Annual Review

2025

MISSION

To advance science-based innovations and contribute to technological progress that benefit industry, society and national interests

VISION

To shape the future of science and technology through challenge-based research

STRATEGIC PRINCIPLE

Challenge-based research and innovation

About us

The Center for Physical Sciences and Technology (FTMC) is the largest and one of the most advanced research centers in the Baltic States, carrying out world class applied and fundamental research, as well as technology transfer in physics, chemistry, and engineering. FTMC serves as a core hub of deep tech competencies, developing solutions with significant scientific, technological, and economic impact.

FTMC's mission is to create science-based technologies that strengthen national competitiveness, contribute to national security, and generate long term value for society and business. Through active collaboration with industry and public sector partners, the FTMC develops solutions focused on defense and security technologies, health, sustainability, advanced mobility, space research, and the digital society.

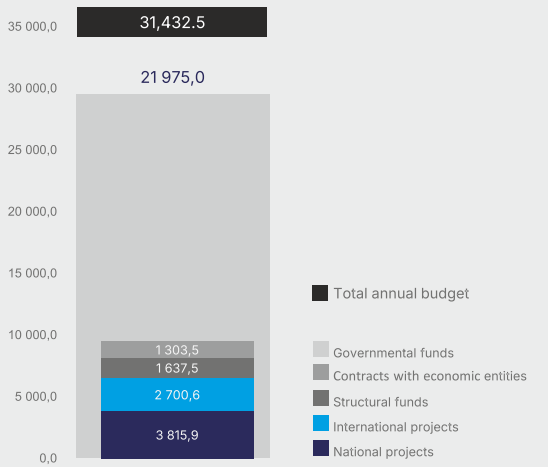
FTMC provides the conditions for transforming scientific ideas into advanced products, services, defense and dual use solutions, integrating scientific research, experimental and business development.

FTMC fosters a top-level research community, encouraging scientific creativity, interdisciplinarity, and international collaboration. FTMC operates advanced research infrastructure, offers clear career pathways, runs doctoral studies, postdoctoral fellowships, and student internships, and educates a new generation of inventive, internationally competitive professionals.

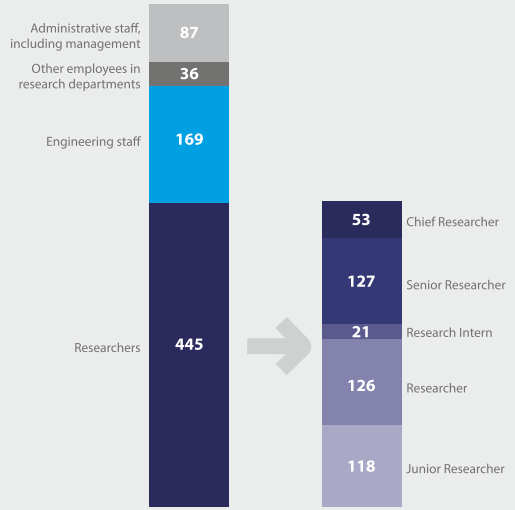
FTMC

2025 NUMBERS

FTMC Budget, kEur

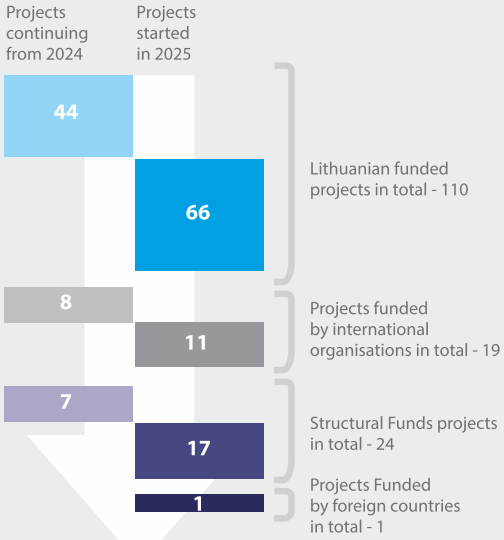


FTMC employees



FTMC projects

In 2025 FTMC was engaged in 154 different projects



PARTNERSHIPS AND BUSINESS COOPERATIONS

New partnerships

Academy of Innovative Semiconductor and Sustainable Manufacturing of National Cheng Kung University (NCKU AISSM)

LIKAT Leibniz-Institut fur Katalys

Korea Photonics Technology Institute

Finnish state research centre VTT

Contracts with businesses

	Total
Value of contracts with businesses	1,126,084.99 €
Average contract value with businesses	1,542.58 €
R&D contract value with businesses	300,100.86 €

Largest business contractors

PROJECTS

ChipsC² LT

Digital Europe Programme (DIGITAL-Chips-2024-SG-CCC-1) Project Lithuanian Chips Competence Centre, ChipsC2-LT. 2025-2029

Gediminas Račiukaitis,
Saulius Tumėnas

The project aims to establish and operate a Chips Competence Centre on advanced semiconductor technologies in Lithuania, providing a one-stop shop to support innovation and growth in the national semiconductor industry.

ChipsC²-LT consolidates expertise from key research and higher education institutions in the country and specialises in chip design, heterogeneous integration, power electronics, and photonic integrated circuits to address the needs of local industry involved in e-mobility, security and communication sectors.

The ChipsC²-LT Centre aims to strengthen the capabilities and skill base of the Lithuanian semiconductorand electronics industry and contribute to Europe's strategic autonomy in this critical industry.

www.chipsc2.lt

laser pro Excellence Hub

Excellent Laser Technologies for the Sustainable Prosperity of Europe, LASER-PRO. 2025-2028

Gediminas Račiukaitis

The Central Bohemian Region (Czech Republic) and Lithuania represent European regions where researchers in photonics and laser technologies are internationally recognised, and where business has a high added value. Intense interaction between science and business promotes development, creating significant potential for new company formation and the emergence of a new generation of industry based on laser technologies with more integrated solutions.

As a key challenge in this area remains the creation of the photonics and laser technology sector, where operating companies produce products with higher added value and exceptional functionality. The Excellence Hubs initiative addresses this challenge by connecting two laser-based innovation ecosystems, fostering a real-place-based innovation culture in the Czech Republic and Lithuania.

www.laserpro-eh.eu/

EUROPEAN RESEARCH EXECUTVE AGENCY (REA) PROJECTS

European Compact Accelerators, Their Applications, and Entrepreneurship, EPACE. 2025-2028

Gediminas Račiukaitis

New technologies of compact accelerators, in particular plasma accelerators, and laser-based x-ray sources are on the verge of reaching maturity in this decade, making it today a perfect time to steer them towards a broader scope of applications in academia, medicine, and the industry.

European Compact Accelerators, Their Applications, and Entrepreneurship, EPACE. 2025-2028

Irmantas Kašalynas

The HERMES project has the ambitious goal of providing breakthrough technological solutions towards the implementation of ultra-fast (100 Gbit/s) short-range wireless communication systems at room temperature, significantly surpassing existing technologies such as Wi-Fi 7 and 5G.

Terahertz Sensors Dedicated to Quantum Cascade Laser Sensing, AtSpecTS. 2025-2027

Dovilė Čibiraitė-Lukenskienė

The project AtSpecTS aims to develop a compact and disruptive spectroscopic gas sensor technology for the 2–5 THz range, utilising advanced field-effect transistor (FET) technology and offer QCL users a new compact and cost-effective solution for atmosphere research.

Next Generation AI Researchers for Air Quality Excellence, NextAIRE. 2025-2028

Steigvilė Byčenkienė

NextAIRE is focused on boosting the interoperability, expanding expertise and providing a more balanced geographical and cross-sectoral circulation of European R&I talents in the field of air quality monitoring. The project actively involves environmental scientists, experts in hardware and Internet of Things (IoT) and machine learning engineers.

EURAMET PROJECTS

Establishing Traceability Routes in Nuclear Medicine, ETRAIN. 2025-2028'

Arūnas Gudelis

Project aims to establish traceability routes for nuclear medicine services and provide guidance and tools to enable its widespread adoption beyond the EU.

Metrology to Support Ammonia Use in Emerging Applications, MetNH3Energy. 2025-2028

Darius Valiulis

Project aims to ensure that the necessary metrology infrastructure and relevant services are established to facilitate the use of ammonia in these emerging applications.

Hybrid Metrology for Sustainable and Low-Carbon Footprint Battery Materials, HyMetBat. 2025-2028

Evaldas Naujalis

Project aims to develop a new hybrid metrology platform that integrates a combination of traceable analytical techniques to enable innovation in next-generation energy storage technologies.

EISMEA PROJECT (European Innovation Council and SMEs Executive Agency)

Multi-Material Additive Manufacturing with Electrostatic Cold Spray, MADECOLD. 2025-2028

Paulius Gečys

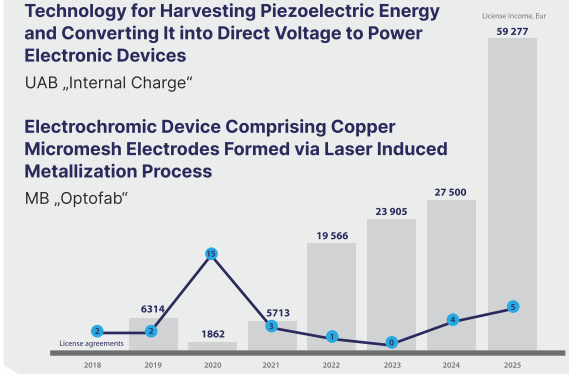
While additive manufacturing (AM) offers exceptional design flexibility, its full potential is limited by technical constraints and high energy consumption compared to conventional methods. Current AM techniques also face challenges in build rate, size, material selection, and surface quality. MadeCold aims to overcome these limitations by integrating solid-state and electrostatic physics with advanced control, design, and materials science to develop an innovative solid-state deposition process.

LICENSE AGREEMENTS AND PATENTS

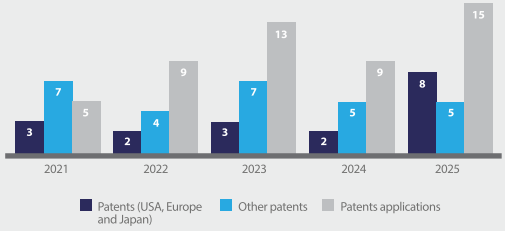
In 2025, FTMC continued its targeted efforts to enhance the practical application of scientific research results and expand collaboration with business partners. It actively pursued new opportunities for technology commercialisation by strengthening its ties with the private sector and further optimising internal processes for intellectual property management.

These initiatives not only maintained but exceeded the results achieved in 2024. In 2025, more licensing agreements were concluded, accompanied by increased revenue, reflecting the growing competitiveness, maturity, and market appeal of technologies developed at FTMC.

FTMC license agreement results (2018-2025)



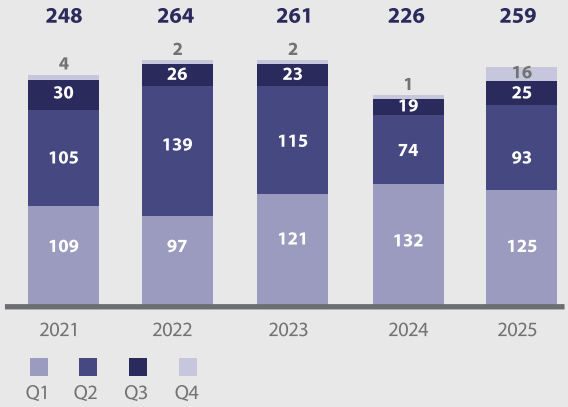
FTMC patenting results (2021-2025)



RESEARCH

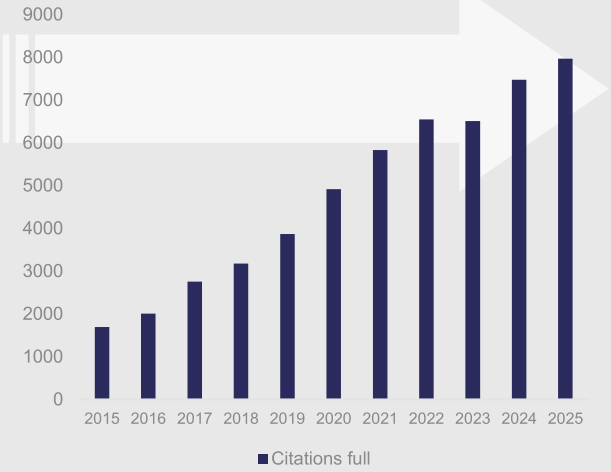
FTMC Q1-Q4 publications (2021-2025)

In 2025, a total of 243 scientific publications were released, the majority of which were classified as Q1–Q2 publications.



Citations of FTMC affiliated publications (2015-2025)

During the past 5 years, FTMC publications particularly contributed towards biosensor research, as well as energy, laser sciences, nano technology and semiconductor development.



Covers of scientific journals and books

- "High-Quality Plasmonic Ag-Au Bilayer Nano-bump Grating Sensor"
- "Copper-Based Multiwavelength UV Surface-Enhanced Raman Spectroscopy"
- "Terahertz Spectroscopy and Its Appli-cations"
- "Carbon-Coated Moth-Eye Structure:
- An Ultrabroadband THz-DUV Near-Perfect Absorber"
- "Synthesis of High-Performance Multifunc-tional Electrode Material using Sweetwood Lignin as a Precursor"

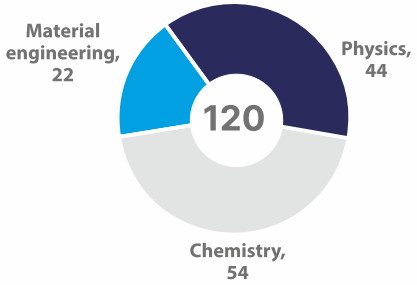
PHD STUDIES

In 2025, FTMC established the **Doctoral School** with the aim of fosteringa strong and cohesive doctoral community grounded in the principlesof academic ethics, openness, and collaboration. As doctoral studentsare an integral part of the FTMC community, particular attention is givento their integration through the development of a mentorship system,the encouragement of experience sharing, and informal community-building activities.

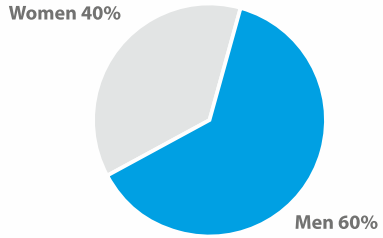
In autumn 2025, five senior doctoral students became mentors forfirst-year PhD candidates, guiding their introduction to FTMC and supporting their integration into the doctoral study process. In addition, team-building and networking events were organised to strengthen the doctoral community, promote peer-to-peer interaction, and foster interdisciplinary connections.

The establishment of the Doctoral School is expected to significantly strengthen FTMC's doctoral education ecosystem and contribute to the training of high-level researchers prepared for both academic careersand professional pathways beyond academia.

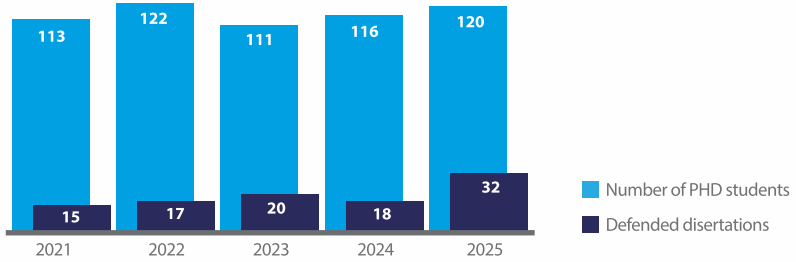
PhD students by field of study



PhD students by gender



PhD students



PhD students by nationality in 2025

MAIN EVENTS

Conferences

The international scientific conference **ECOBALT 2025** was held in Vilnius, organised by FTMC together with the Vilnius University Life Sciences Center and the Vilnius University Faculty of Chemistry and Geosciences.

For the first time in Lithuania, the International Science Week (RE) SEARCH 2025 brought together leaders from science, business, government, and international organisations. As part of the programme the international practical conference **TECH TRANSFER UNLOCKED: BRIDGING IDEAS ACROSS THE REGION AND UK**.

For the first time in Lithuania, a high-level international symposium **OPTICAL COATINGS FOR LASER APPLICATIONS (OCLA)**, dedicated to optical coatings for laser systems, was held.

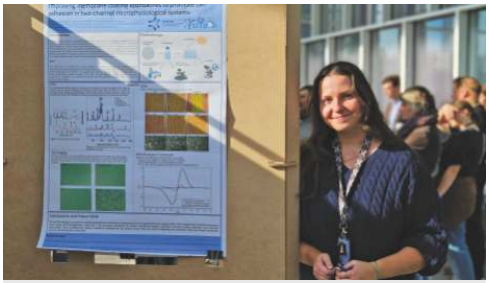
FTMC hosted a **MEETING OF THE EUROPEAN PARTNERSHIP ON METROLOGY (EPM) COMMITTEE** – the first ever held in Lithuania and the ninth overall. The field is coordinated by EURAMET, the association uniting Europe's national metrology institutes.

From Pupil to PhD

Engineering competition **VĖJUOTOS MINTYS: VĖJO JĖGAINIŲ IŠŠŪKIS** ("Windy Ideas: The Wind Turbine Challenge") welcomed students from grades 9-12, who were challenged to build a working wind turbine model in real time using the materials provided – and one of their own. A total of 51 students from 17 teams participated.

During the "Open Readings" conference in Vilnius, the finale of the first national school students' crystal growing competition **"AUKį"** took place. Event attracted great interest, with dozens of crystal samples submitted by students from schools across Lithuania.

For the 22nd time, Lithuania hosted its largest science communication festival, **ERDVĖLAIVIS ŽEMĖ ("SPACESHIP EARTH")**, held nationwide. FTMC participated offering visitors seven engaging events. The largest number of young participants was attracted by the two day FTMC QUANTUM FORUM, where physicists and chemists from FTMC presented their research in quantum tech-nologies.



The annual FTMC conference for doctoral students and young scientists, **FIZTECH 2025**, attracted around 100 participants representing FTMC and other institutions. This event provided a great opportunity for young talents to present their work, discuss, and network.

AWARDS AND RECOGNITIONS

Dr. Gediminas Račiukaitis, Head of the FTMC Department of Laser Technologies and President of the Lithuanian Laser Association, was awarded the Officer's Cross of the Order of the Grand Duke of Lithuania. Other multiple recognitions: laureate of journal "Photonics100" list for 2026; winner of Baltic Awards as representative of Science in the Baltics; honored by St. Christopher Award in the category "For Merits in Science".

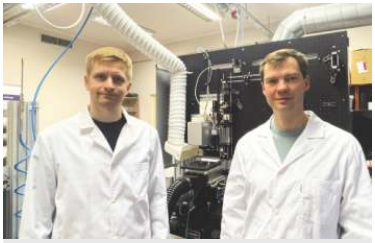
State Award The Orders of the Grand Duke of Lithuania Gediminas were presented to:

- **Professor Habil. Dr. Arūnas Ramanavičius**, Head of the FTMC Department of Nanotechnology;
- **Professor Habil. Dr. Vidmantas Remeikis**, former FTMC Director;
- **Professor Habil. Dr. Gediminas Niaura**, researcher at the FTMC Department of Organic Chemistry (Knight's Cross).

Professor Dr. Ieva Plikusienė was appointed to the prestigious Scientific Advisory Board of UNESCO's International Basic Sciences Programme (IBSP), becoming the first Lithuanian scientist to hold this distinguished position.

Dr. Simonas Ramanavičius, researcher at the FTMC Department of Electrochemical Material Science, was awarded the Young Scientist Scholarship competition, also **Dr. Ramūnas Levinas**, chemist at the FTMC Department of Catalysis, received the scholarship from the Research Council of Lithuania.

Dr. Vladislovas Čižas, physicist from the FTMC Department of Optoelectronics, was recognised for the Best Doctoral Dissertation of 2024 (Academic Supervisor Prof. Habil. Dr. Gintaras Valušis).



Dr. Juozas Dudutis and **Dr. Paulius Gečys** from the FTMC Laser Microfabrication Laboratory won the Gentec-EOLaser Lab Awards. As part of the award, the laboratory received aUP19K-15S-H5-BLU-D0 laser power detector.

BEYOND SCIENCE

FTMC SCIENCE AMBASSADORS

Dr. Mažena Mackoit-Sinkevičienė, Dr. Vytautas Jakštas, Dr. Raimonda Bogužaitė, Dr. Vladislovas Čižas, and Dr. Vincentas Mindaugas Mačiulis – visit schools across Lithuania, engaging pupils with the fascination of the natural sciences. Ambasadors have developed their own learning kits, which pupils can explore directly in the classroom. Through this initiative, FTMC contributes to the advancement of STEAM initiatives, helps strengthen pupils' competencies in the natural sciences, and introduces them to the everyday work of scientists.

FTMC INFLUENCERS

FTMC researchers share their discoveries and insights with the wider public. DR. MAŽENA MACKOIT-SINKEVIČIENĖ runs her own YouTube channel where she makes fascinating physics topics accessible and engaging. DR. KASTYTIS ZUBOVAS shares his insights weekly on "Mokslo sriuba" ("Science Soup"), Lithuania's most popular science podcast, discussing the latest developments in astrophysics. He also maintains his own blog, "Konstanta-42", and publishes science articles online.

The FTMC Running Club, made up of FTMC scientists and administrative staff, not only participates in sporting events like the Vilnius Marathon, but also organises them. Every autumn, winter and spring, the FTMC CROSS takes place in Vilnius, bringing together employees from research institutions across Lithuania.

The increasingly popular **FTMC CHESS TOURNAMENT** was held for the 6th time this year. It brought together FTMC scientists, representatives from other organisations and communities, and students. The tournament was initiated and founded by Linas Galkauskas, Dr. Žilvinas Ežerinskis, and Dr. Milda Tamošiūnaitė-Survilienė.

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