edge technology to create a transformative cultural experience.

This initiative underscores the Institute's commitment to harnessing technological innovation creating cultural experiences that foster deeper public engagement. Approved by the Central Archaeological Council, the project envisions a digital experience that brings Aristotle's life and works to the forefront. Visitors will explore a modular timber pavilion where philosophical and historical narratives come alive through digital technologies. Together with AiTHERION, this project exemplifies the Institute's dedication to pioneering culture-centric initiatives that bridge the past and the future for societal impact. In 2024 this project gained funding from the Attica Region funding programme.

The Lyceum Project: AI Ethics with Aristotle

On June 20, 2024, over 440 attendees, including Greece's Prime Minister Kyriakos Mitsotakis, convened at the Athens Conservatoire for "The Lyceum Project: AI Ethics with Aristotle," a conference exploring AI ethics through Aristotelian philosophy.

Organised by Oxford University's Institute for Ethics in AI, in partnership with Stanford's Human-Centered AI, NCSRD and the World Human Forum, the event aimed to integrate Aristotle's ethical principles into contemporary AI discourse. The conference featured the unveiling of a white paper by Professors John Tasioulas and Josiah Ober, proposing an Aristotelian framework for addressing AI's ethical challenges. Key themes included grounding AI ethics in human flourishing, viewing AI systems as tools to enhance human capabilities, and ensuring AI serves the common good through democratic oversight.

Discussions included panels with leading academics and practitioners, as well as presentations by emerging researchers. The event concluded with a celebration at the archaeological site of Aristotle's Lyceum, featuring a performance of Sasha Waltz's 'In C' by Athens Conservatoire graduates.

In 2025, on June 20, The Lyceum Project places childhood and AI at the epicentre of public debate to deliberate on: What does it mean to be a child in the age of AI? How to guide technology with wisdom and integrity, ensuring AI empowers children? And how does innovation align with our highest values, shaping a future that benefits all children?

AI & Digital Innovation



Denia Kanellopoulou
Head of Digital Innovation Unit

The Institute of Informatics & Telecommunications (IIT) has been at the forefront of not only advancing AI technologies but also leveraging them to drive digital innovation and transformation. Our participation and contribution in key European initiatives exemplify our commitment to increasing AI adoption, fostering innovation, and delivering impactful solutions across sectors.

The Digital Europe Programme aims to bring digital technology to businesses, citizens and public administrations by supporting projects in key areas such as AI. Within this framework, IIT actively participates in two pivotal initiatives; the **European Digital Innovation Hubs (EDIHs)** and the **European AI-on-Demand Platform (AIoDP)**. Moreover, the European Commission (EC) has launched the AI innovation package to support AI start-ups and Small and Medium Enterprises (SMEs), which includes the set-up of the **European AI Factories (AIFs)** as one of its pillars, with IIT set to host one of the first seven across Europe.

These initiatives are overseen by the EU AI Office, which aims to enable the future development, deployment and use of AI in a way that fosters societal and economic benefits and innovation while mitigating risks. It will also implement mechanisms for the collaboration of EU-funded AI innovation initiatives to multiply the benefits and ensure maximum reuse of resources. As IIT is actively participating in or leading such initiatives, we aim to exploit our insights and play a critical role in driving collaborations and setting pathways for cross-fertilisation of activities.

SMART ATTICA European Digital Innovation Hub

The European Digital Innovation Hub for AI in Energy & Environment, Supply Chain & Mobility, Culture & Tourism

EDIHs support companies in improving their processes, products, or services through digital technologies by providing services that are central to successful digital transformation. The services for start-ups, SMEs and public organisations are subsidised and free of charge. IIT has been coordinating the **Smart Attica EDIH** since January 2023 and until the end of 2024, this initiative has:

- Created a Masterplan for the Digital Transformation of the Public Sector with the Ministry of Interior and all Greek EDIHs.
- Organised the Innovation Greece 5.0 conference with around 700 participants.
- Supported more than 2000 SMEs, 20 mid-caps and 30 public organisations with indirect beneficiaries amounting to 12.000 organisations and 80.000 citizens.

DeployAI

Development & Deployment of the European AI-on-Demand Platform

DeployAI stands at the cutting edge of industrial AI innovation, building the next-generation European AIoDP. This platform aims to democratise access to AI resources, empowering businesses across Europe to:

- Access ready-to-use AI tools, datasets, and services tailored for industrial applications through a development environment that will facilitate innovation and a marketplace that will allow the commercialisation and uptake of trustworthy AI solutions made in the EU.
- Enable and stimulate collaborations by mapping and connecting AI innovation stakeholders (from start-ups to investors, academia and other national and EU initiatives).

The project kicked off in January 2024 and as it is a large and demanding project (28 million € budget & 28 partners) IIT is one of the three partners supporting its coordination. The project will already release a Minimum Viable Product (MVP) for testing purposes in early 2025, which will include:

- The AI Builder with DevOps tools that facilitate development without programming knowledge.
- The Large Language Model (LLM) playground that enables comparison of LLMs performance, accuracy and response quality.
- Access to cloud, HPC and Kubernetes container platforms.
- The Business Navigator that allows exploration of the EU AI ecosystem.
- Ready-for-exploitation products through the Marketplace and a metadata-based catalogue.
- Domain-specific tools & services that can bootstrap AI solutions development (e.g. in the Energy domain).

The commercial MVP, which will be open to external users, is planned to be launched in mid 2025 and includes many more features and capabilities that will be particularly attractive for the AI and Innovation communities.

Cross-fertilisation of AI Innovation Activities

The Digital Innovation Unit, is actively fostering the collaboration of the AI Innovation initiatives where the Institute plays a leading role, with other initiatives to maximise impact. As these initiatives will be operational in 2025, this year marks a crucial phase for implementing the collaboration roadmaps designed in 2024. For instance, planned activities will enable Smart Attica and Pharos AI Factory to leverage the AIoDP, expanding their service offerings and increasing their innovation capacity. Conversely, the AIoDP will benefit from the ecosystems built around Smart Attica and Pharos AI Factory by accessing and onboarding Greek start-ups, SMEs and other communities engaged in their activities. Since both Smart Attica and Pharos AI Factory target the Greek innovation ecosystem, they will engage in joint activities to ensure a multiplier effect on the respective investments. IIT will also foster collaboration with other key initiatives including Greek EDIHs, European Testing and Experimentation Facilities (TEFs), European Data Spaces, other AI Factories (AIFs) and the Big Data Value Association (BDVA).

Future Directions

Looking ahead, **2025 will be a pivotal year** for operationalising these initiatives, executing collaboration roadmaps, and scaling their impact. Our priorities include:

- **Enhancing AI infrastructure and deployment,** ensuring European businesses can leverage cutting-edge AI tools and services.
- **Strengthening cross-initiative synergies** to maximise resource efficiency and accelerate AI deployment.
- **Expanding industry engagement** by onboarding more start-ups, SMEs, and public sector stakeholders.

As AI innovation accelerates across Europe, IIT remains committed to being at the forefront of AI-driven transformation, ensuring long-term sustainability and impact across sectors, while strengthening Greece's position in the evolving AI landscape. Through initiatives like Smart Attica, Pharos AI Factory, and the AI-on-Demand Platform, we are building a robust ecosystem that enhances AI adoption, empowers businesses, and supports the EU's broader digital strategy.

Pharos

The Greek AI Factory for Accelerating AI Innovation

The AI Factories (AIFs) initiative aims to strengthen Europe's capabilities in the field of AI and High-Performance Computing (HPC) by supporting the creation of ecosystems/hubs that promote innovation, collaboration and growth. They bring together computing power, data and talent as necessary elements to create groundbreaking Generative AI models and advance AI applications in various critical sectors.

IIT in collaboration with the Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety (INRASTES) drove the proposal for the creation of the Greek AIF "Pharos", which is included in the "Blueprint of Greece's AI Transformation", prepared by the High - Level Advisory Committee on Artificial Intelligence, as one of the flagship initiatives. The proposal was successful and in 2025 Greece will host one of the first 7 AIFs in Europe, under the technical coordination of our multi-disciplinary team. Pharos will provide a set of services in order to become a one-stop-shop point where businesses and organisations will be able to obtain know-how as well as data and tools for the development of AI applications, and even support for their business sustainability. Initially, Pharos will focus on three strategic pillars: Health, Sustainability (Energy, Climate Change, Environment) and Language & Culture to strengthen innovation in these axes and bring significant benefits to the Greek economy and society. In 2025, Pharos plans to extend its support by including more countries and constitute the AIF of Southeastern Europe.





Lavrio Technology Park where the hypercomputer Daedalus will be situated

IIT in the European Defence Fund: advancing AI and Cybersecurity Research

The European Defence Fund (EDF) is the Commission's instrument to support research and development in defence, promoting cooperation between research and innovation actors in this domain, boosting capability developments and supporting development of cutting-edge and interoperable defence technologies. The Institute participates in EDF in line with national priorities and interests as expressed by the Hellenic Ministry of National Defence and in the context of ethical and responsible dual-use research on crisis preparedness, people and infrastructure protection and disaster response. Currently IIT is active in basic research activities within EDF, focusing on AI and Cybersecurity, and participating in ongoing EDF Research Actions described below.

FaRADAI
Frugal Robust Advanced Intelligence

Within the FaRADAI EDF project (Frugal and Robust AI for Defence Advanced Intelligence), current advances in AI technologies are researched while addressing main challenges imposed in the defence domain: robustness of AI techniques towards data frugality, lack of computational resources and potential loss of access to infrastructure, and explainable AI to enhance trust and support critical decision making. In this context, research within FaRADAI aims to develop a robust, trustworthy and adaptable repository of AI models and techniques for defence applications. IIT participation is implemented through a successful collaboration of CIL and the Computational Intelligence Laboratory and the Integrated Systems Laboratory (ISL) research groups IIT and involves the development of an annotation pipeline for various dual-use tasks within situational awareness context (image classification, object detection, audio captioning, audio classification) by leveraging automations through deep learning models that reduce the human annotation effort. Furthermore, we study adversarial attacks in the audio domain by developing defensive mechanisms for detecting these attacks that increase the robustness of sound event detectors in various surveillance use cases. Additionally, state-of-the-art techniques for few-shot classification both in the image and audio domain are being studied to address data frugality. Finally, IIT also studies and develops real-time anomaly detection for maritime safety and vessels trajectory data using Machine Learning (ML) and Deep Learning (DL) techniques.

AInception
AI FRAMEWORK FOR IMPROVING CYBER DEFENCE OPERATIONS

The primary objective of the AInception EDF Project (AI Framework for Improving Cyber Defence Operations) is to develop novel AI-based tools and techniques for detection and response. These techniques encompass adversarial behaviour detection in logs and network traffic, threat understanding, contextualisation, and explanation, risk and impact-aware response action generation, and automated execution and evaluation on the underlying infrastructure. AI will play a central role in all these steps within the AInception tool pipeline. These tools will be integrated into a proof-of-concept end-to-end detection and response prototype, which will be evaluated in operational scenarios involving end users.

CORE Research Lab of IIT, is leading the activities focused on risk- and impact-aware response actions. IIT is concentrating on the implementation of defence solutions utilising attack graphs and reinforcement learning to optimise decision-making in dynamic military environments.

Additionally, IIT is developing explainability tools to ensure that the AI-driven decisions are interpretable by military personnel, in accordance with operational requirements.

eGov Demokritos

Developing a Digital Culture for a Future-ready Public Sector





2024 was another productive year for the eGovernance Department, which continued its efforts to advance digital transformation in NCSR Demokritos, in the General Secretariat for Research and Innovation (GSRI) and others.

A notable achievement was the update of the "RIview" platform (Research-Innovation view), an evaluation platform for Research Centres and Institutes in Greece, on behalf of General Secretariat for Research and Innovation (GSRI). Upon completion of the evaluation, both GSRI and the Presidents of the Research Centres gain access to comprehensive statistical data on finances, human resources, bibliography, scientific publications and more. Additionally, the "RIview" platform features a REST API service making all evaluation data available on the official GSRI website.

In 2024, the "D.U.A. Platform - All in One Go" became fully operational within the Institute with 248 DUA activations (42 by permanent staff and 206 by temporary contract staff). Additionally, a new feature was introduced enabling approximately. 350 permanent staff members to access their personal folder, containing all their personal files. A total of 150.000 files were digitised for this purpose and a management application was developed, to facilitate updates and the uploading of new files by Division of Administration personnel.

Moreover, the Department updated the "applio box" platform for creating and managing calls for proposals and submissions. It enables the implementation and monitoring of all phases of the process, from creating calls and submitting proposals, to their evaluation and the publication of final results.

Lastly, the IIT intranet portal was designed to streamline internal communication and enhance collaboration within the Institute. Additionally, two dedicated websites were developed - one for the Innovation Office and another for the Special Account for Research Funds of NCSRD.

IIT Summer Schools

The Institute of Informatics & Telecommunications (IIT) dedicated the summer of 2024 to Artificial Intelligence taking over the co-organisation and hosting of summer schools and conferences.

During the first week of July we hosted the **HIAS Universal AI Course**, with the Hellenic Institute of Advanced Studies (HIAS). IIT Director **Dr Vangelis Karkaletsis** welcomed more than 450 university students from Greece. Talks and panel discussions took place with Institute Researchers who were amongst the lecturers at the event, **Dr Georgios Paliouras** and **Dr Alexandros Artikis** presented "AI Application for Events & Activity recognition" while **Dr Xenia Ziouvelou** presented "Ethics in AI". During the second week of July, the historic **59th Summer School of NCSR Demokritos** welcomed more than 300 University students. Tuesday 9 July was the designated day for Informatics and Telecommunications with 10 scheduled presentations by IIT researchers. The day, organised and moderated by IIT's Education Officers, included multiple presentations on different manifestations and applications of AI, including AI & Health, Music, Natural Sciences as well as NLP, Digital Transformation of Education and AI Ethics. Additionally, there were sessions and presentations related to 6G Architectures, Network Management & Security Enablers, Cybersecurity and Advanced Wearable Antennas, as well as student visits to the IIT Anechoic Chamber for Far-Field antenna measurements.

In the two final weeks of July, we hosted two European Schools on AI **ESSAI & ACCAI** co-organised by an array of organisations across Europe. The European Association for Artificial Intelligence, TAILOR – Network of Research Excellence Centres, the Hellenic Artificial Intelligence (HIAS), Artificial Intelligence Team of the Department of Informatics and Telecommunications of the National (NKUA), the Archimedes Research Unit, and the NCSR Demokrtios (NCSRD). IIT participated with a presentation on **Complex Event Recognition** by **Dr Alexandros Artikis** on Wednesday 17 July.

In September we hosted the **Athens Natural Language Processing Summer School (AthNLP) 2024.** The summer school was organised jointly by ATHENA Research Center, NCSRD, Athens University of Economics and Business, and Heriot-Watt University.

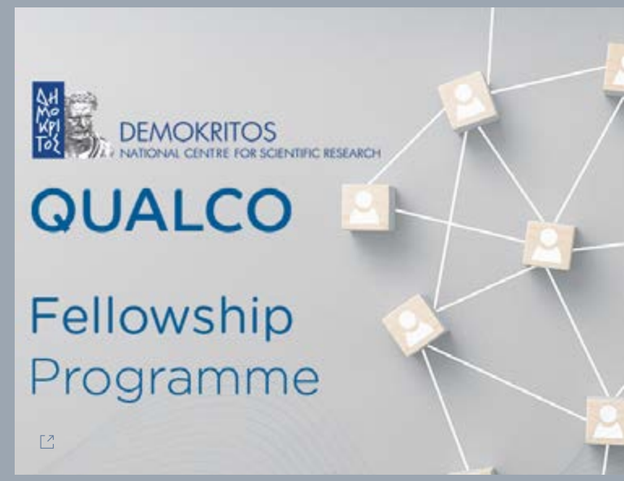


Dr Vangelis Karkaletsis Opening speech at HIAS AI Summer School 2024

Demokritos – Qualco Industrial Research Fellowship Programme

The pioneering "Demokritos-Qualco Fellowship" programme started in 2021 and is a five - year industrial Research and Development (R&D) collaboration that aims to advance AI-driven research in FinTech with the scientific supervision of NCSR Demokritos and the financial support and domain expertise of QUALCO. In 2024, the R&D team of one postdoctoral fellow and two PhD researchers yielded significant achievements in the field. Highlights of 2024 include the publication of two journal papers and three conference papers, as well as presentations of impactful solutions at the Financial Natural Language Processing Workshop (LREC-COLING 2024) and the International Conference on AI in Finance (ICAIF 2024).

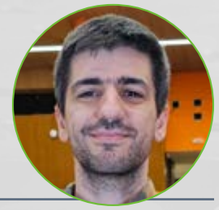
The team also released two extensive financial datasets to foster collaboration and drive progress within the global research community. Moreover, five Master of Science (MSc) theses from the Institute's Master in Data Science programme were supervised, each addressing advanced machine learning challenges with a focus on financial data analysis.



New Tenured Researchers

We extend our warmest congratulations to the newly appointed tenured researchers of 2024 and wish them a successful and rewarding scientific journey at the Institute of Informatics & Telecommunications. In a brief ceremony, they took their oath before Dr Georgios Nounesis, Director and Chairman of the Board of NCSR Demokritos, in the presence of Dr Vangelis Karkaletsis, Director of the Institute.





Akis Kourtis

My work focuses on the fields of Cybersecurity, Network Function Virtualisation (NFV), Software-Defined Networks (SDN), and 5G technologies, emphasising the integration of these areas into advanced frameworks for secure communication and adaptive security. As the leader of the CORE research group and coordinator of several Horizon Europe projects, I manage critical innovations in the fields of network security, quantum cryptography, and Edge Technologies. Achieving tenureship is of paramount importance to my professional journey, as it ensures stability and recognition, allowing me to deepen my contribution to research, secure continuous funding, and promote innovation through long-term collaborations between academia and industry.



Lida Arnellou

My role as responsible for cultural and science communication initiatives utilising digital technologies, focuses on leveraging these technologies to create meaningful experiences with lasting societal impact. This tenureship significantly enhances my ability to contribute to the Institute by enabling long-term planning, fostering stability, and facilitating the development of more ambitious and impactful projects. It also reflects the organisation's commitment to engage in interdisciplinary initiatives, such as AiTHERION, which foster public dialogue, raise awareness of contemporary techno-ethical issues, and build bridges between the Institute and society. Through this role, I can further align my expertise with the organisation's mission, advancing both individual and collective research goals.



Anastasia Krithara

My work focuses on Artificial Intelligence, Machine Learning, and Knowledge Representation, with a strong emphasis on applications in Health Sciences. Achieving tenureship is a significant milestone for my career, as it provides the stability and recognition needed to pursue long-term research goals. My primary objective is to advance my research by growing the BioHIT team, expanding its capacity with new members, and securing additional funding at both national and European levels. I am committed to publishing in top-tier journals, fostering collaborations with academic, industrial, and research partners, and positioning our team as a leader in AI for Health Sciences research. Scientific excellence drives my efforts to ensure our work has meaningful societal impact.



Nikos Katzouris

My research revolves around combinations of Machine Learning with Knowledge Representation and Reasoning. I work on techniques that can improve the transparency, robustness and trustworthiness of learning-based AI systems, such as Neuro-symbolic AI and knowledge-aware learning, with a special focus on temporal, event-based applications. My election as a tenured, level C researcher marks a critical milestone for me, signifying the recognition of my work so far and reflecting the trust of my colleagues and the Institute. It motivates me to continue to grow and also, help the institute grow, in the rapidly evolving landscape of AI and its impact on Science, Industry and Society.



Denia Kanellopoulou

My role focuses on advancing research in Digital Innovation and the exploitation of Emerging Technologies. This includes contributing to key European flagship AI initiatives, such as the AI Factories, the AI-on-Demand Platform, and the European Digital Innovation Hubs. A significant aspect of my work involves fostering strategic collaborations with the industry, aiming to bridge research priorities and outcomes with real-world business challenges. I am truly honoured by this tenureship, which not only recognises my career achievements and contributions to date, but also marks a significant milestone in my professional journey. This position provides an exciting opportunity to further advance IIT's contributions to the field of Digital Innovation, and I am committed to leveraging these responsibilities to bring impactful results.

DeployAI

Development and Deployment
of the European AI-on-Demand Platform
1/1/2024 - 31/12/2027
DIGITAL - CSA - SKEL | The AI Lab
NCSRD budget: 2,041,025€
https://deployaiproject.eu/

SUNRISE-6G

SUstainable federatioN of Research
Infrastructures for Scalingup
Experimentation in 6G
1/1/2024 - 31/12/2026
Horizon Europe - FRONT
NCSRD budget: 550,000€
https://sunrise6g.eu/

SAFE-6G

A Smart and Adaptive Framework
for Enhancing Trust in 6G Networks
1/1/2024 - 31/12/2026
Horizon Europe - FRONT
NCSRD budget: 430,900€
http://safe-6g.eu/

NOUS

A catalyst for EuropeaN ClOUd
Services in the era of data spaces,
high-performance and edge computing
1/1/2024 - 31/12/2026
Horizon - Euratom - SKEL | The AI Lab
NCSRD budget: 651,785€
https://nous-project.eu/

MANOLO

Trustworthy Efficient AI
for Cloud-Edge Computing
1/1/2024 - 31/12/2026
Horizon Europe - SKEL | The AI Lab
NCSRD budget: 532,500€
https://manolo-project.eu/

ENVELOPE

Evaluation and validation of connected
mobility in real open systems beyond 5GS
1/1/2024 - 31/12/2026
Horizon Europe - FRONT
NCSRD budget: 708,750€
https://envelope-project.eu/

CHANGER

Challenges and innovative
changes in research ethics reviews
1/1/2024 - 31/12/2026
Horizon Europe - SKEL | The AI Lab
NCSRD budget: 547,500€
https://changer-project.eu/

AGRARIAN

SpAce-AIr-Ground Last Mile InfRastructure &
Dynamic PrOgrAmmable DistRibuted
EnvIronment For Edge FArmiNg
1/1/2024 - 31/12/2026
Horizon Europe - C.O.R.E
NCSRD budget: 1,559,375€
https://agrarian-project.eu/

AIEdu

How AI influences the way teachers teach
and students learn to live in democracy
1/1/2024 - 31/12/2024
Collaboration with Private Sector -
SKEL | The AI Lab
NCSRD budget: 8,500€

INSTAR

International cooperation for digital
standardisation
1/1/2024 - 30/6/2026
Horizon Europe - CIL
NCSRD budget: 133,562€
https://www.instarstandards.org/

6G CLOUD

Service-oriented 6G network architecture
for distributed, intelligent, and sustainable
cloud-native communication systems
1/1/2024 - 30/6/2024
Horizon Europe - C.O.R.E & NeL
NCSRD budget: 353,750€

ALIGN

1/10/2024 - 31/12/2027
Services
SKEL | The AI Lab
NCSRD budget: 280,000€

PREVENT

Pollution Reduction and Early-warning for
Vulnerable Ecosystems in Adriatic-Ionian
Territories
1/9/2024 - 31/8/2027
Interreg IPA Adriatic Ionian Programme
- CIL | knowledge management unit
NCSRD budget: 147,475 €
https://prevent.interreg-ipa-adrion.eu/

INTACT

Integrated software toolbox
for secure IoT-to-Cloud computing
1/9/2024 - 31/8/2027
Horizon Europe - C.O.R.E. & WiCom
NCSRD budget: 317,000 €
https://intact-horizon.eu/

YouthGovAI

Youth participation in AI governance
31/8/2024 - 30/8/2027
Erasmus + - SKEL | The AI Lab
NCSRD budget: 103,675 €

23 New Research Projects

AITHERION

Υπηρεσίες Ψηφιακών Εκθέσεων
1/6/2024 - 31/5/2027
Services - Artifact
NCSRD budget: 300,000 €
https://aitherion.gr/en/

CoGNETs

Continuums Of Game NETs:
swarm intelligence as information processing
1/6/2024 - 31/5/2027
Horizon Europe - C.O.R.E.
NCSRD budget: 320,000 €

XRinVET

Enhancing digital innovation (web 4.0) and
attractiveness of vet through extended reality
(VR/AR) training for better skills-match
1/11/2024 - 30/4/2027
Erasmus+ - NML & Mind
NCSRD budget: 39,203 €

KIDSWELL

Supporting educators to ensure an inclusive
learning environment for ADHD children based
on the introduction of emerging technologies
for skills acquisition and civic-engagement
1/11/2024 - 31/12/2026
Erasmus + - NML & Mind
NCSRD budget: 55,049 €

GreenSIGNS

Promoting high quality, digital transformation
(VR gamification) and green transition in inclusive
Youth Workers practices for youth
with hearing impairment (or deafness)
for better employability prospects
1/6/2024 - 30/9/2026
Erasmus + - NML & Mind
NCSRD budget: 54,410€
https://greensigns.eu/

ESA-DANTE

Deployable Satellite Navigation Antenna
1/8/2024 - 31/1/2026
Collaboration with Private Sector - WiCom
NCSRD budget: 150,000 €

Thymele

An Open-access Dynamic Multimedia
Dictionary of the Performing Arts
12/3/2024 - 12/1/2026
National projects - CIL
NCSRD budget: 20,000 €

H-OCR

Ανάγνωση χειρογράφων πρακτικών Γενικού
Συμβουλίου Τράπεζας της Ελλάδος
18/1/2024 - 31/12/2024
Collaboration with Private Sector - CIL
NCSRD budget: 15,000 €

Kick off in 2025

8 New Research Projects

AI Factories - PHAROS

The Greek AI Factory for accelerating AI innovation
1/4/2025 - 31/3/2028
Horizon Europe - SKEL | The AI Lab
NCSRD budget: 5,600,000€

SMARCO

SMARt COmmunities Skills Development in Europe
1/2/2025 - 31/1/2029
Erasmus+ - SKEL | The AI Lab
NCSRD budget: 133,050 €

O CEI

Open CloudEdgeIoT Platform Uptake in Large Scale Cross-Domain Pilots
1/1/2025 - 30/6/2028
Horizon - Euratom - FRONT
NCSRD budget: 574,375 €

d-AI-logue

An AI-driven platform employing Socratic dialogue to help young adults critically analyze information
1/1/2025 - 31/1/2028
Collaboration with Private Sector - SKEL | The AI Lab
NCSRD budget: 750,000 €

6G Versus

6G Vertical trials for Sustainability
1/1/2025 - 31/12/2027
Horizon Europe - FRONT
NCSRD budget: 695,000 €
https://6g-versus.eu/

MARE

MARE Programmable, Modular and Disaggregated Security Plane for 6G Ecosystems
1/1/2025 - 31/12/2027
Horizon Europe - C.O.R.E
NCSRD budget: 389,375 €

UNITY-6G

UNified archITecture for Open RAN-enabled Distributed, Scalable and SustainabilitY-enhanced 6G Networks
1/1/2025 - 31/12/2027
Horizon Europe - FRONT
NCSRD budget: 407,500 €

ACCEND

Accelerating European Deep Tech Startups
1/1/2025 - 31/12/2026
Horizon Europe - SKEL | The AI Lab
NCSRD budget: 156,250 €

Laying the Foundation for a Thriving Workplace: The HRU's First Year

The year 2024 marked the pilot operation of the Human Resources Unit (HRU) at Institute of Informatics & Telecommunications (IIT), a significant step toward strengthening administrative organisation and fostering a culture that places people at the core of the Institute's strategy. From the outset, the HRU prioritised enhancing key administrative functions, promoting employee wellbeing, supporting professional development and advancing equity, diversity and inclusion in the workplace.


Human Resources Unit

In terms of administrative organisation, the Unit introduced structured procedures addressing critical areas such as employee onboarding and offboarding, daily operational support, training needs assessment and human resources analytics. Additionally, it introduced valuable tools, including the new IIT Intranet -revitalised with updated and meaningful content- and comprehensive dashboards to streamline processes and enhance internal efficiency.

Employee health and wellbeing were placed at the forefront through practical interventions and social and educational initiatives. The HRU facilitated safety inspections across the Institute, established designated outdoor break areas and contributed to acquiring two portable defibrillators for the Centre. Moreover, over 40 IIT employees completed First Aid certification. To foster community and belonging, the Unit organised two major staff events and a visit for employees and their children to the AiTHERION exhibitions.

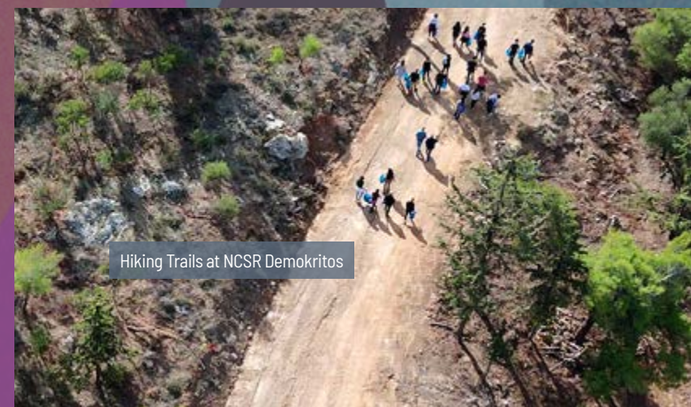
A large-scale environmental initiative focused on trail mapping and campus cleaning, as well as the systematic recycling procedures within the Institute underscored the connection between the natural environment and workplace quality of life.

Significant efforts were made to improve accessibility for individuals with disabilities, ensuring key infrastructure enhancements, including new ramps, additional accessible parking spaces and sign language interpretation at events. It also actively encouraged broader technical improvements to enhance accessibility across the Centre. In alignment with NCSR Demokritos broader strategy on equality and inclusion, IIT engaged in awareness and training initiatives on equal employment opportunities, mentoring women in STEM, integrating gender perspectives into research and education, combating workplace discrimination, enhancing psychological safety and addressing gender-based violence in academic and research settings.

In conclusion, the inaugural year of the Unit was a period of dynamic evolution and procedural adaptation, aiming to improve both the employee experience and organisational efficiency. Looking ahead, the focus will be on strengthening HR policies, expanding professional development initiatives and fostering an even more supportive work environment. Guided by the principles of equity, diversity and inclusion, the HRU remains committed to empowering IIT's people, cultivating a culture of collaboration and respect and ensuring the Institute strives to be a space of progress, creativity and belonging.



First Aid Course


Hiking Trails at NCSR Demokritos



NCSR Demokritos' Network Evolution: Innovating Connectivity, Infrastructure & Security

The Network Operations Center (NOC) manages a complex network serving more than 900 users and over 3,000 devices across all Research Institutes and on-site companies of the NCSR Demokritos (NCSRD) campus. NOC ensures reliable connectivity, advanced cybersecurity, and comprehensive core network services to seamlessly support these wide-ranging operations. In addition, NOC is responsible for managing the entire IT infrastructure of NCSRD, ensuring smooth operations and continuous technological progress. By offering expert consultation and customised solutions, NOC strengthens research capabilities and boosts overall operational efficiency.

Following the successful NCSRD campus network upgrade, under the HEPHAESTUS project, NOC transitioned to a faster, modern infrastructure. This year, strengthening cybersecurity has been a key focus. A newly implemented perimeter firewall system now provides high-availability protection across the entire campus. Additionally, an AI-driven anomaly detection and response platform enhances threat identification and mitigation. Several other upgrades have improved service levels, resilience, and user value.

Looking ahead, completing the full migration of the NCSRD campus network remains a priority. This migration is essential for transitioning to a VoIP-only telephony system. Another key initiative is the transfer and initial operation of the NCSRD Tier 3 Data Centre, scheduled for fourth quarter of 2025.

In the long term, we plan to adopt network automation to simplify management processes and improve service availability. These efforts demonstrate our ongoing commitment to innovation, operational efficiency, and robust security-both now and in the future.

Meet the Team



Elena Galifianaki
Head of Communications



Fay Pitsilidou
Senior Communications Officer



Pelagia Drosaki
Communications Officer



Irina Defaranou
Communications Officer



Kostas Nikolos
Education Communication Assistant



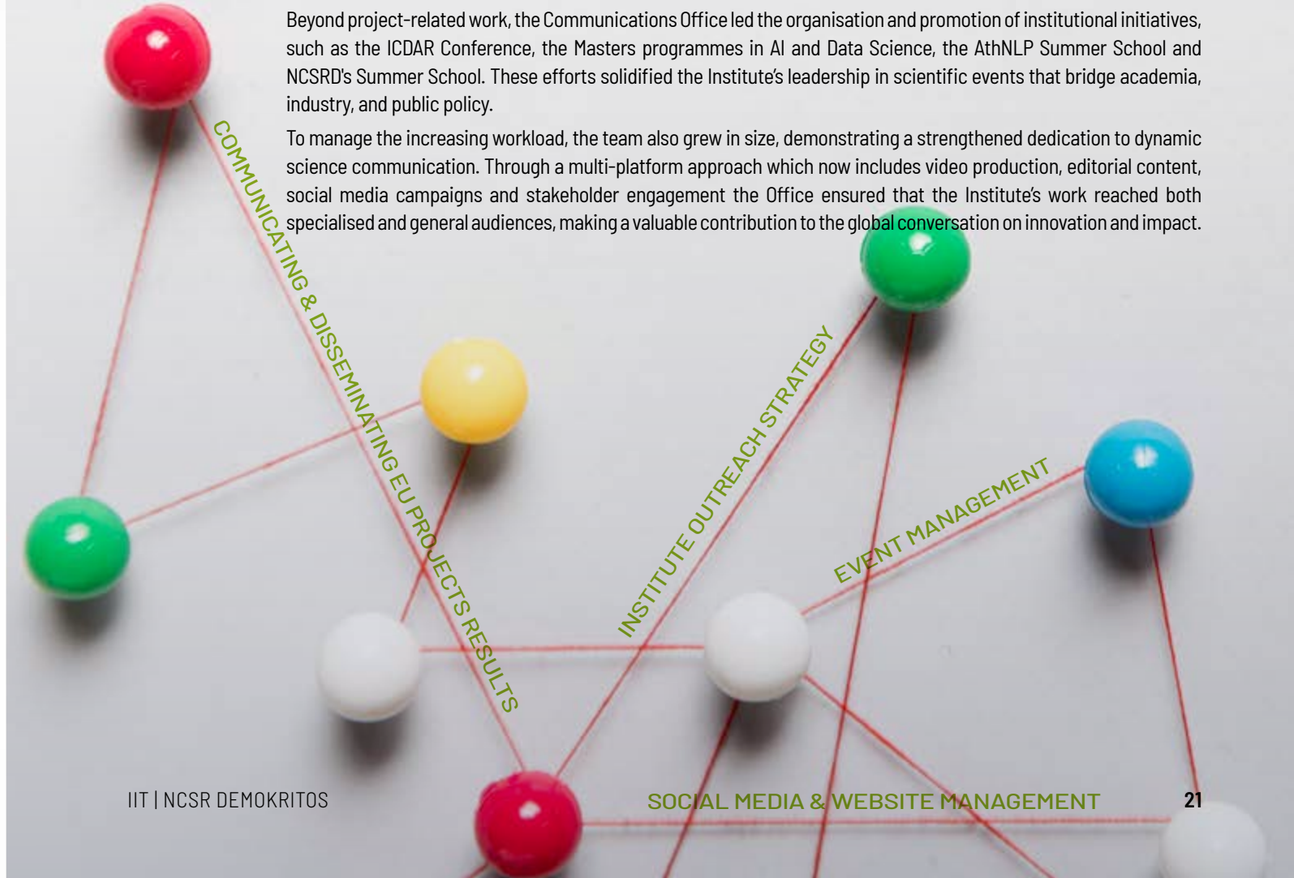
Yota Sotiropoulou
Graphic Designer

In 2024, the Communications Office of the Institute of Informatics and Telecommunications (IIT) continued to build on its momentum, solidifying its position as a leading force in European research dissemination and strategic science communication.

This year, the Office successfully concluded the FRISCO project with the organisation of a high-level conference in Brussels, which featured participation from the European Commission. The Office maintained its leading role in the communication and dissemination activities of the EVENFLOW project and, in this context, initiated and coordinated the TrustWorthy AI Cluster — a dynamic initiative bringing together projects from the same call, focused on trustworthy AI. Additionally, the Office assumed leadership of communication and dissemination for the newly launched CHANGER project and played a pivotal role in DeployAI, the European flagship project on Artificial Intelligence, while continuing to contribute to the AI4Europe activities. The Office also led the communication and dissemination efforts for the AGRARIAN project, contributing its expertise to the execution of Open Calls. Simultaneously, it provided communication and dissemination support to several other projects, including MANOLO, AI4TRUST, FARADAI, and ENEXA.

Beyond project-related work, the Communications Office led the organisation and promotion of institutional initiatives, such as the ICDAR Conference, the Masters programmes in AI and Data Science, the AthNLP Summer School and NCSRD's Summer School. These efforts solidified the Institute's leadership in scientific events that bridge academia, industry, and public policy.

To manage the increasing workload, the team also grew in size, demonstrating a strengthened dedication to dynamic science communication. Through a multi-platform approach which now includes video production, editorial content, social media campaigns and stakeholder engagement the Office ensured that the Institute's work reached both specialised and general audiences, making a valuable contribution to the global conversation on innovation and impact.



Implementation of the Institute's Strategic Plan 2023 - 2026

The 2023–2026 strategic plan builds upon the accomplishments of the previous period and focuses on enhancing the Institute's operations and impact, guided by the three strategic pillars that define its core identity. Additionally, the plan explicitly emphasised initiatives for promoting the core institutional and societal values of inclusivity, collaboration and cross-fertilisation of different principles and domains. Finally, and given the significant progress on all three pillars, the plan aimed to create tighter connections between the pillars and establish a virtuous loop between them.

The Institute has made significant progress in its effort to effectively organise research through its two core research divisions: the Intelligent Information Systems and the Telecommunications & Networks. Each of these divisions now has a designated Board responsible for monitoring research activities, fostering innovation, and overseeing operational implementation—a step that has already been completed successfully. Another major initiative is the reorganisation of Research Labs into more dynamic Research Groups, each with a clear sustainability and growth plan. This is an ongoing process. Further work is needed to fully implement this new organisational model.

The Institute has also made notable progress in strengthening its human capital, particularly through the increase in tenured personnel. This aligns with its strategic goal of augmenting research capacity and ensuring long-term institutional stability. The expansion of tenured staff enhances the Institute's ability to sustain high-quality research, attract competitive funding, and support its growing research initiatives.

To further support research activities, the Institute has reinforced several key support mechanisms. The Institute's Advisory Board plays a central role in research oversight, while education efforts are being coordinated through a dedicated team. Additionally, responsible innovation has been strengthened through collaboration with ahedd DIH, and outreach efforts are being managed through the Communications Office. At an administrative level, various units have been established or restructured, including the Secretariat, Procurement, and Legal Offices. IT Support and the Network Operation Centre (NOC), in collaboration with eGov, now serve the entire NCSR Demokritos (NCSRD), and the eGovernance Office, initially set up within the Institute, has now evolved into a separate department within NCSRD.

Looking ahead, the primary challenge is to build upon these existing structures to further facilitate research activities and enhance the quality of research output. Several key actions have been planned to address this. The Project Management Office has been set up, aiming to improve the management of funded projects and aid proposal preparation. At the same time, project administration has been synchronised to ensure smoother operations.

A specialised Legal Team has already been formed to handle legal matters related to projects and proposals, working in close collaboration with the NCSRD Legal and Innovation Offices. Additionally, a Team for IIT Buildings Maintenance and Security has been set up to manage the increased needs arising from new construction, as well as the renovation and upkeep of existing buildings. The Institute has also taken significant steps toward fostering inclusivity, with the formation of a Team for Equality, Diversity, and Inclusion, as part of the NCSRD Gender Equality Plan. Similarly, a Human Resources Team has been successfully established to support workforce development.

In conclusion, while major structural changes have been implemented—such as strengthening divisional oversight, reorganising administrative units, and enhancing legal and HR support—certain aspects of the research organisation plan remain in progress. Moving forward, focus will also be directed on strengthening research support mechanisms, ensuring compliance, and improving overall efficiency to further enhance the Institute's research excellence.

A Blueprint for Greece' s AI Transformation

The Institute of Informatics & Telecommunications (IIT) at NCSR Demokritos (NCSRD) made a significant contribution to the "Blueprint for Greece's AI Transformation", a concrete and cohesive landmark document that outlines a practical roadmap for Greece's leadership in the fields of AI and data governance.

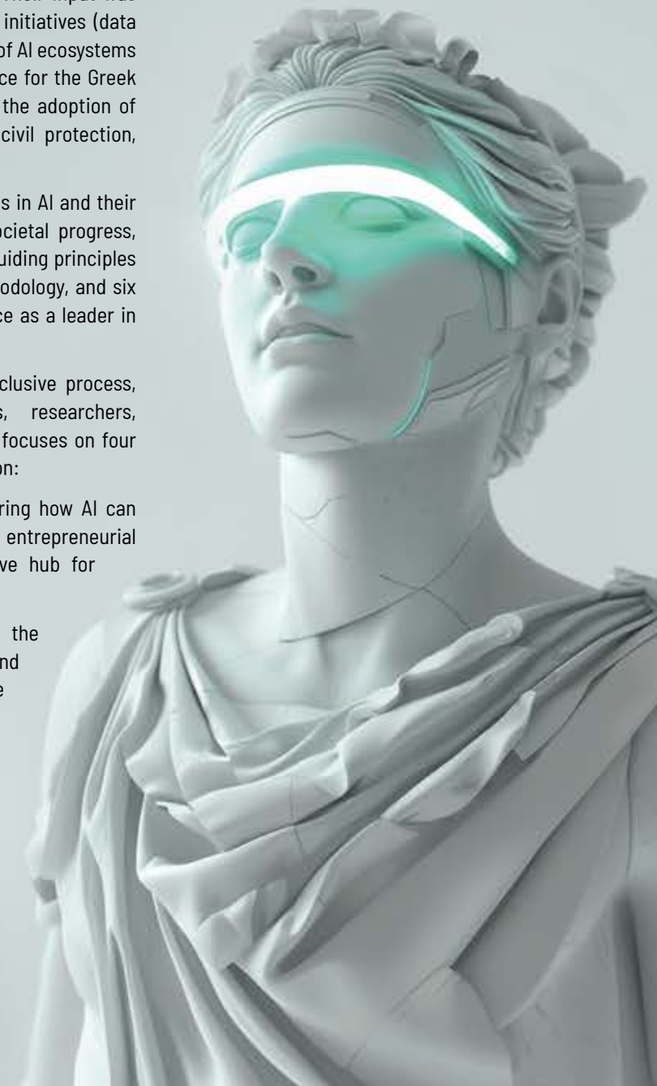
Under the guidance of Dr Vangelis Karkaletsis, Director of the Institute and member of the High-Level Advisory Committee on Artificial Intelligence under the Prime Minister, NCSRD researchers, Stelios Karozis, Denia Kanellopoulou, Giorgos Petasis, Dimitris Kyriazanos, Alexandros Nousias and Giorgos Xylouris played a key role in shaping the study's insights and developing its strategic recommendations. Their input was instrumental both in proposals for flagship initiatives (data collection and governance, the development of AI ecosystems around data, and the creation of a data space for the Greek language and culture) and in proposals for the adoption of AI across various state sectors (defence, civil protection, culture, smart cities).

This study examines the rapid advancements in AI and their potential to drive economic growth and societal progress, both nationally and globally. It outlines the guiding principles for a national AI strategy, the adopted methodology, and six flagship projects designed to position Greece as a leader in AI innovation.

The strategy was developed through an inclusive process, bringing together government officials, researchers, entrepreneurs, and international experts. It focuses on four key areas critical to Greece's AI transformation:

- Innovation and Entrepreneurship: Exploring how AI can promote innovation and strengthen the entrepreneurial ecosystem, making Greece an attractive hub for start-ups and investments.
- Education and Research: Highlighting the importance of enhancing education and research to develop skills and advance knowledge in the AI sector.
- Regulatory Framework: Investigating the significance of responsible and safe AI usage, emphasising the need for appropriate Regulations.
- AI Applications in Government: Proposing methods for implementing AI technology in the public sector to improve efficiency and transparency.

One of the flagship projects proposed is Pharos: The Greek AI Factory, an initiative set to launch in March 2025 with a €30 million budget. Pharos will focus on AI applications in Health, Greek Language & Culture, and Sustainable Development, serving as a hub for collaboration between academia, industry, and the public sector. NCSRD is the technical coordinator of Pharos.



PhDs Scholarships

Wrapping Up the Joint PhDs Initiative

In 2007 IIT initiated an innovative **PhD scholarships programme,** jointly with universities in the USA, in order to continue the Institute's cutting-edge research in a variety of fields, such as Artificial Intelligence, Machine Learning, Robotics, Big Data, Bioinformatics. This joint research was carried out at NCSR Demokritos (NCSRD) in collaboration with foreign institutions. It is important to mention that the PhD scholarships were full, covering tuition and living expenses, in Greece and abroad, travel, as well as the costs of participation in scientific conferences.

This programme wrapped up in 2024 with 12 PhD researchers, who had the opportunity to acquire such academic experience:

Pavlos Doliotis (UTA Arlington),
Giorgos Galatas (UTA Arlington),
Alexandros Lioulemes (UTA Arlington),
Evangelos Metsis (UTA Arlington),
Michalis Papakostas (UTA Arlington),
Alexandros Papangelis (UTA Arlington),
Christos Sevastopoulos (UTA Arlington),
Kostas Tsiakas (UTA Arlington),
Eleni Litsa (Rice University),
Romanos Fasoulis (Rice University),
Nikos Sarafianos (University of Houston),
Christos Smailis (University of Houston),

The supervisors from the collaborating universities were: **Prof. Fillia Makedon** (UT Arlington), **Prof. Ioannis Kakadiaris** (University of Houston), and **Prof. Lydia Kavraki** (Rice University).

The students were able to conduct research at leading universities in the USA, in combined with research at NCSRD, and through this programme there was a direct connection to the job market through their participation in internship programmes. In addition to the host institutions, students and graduates of the programme have had the opportunity to collaborate with some other high-ranking universities in the USA, such as the University of Southern California, Carnegie Mellon University, Yale University, but also to work in technology giants, such as Toshiba, Uber and Amazon.



Dr Fillia Makedon is the Jenkins-Garrett Professor at the University of Texas at Arlington (UTA). She received her PhD in Computer Science from Northwestern University in 1982. Between 1991-2006, she was Professor of Computer Science at Dartmouth College where she founded and directed the Dartmouth Experimental Visualisation Laboratory (DEVLAB). Between 2006 and 2014 she served as the department chair of the Computer Science and Engineering (CSE) Department at UTA.

UTA
THE UNIVERSITY OF TEXAS AT ARLINGTON

Dr Fillia Makedon, the initiator of the joint PhD programmeme, shares her thoughts on this 17-year-old joint endeavour.

How has this collaboration positively impacted your University/Institute?

The UTA-NCSR Demokritos collaboration started in 2007. It was the first such joint PhD programme between NCSRD and a US-based university. The programme has had a significant impact on UTA's research output and visibility. This is due to three factors: (a) The NCSRD students came with a strong technical background. They excelled in their research and elevated the status of the CSE department at UTA. (b) The student participants of this programme collaborated with highly skilled NCSRD researchers who provided valuable guidance to their research. (c) The programme was designed to ensure timely degree completion and a balanced time-sharing between the two institutions.

In what ways has this joint venture supported students' development and their overall experience studying in the USA?

The students had the ability to receive input to their development from two distinct scientific sources: an advanced USA educational programme at UTA and an advanced research environment at NCSRD that offered them unique experiences in European research problems. In particular, the students benefited greatly from one-on-one interactions with the NCSRD Greek researchers who helped them formulate and solve exciting research problems.

As a key contributor to this 17-year initiative, do you feel your initial expectations were met now that the programme has concluded?

I am pleased and feel very fortunate that I was able to help start and be part of this initiative because it not only helped the development and enhancement of UTA, but also contributed to the excellence of my lab, the Human Centered Computing Lab (Heracleia). Personally, it offered me opportunities to experience first-hand European research projects and helped me inspire all the other students in my lab with new research insights. I now wish that these NCSRD fellows will be able to find opportunities where they can offer back to Greece the know-how that they received while attending this excellent programme.



Institute Divisions

Telecommunications & Networks Division (TN)



Dr Fotis Lazarakis, Head of the Board, Division of Telecommunications and Networks

The Division of Telecommunications & Networks (TN) consists of five Research Teams namely, WiCom (Wireless Communications), NeL (Telecommunications Networks Laboratory), CORE (Connectivity and Cloud, Orchestration, Resource Optimisation and Experimentation), FRONT (FutuRe cOmmunication NeTworks) and NML (NET MEDIA LAB & MIND-BRAIN R&D).

At the TN Division we aim at conducting research on state-of-the-art and future technologies for telecommunication networks and systems contributing to digital transition, environmental, social, and economical sustainability as well as trustworthiness and privacy. Our activities cover a range of topics, i.e., wireless technologies for below 6 GHz frequencies as well as millimeter waves and subTHz frequencies, including advanced transmit/receive techniques and MIMO systems; antenna design, implementation and characterisation including wearable antennas and incorporation of metamaterials; 5G/6G cloud and edge-cloud architectures inserting intelligence through programmability and AI techniques; connecting IoT, edge, and cloud technologies; formulation of models for performance evaluation and design of improved protocols, mechanisms, processes; deployment of experimental infrastructures; cybersecurity certification and post quantum cryptography applications; end-to-end user services and vertical applications.

In 2024, the personnel of TN Division consisted of eight permanent researchers, 71 research associates and eight colleagues for administrative, scientific and technical support of the research activities. In total, 28 Research & Development (R&D) projects were being implemented, 28 scientific contributions were published, one patent was submitted while members of the research groups were active in EU standardisation bodies, agencies and fora e.g., ETSI OpenCAPIF, ETSI MEC, ENISA.

Research Highlights

In 2024, four new SNS 6G projects were funded, one (1) Horizon Civil Security for Society, one Horizon Food, Bioeconomy, Natural Resources Agriculture and Environment, three Erasmus+ and one funded by the European Space Agency. Moreover, the researchers of TN Division continued to publish their work in scientific journals, participate at conferences and workshops, monitor and contribute to international fora and standardisation groups.

Selected research highlights are listed below.

- Prototypes of reconfigurable wearable textile antennas (RWTA) were fabricated and characterised in the Institute's anechoic chamber; a RWTA demonstration setup has been developed.

- Channel modeling of user-to-LEO (Low-Earth Orbit) satellite direct access at 28 GHz through ray-tracing simulations; specifically, the work focused on the investigation of multi-path fading characteristics where very few works have been published on the topic.

- Calculation of Transparent Conductive Films (TCF) complex impedance through waveguide measurements; TCFs have great potential for various 5G/6G applications while as a case study, a transparent antenna was characterised in IIT's anechoic chamber.

- Upgrade of a fully instrumented and automated 5G testbed, capable of monitoring all aspects of a 5G network and generating high-quality datasets. The 5G DDoS (Distributed Denial of Service) dataset is freely available and offers new possibilities in our research on AI-driven threat detection.

- Work on Compliance-as-Code frameworks has led to an automated system for security compliance, translating system assets into Bills of Materials (BoM) and implementing proactive mitigation strategies.

- Implementation of a Distributed Autonomous Organisation (DAO) framework, based on Edge and Distributed Intelligence paradigm, supporting Smart Contracts and Self-Sovereign Identities (SSIs). The framework enhances decentralised trust, enabling secure, transparent, and self-governing digital transactions within edge computing environments.

- Development of B5G/6G L-GRECO platform which is co-located at the campuses of NCSR Demokritos and OTE Academy, interconnected with a dedicated 10Gb dark fiber. L-Greco is a state-of-the-art large-scale testbed supporting 5G Stand-Alone and B5G networks, cloud and edge infrastructures, Internet of Things (IoT) systems and AI applications.

- Co-founding of ETSI Software Development Group OpenCAPIF which is developing an open-source Common API Framework, as defined by 3GPP, allowing to expose and consume APIs in a secure and consistent way. OpenCAPIF allows for rapid prototyping and experimentation in research and standardisation activities and forms an open community.

- Design of Network Digital Twins as integral part of AI/ML Frameworks in 6G Architectures

- Modeling and Performance Assessment of IoT networks deployed as Multi-Hop LoRaWAN Linear Sensor Networks; the use cases under study are related to Energy-Efficient Pipeline Monitoring and Smart Railway Transportation Systems.

Moreover, it is worth emphasising our participation in the flagship EU project 6G-SUNRISE (SUstainable federatioN of Research Infrastructures for Scaling-up Experimentation in 6G) which involves 28 partners and 14 6G Testbeds. Additionally, four PhD theses were completed, one patent has been applied to OBI on a Mechanically Reconfigurable Textile Antenna, and a workshop on wearable antennas was organised, entitled "Body-Centric Communications: Textile Antennas, Smart Clothes, Human Body Interactions and Measurement Techniques".

Plans for 2025

Our scope is to continue playing a major role in the European landscape through participation in R&D projects, dissemination of research achievements to visible journals and conferences, and revealing IIT as a reference center for 6G technologies. Thus, we aim at exploiting already gained know-how and extend our research to activities such as wearable antennas and metamaterials for biomedical applications, implementation of B5G network for the integration of Terrestrial and non-Terrestrial Networks, focusing on 6G Network Digital Twin Frameworks for enhancing native AI/ML network management functions, strengthening post-quantum encryption (PQE) effort, expanding Cyber-Defense & Dual-Use Technologies within European Defense Fund (EDF) framework.

Intelligent Information Systems Division (IIS)



Dr George Paliouras, Head of the Board, Division of Intelligent Information Systems

The Intelligent Information Systems Division (IIS) of the Institute of Informatics & Telecommunications (IIT) stands as one of Greece's largest AI-focused research ecosystems, continuing the longstanding tradition of NCSR Demokritos (NCSRD) in Artificial Intelligence. The division is composed of a dynamic and diverse team, united by a common purpose: to advance AI through cutting-edge methods and technologies. IIS includes seasoned researchers with expertise across a broad range of AI domains, as well as talented young scientists bringing new perspectives and ideas. In recent years, the scientific background of the Division's personnel has been diversified, leading to a multi-disciplinary population that has expanded the possibilities for innovation. As AI becomes embedded in daily life, our research scope has broadened to address its societal and political dimensions, along with exploring advances in fields such as life sciences, natural sciences, and culture. The interdisciplinary environment at NCSRD plays a key role in fostering this development.

IIS is dedicated to developing Trustworthy AI methods and tools that generate tangible societal impact. Our work spans from foundational research to applications geared towards innovation and the marketplace. We actively participate in international collaborations and aim to contribute to national economic growth. A core aspect of our mission is the democratisation of AI through comprehensive education initiatives, targeting audiences from school students to young professionals and researchers.

2024 Highlights

In 2024, IIS researchers achieved notable scientific and technological advancements:

Novel Fundamental AI Methods

- New approaches to make Graph Neural Networks resistant to oversmoothing
- A novel representation for multi-relational graphs, facilitating fast graph analytics
- A tensor-based implementation of a formal technique for complex event recognition
- Expressive automata-based techniques for complex event recognition and forecasting
- Neuro-symbolic approaches for complex event recognition
- A zero-shot retrieval technique, combining Large Language Models (LLMs) with rank aggregation
- A zero-shot method for fine-grained semantic indexing
- A new method for the detection of human values in text (first place in the Human Value Detection competition)

Innovative AI-based Solutions

- AI models for survival analysis in disease progression prediction
- Graph-based methods for predicting drug-drug and drug-target interactions
- Improved techniques for detecting disinformation
- A new LLM-based method to predict bankruptcy, based on financial reports
- A community-driven framework for data-intensive Earth Observation innovation
- A method for optimising the structure of bio-inspired composite materials
- An inverse design approach for metal-organic frameworks (ZIFs)
- An Autonomous Surface Vehicle (ASV) for marine surface cleaning (awarded twice for innovation)
- Techniques for geospatial forecasting and anomaly detection

Infrastructure and Tools

- Development of the Kallamaki LLM for the Greek language
- Participation in the AI-on-Demand Platform architecture and development of a seamless workflow execution and data provenance visualisation solution
- Launch of an online self-assessment tool for personal values and AI literacy
- Release of a digital platform for republishing historic Greek literary works
- Large-scale pilot deployment of a wildfire crisis management system in Samaria Gorge
- Pilot implementation of quantum encryption for secure cloud-based healthcare data at Alexandra Hospital (Athens)
- Release of a large-scale multimodal financial dataset

These accomplishments were achieved through various research initiatives funded by the European Commission, private sector partnerships, and national programs. Major projects launched in 2024 include:

- DeployAI - Development and deployment of the European AI-on-Demand Platform
- MANOLO - Trustworthy efficient AI for cloud-edge computing
- NOUS - A catalyst for European cloud services in the era of data spaces, high-performance and edge computing
- Thymele - An Open-access Dynamic Multimedia Dictionary of the Performing Arts
- INSTAR - International cooperation for digital standardisation
- PREVENT - Pollution reduction and early-warning for vulnerable ecosystems in Adriatic-Ionian territories
- ALIGN - Technical protocols and standards for ethical and legal compliance of AI systems
- YouthGovAI - Youth participation in AI governance
- CHANGER - Challenges and innovative changes in research ethics reviews

In addition to research, IIS made significant societal and scientific contributions through various initiatives:

- Collaboration with the EU AI office
- Collaboration with the Council of Europe Expert Group on AI and Education Assessment
- Contribution to the Blueprint for Greece' s AI Transformation
- Participation in the Greek National Bioethics, TechnoEthics Committee
- Operation of the AiTHERION exhibition space, which welcomed more than 4,000 students and 1,600 additional visitors in its inaugural year
- AI knowledge and technology transfer to Greek Small and Medium-sized Enterprises Small and Medium-sized Enterprises (SMEs) public bodies and healthcare organisations
- Hosting of the 18th International Conference on Document Analysis and Recognition (ICDAR)

Plans for 2025

Looking forward to 2025, IIS seeks to further elevate its global presence and impact. We will continue to produce top-tier research in our core AI domains and contribute actively to global AI infrastructure and ethical dialogues.

Our focus remains on developing AI techniques that are computationally efficient, effective, and trustworthy. A central goal is the integration of general-purpose, data-driven AI with domain-specific human knowledge and supervision, thereby improving robustness, safety, and interpretability. Moreover, we also develop tools that empower and support citizens in the age of AI.

Our developments will align with the standards and principles of the AI-on-Demand Platform, where IIS holds a central role. The inauguration of the Pharos: The Greek AI Factory will signify a new chapter, opening doors to extend our innovations across national and international arenas. Our dedication to applying AI in areas like health, culture, security, and science, combined with the interdisciplinary strengths of our research centre, will continue to drive future accomplishments.

Organisational Chart



INSTITUTE DIRECTOR
V. KARKALETSIS



DEPUTY DIRECTOR
F. LAZARAKIS



SCIENTIFIC COUNCIL
Chair: **S. PERANTONIS**
F. LAZARAKIS
G. GIANNAKOPOULOS
G. PALIOURAS
T. GIANNAKOPOULOS
E. ALEXOPOULOU

EVALUATION & ADVISORY BOARD
Chair: **M. MATTHAIOU**
D. NIKOLOPOULOS
A. MARKOPOULOU
G. SMARAGDAKIS
D. KOUTRA
P. SOFOTASIOS



DIVISION
OF TELECOMMUNICATIONS
AND NETWORKS
Head of the Board: F. LAZARAKIS

DIVISION
OF INTELLIGENT
INFORMATION SYSTEMS
Head of the Board: G. PALIOURAS



Board members
Head of Research Strategy: **H. KOUMARAS**
Head of Innovation: **P. TERLIXIDIS**
Head of Human Resources & Operations: **A. MOSCHOVI**
Representative of other Divisions: **G. PALIOURAS**

Board members
Head of Research Strategy: **S. PERANTONIS**
Head of Innovation: **D. KANELLOPOULOU**
Head of Human Resources & Operations: **D. OIKONOMIDOU**
Representative of other Divisions: **F. LAZARAKIS**

ahedd. Digital Innovation Hub
Head: G. GIANNAKOPOULOS

NOC
Network Operation Centre
Head: G. XILOURIS

eGOVERNANCE
Office
Head: V. KARKALETSIS

EDUCATION OFFICE
Head: D. KYRIAZANOS
N. DIMITRIOU & G. GIANNAKOPOULOS

COMMUNICATIONS OFFICE
Head: E. GALIFIANAKI

ADMINISTRATION UNIT
SECRETARIAT: D. GIANTSIOU
PROCUREMENT OFFICE: E. ALEXOPOULOU
IT OFFICE: I. DERMOUSIS
LEGAL ADVISOR: C. PALLAS

IIT Support Units | NCSRD Units | Divisions

The Evaluation & Advisory Board of IIT

The Institute's Evaluation & Advisory Board, set up in 2022, is composed of six distinguished researchers in fields relevant to IIT's research areas.

Chair of the Board



Michalis Matthaiou
Queen's University Belfast, UK



Dimitrios Nikolopoulos
Virginia Tech, USA



Athina Markopoulou
University of California Irvine, USA



Georgios Smaragdakis
TU Delft, The Netherlands



Danai Koutra
University of Michigan, USA



Paschalis Sofotasios
Khalifa University, UAE

New Building

The new building for the Institute of Informatics and Telecommunications (IIT) of NCSR Demokritos, which is currently under construction, is planned to be available by October 2025. The building is designed and constructed under the auspices of the most recent sustainability and environmental standards to offer contemporary collaborative spaces, offices and services to the personnel. The building has a nominal office capacity of 150 persons.

The new building will provide a state-of-the-art data centre infrastructure that corresponds to Tier 3 Datacenter standards. The data centre's specifications eliminate a single point of failure in all the supporting utility infrastructure such as Power Supply, fire detection, protection and suppression as well as air conditioning. The data centre with a capacity of 25 42U racks will also host all the critical IT infrastructures of NCSRD along with infrastructure used for Research & Development (R&D) projects. The new building has been designed with various security and safety provisions as foreseen by the regulations for public buildings. The building is supervised by a Closed-Circuit Television (CCTV) system and automatic access control will be required besides at the entrances also for entering any room / office space. Smart monitoring systems will be monitoring the building environment for Volatile Organic Compounds (VOCs) besides the usual environmental metrics (i.e. temperature, humidity). Any emergencies will be announced to all public spaces of the building.

The vision for the building is to form a smart living lab where various data from smart systems and sensors will be collected and will be available to the researchers for further study and development of innovative solutions.

As a complex project that demands close supervision, the IIT collaborates with the responsible department (Directorate of Technological Applications) of the NCSRD to assemble a team of experts. Their primary objective is to thoroughly review and ensure the accurate implementation of the requirements outlined during the building's design phase. The team of experts is responsible for overseeing various aspects, including Access Control, Building Automation, CCTV, Fire protection infrastructure, Network and IT infrastructure, Conference and Congress centre rooms, and more.





Institute's Progress 2019-2024

Total Funding

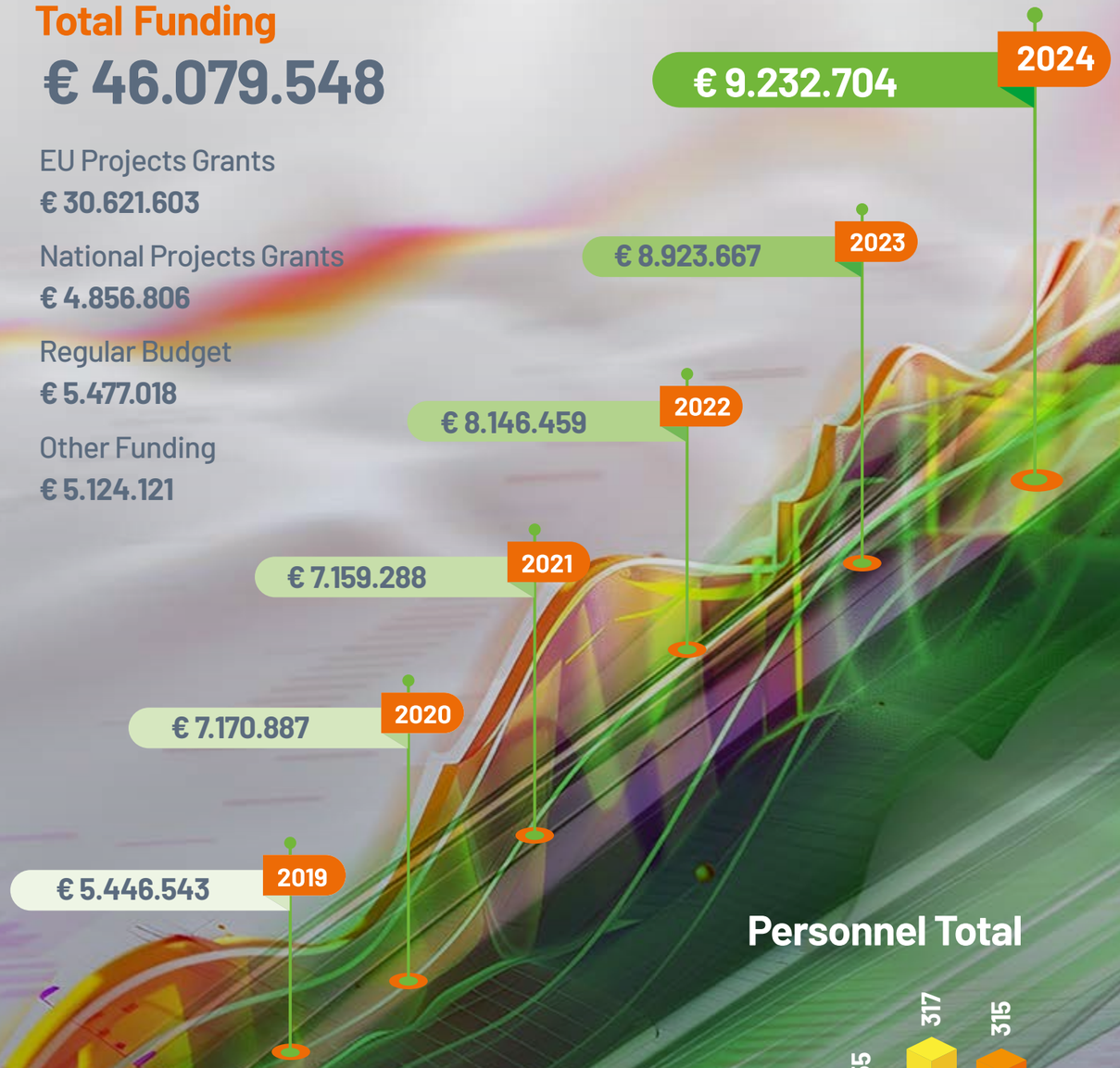
€ 46.079.548

EU Projects Grants
€ 30.621.603

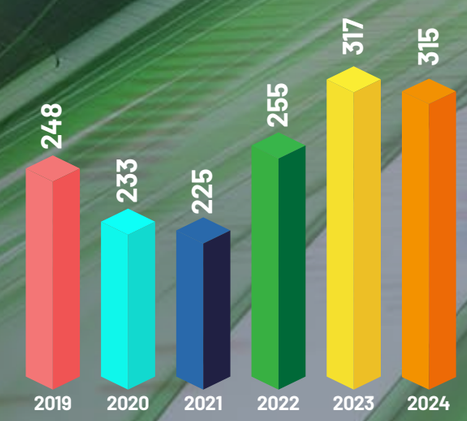
National Projects Grants
€ 4.856.806

Regular Budget
€ 5.477.018

Other Funding
€ 5.124.121



Personnel Total



DEMOKRITOS

INSTITUTE OF INFORMATICS
& TELECOMMUNICATIONS
NCSR DEMOKRITOS

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