



**Frontiers Foundation**  
From Spark to Discovery

# **FRONTIERS FOUNDATION**

## **Frontier Top Research and Talent Development Programs**

### **Members of the Nobel and Abel Prize-winning Board of Trustees:**

Ferenc Krausz (Budapest, Munich, Hong Kong) – Chairman,  
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## EXECUTIVE SUMMARY

Hungary's greatest asset is the knowledge derived from its talented and diligent people. However, many leading Hungarian researchers work abroad, where they find better opportunities for advanced research and innovation.

The FRONTIERS Program aims to build an internationally competitive scientific ecosystem in Hungary that can:

- retain and attract top researchers,
- identify and mentor exceptional talent early,
- and transform scientific achievements into globally competitive innovations.

**The FRONTIERS Program is built on three interconnected pillars:**

### **Frontier Research**

The program will offer 25 Frontiers Fellows and 50 Frontiers Investigators a stable, long-term, and internationally competitive research environment in collaboration with Hungarian universities and research institutes.

### **Talent Development**

The program will establish a nationwide network to identify, mentor, and support scientific talent from secondary school through international research and innovation careers.

### **Technology Transfer**

The program will support the economic application of research through spin-off company creation, intellectual property protection, and deeptech development.

The program aims to strengthen the Hungarian research ecosystem by promoting international integration, excellence, and performance-based operations, rather than creating a separate institution.

### **Core Principles of FRONTIERS**

- long-term, stable funding,
- international standards of excellence,
- measurable performance,
- institutional cooperation,
- and a central role for teachers and mentors.

The FRONTIERS Program aims to position Hungary as a long-term leader in world-class research, talent development, deeptech enterprise creation, and internationally significant scientific breakthroughs.

**HERE, IN HUNGARY.**

## THE FRONTIERS MODEL

Albert Szent-Györgyi remains the only Nobel laureate for research conducted in Hungary. Nearly a century after the discovery of vitamin C, Hungary is poised to foster new Nobel Prize-worthy scientific breakthroughs.

Many of Hungary's most promising researchers currently work abroad, contributing to countries that offer world-class, stable research environments. For example, the Max Planck Society in Germany has produced six Nobel laureates in the past six years.

The FRONTIERS Foundation seeks to offer research conditions as competitive as the Max Planck Society for 25 world-renowned researchers and 50 promising young scientists in the life and physical sciences, using only 5% of the MPS budget. The Foundation uniquely integrates frontier research with innovative talent development to ensure a strong next generation for emerging centers of excellence and sustained global leadership.

The Foundation's primary goal is to empower exceptional Hungarian talent to achieve their potential in Hungary, advancing both global progress and the nation's knowledge-based economy.

## A TALENT- AND KNOWLEDGE-BASED SOCIETY – THE ROLE OF FRONTIERS

Hungary excels at nurturing young talent, ranking 5th in international mathematics olympiads and 9th in physics olympiads. However, it ranks only 49th in GDP per capita. This contrast shows that Hungary is not fully leveraging its most valuable asset: the knowledge and abilities of its exceptional talents. Many of Hungary's brightest individuals leave for countries that offer better opportunities to achieve their ambitions. Since Albert Szent-Györgyi, Hungarian Nobel laureates have received recognition for work conducted abroad.

Brain drain has further consequences: disruptive innovations that shape the future are developed in the countries where Hungary's top talents relocate. This issue is worsened by declining interest in the sciences among young people. Warning signs are evident: over the past decade, Hungary's Olympic results have not consistently placed the country among the world's top ten, resulting in a gradual decline in overall rankings.

The FRONTIERS Program addresses these complex challenges through the following initiatives:

1. A focused, nationwide talent development system that identifies students interested in or open to careers in research, engineering, and innovation from the end of primary school onward. The program covers all natural sciences and provides consistent mentoring and targeted support throughout participants' careers. Its goal is to train more professionals who are competitive in deeptech fields and to identify exceptional talents who may become Hungary's future leading scientists, innovators, and technology entrepreneurs.
2. A network of knowledge centers led by world-renowned scientists, providing internationally competitive conditions for outstanding Hungarian minds at home and attracting exceptional international experts to Hungary.

The program is based on the insight that, in science, innovation, and technology entrepreneurship, world-leading scientists and innovators are the strongest draw for talented and ambitious young people.

This is the core concept of FRONTIERS: attracting internationally outstanding researchers to Hungary through long-term support to establish world-class research centers, build schools of scientific excellence, and foster deeptech spin-off companies. These efforts will strengthen Hungary's innovation ecosystem and knowledge-based economy.

Each of the 25 world-renowned researchers (Frontiers Fellows) would establish a Frontiers Center affiliated with a Hungarian university or a Hungarian Academy of Sciences/HUN-REN research institute, integrating these new knowledge centers into the existing research and development ecosystem.

By maintaining their foreign affiliations, the Frontiers Fellows would embed Hungary's research system within the world's leading research institutions. This international integration would

strengthen the existing ecosystem and create unique opportunities for top students selected through the secondary-school talent development program.

Mentoring within the FRONTIERS network would significantly increase the likelihood that, after studying abroad, these individuals would return to Hungary to apply their knowledge. As a result, more outstanding talents could contribute to advancing Hungary's scientific standing. Additionally, 50 Frontiers Investigators, eligible with a European Research Council (ERC) grant or an equivalent non-EU funding award, would further support this goal.

Furthermore, the Frontiers Accelerator grant system would provide rapid, effective support to the most promising young talents, increasing their chances of obtaining ERC funding and eventually applying for a Frontiers Investigator position. The Accelerator–Investigator–Fellow framework covers the entire research career pipeline. It supports young talents at the start of their careers and offers long-term opportunities for researchers pursuing ambitious goals that may lead to the establishment of a Frontiers Center. The selection of top researchers follows the highest international standards, guaranteed by the

## **INTERNATIONAL NOBEL AND ABEL PRIZE-WINNING BOARD OF TRUSTEES:**

### **Ferenc Krausz**

Nobel Prize-winning Chairman of the Board, Director at the Max Planck Institute of Quantum Optics, and Professor at Ludwig Maximilian University of Munich and the University of Hong Kong.

### **Steven Chu**

Nobel Prize-winning member of the Board, Professor in the William R. Kenan Jr. Department of Physics at Stanford University, and former United States Secretary of Energy (2009–2013).

### **László Lovász**

Abel Prize-winning member of the Board, former President of the Hungarian Academy of Sciences, Professor Emeritus at Eötvös Loránd University, and Research Professor at the Alfréd Rényi Institute of Mathematics.

### **Randy Schekman**

Nobel Prize-winning member of the Board, Professor in the Department of Molecular and Cell Biology at the University of California, Berkeley, and Investigator at the Howard Hughes Medical Institute.

### **Donna Strickland**

Nobel Prize-winning member of the Board and Professor in the Department of Physics and Astronomy at the University of Waterloo.

The program's long-term success relies on the consistent and strategic development of Hungary's most valuable resource: knowledge built on talent and diligence.

The FRONTIERS Foundation is launching a new phase in Hungarian science and engineering talent development, guided by these principles:

- Talent development requires and deserves long-term, stable support.
- Support is effective only when outcomes are measurable.
- Measurable effectiveness forms the basis for best practices.
- Resources should be directed to teachers, and their efforts efficiently coordinated.

This approach maximizes professional effectiveness and ensures cost-efficient resource use.

In partnership with organizations that share these principles, FRONTIERS commits to:

- Identifying outstanding talents and motivated students through a nationwide teacher network, and guiding them toward careers where they can best realize their abilities.
- Combining broad development opportunities, such as national extracurricular science networks, with targeted support for top students through Olympiad schools, and providing long-term career tracking with active involvement from the FRONTIERS research network.
- Organizing professional development programs where leading educators train fellow teachers, strengthening national talent development standards.
- Providing educators involved in talent development with the highest possible professional, social, and financial recognition.

The goal is for Hungary's greatest resource, knowledge built on talent and diligence, to reach its full potential and create lasting value for the country.

To maximize the social and economic impact of knowledge capital developed in FRONTIERS knowledge centers, the FRONTIERS Technology Transfer (FTT) working group will be established.

FTT will actively support leading researchers in transforming their results into competitive innovations and market successes by providing comprehensive assistance with:

- registering qualified know-how,
- intellectual property protection and patenting,
- developing and implementing business concepts,
- preparing spin-off projects,
- and accessing funding opportunities.

The FRONTIERS Incubation Program complements these efforts by offering individualized support, tailored development plans, and access to extensive professional networks to help research-based commercialization ideas become internationally competitive startups.



The FRONTIERS campus, currently under development near the Faculty of Science at Eötvös Loránd University and the Faculty of Electrical Engineering and Informatics at Budapest University of Technology and Economics, offers an ideal setting for establishing a dozen Frontiers Centers. Additional knowledge centers will be developed in collaboration with institutions from Hungary's existing research ecosystem. The FRONTIERS Talent Development Center will be established in Zakarpattia, expanding the program's reach throughout Hungarian-

### Unique Features of the FRONTIERS Program

- **Long-term, predictable support:** For the first time, both talent development and frontier research will operate within a stable and predictable funding environment, all within an integrated system under one roof.
- **Freedom of institutional affiliation:** FRONTIERS leading researchers may choose the institution through which they access Foundation support, fostering healthy competition for top talent. Selected institutions benefit from financial support and opportunities to collaborate with international research centers, where most researchers maintain connections.
- **System-wide impact on the research ecosystem:** Competition for FRONTIERS researchers is expected to shift the Hungarian research ecosystem toward a stronger focus on frontier research. As a result, both FRONTIERS resources and funding for universities and the Hungarian Academy of Sciences / HUN-REN network may increasingly support world-class research. This trend could be reinforced by a government evaluation and funding framework for universities and MTA/HUN-REN institutions that considers the number of FRONTIERS knowledge centers and researchers at each institution.
- **Alignment with international standards of excellence:** Integrating FRONTIERS support schemes with European Research Council (ERC) grants ensures high research quality and encourages Hungary's leading researchers to strengthen frontier research by securing significant international funding.
- **Integrated talent development:** By combining the FRONTIERS international research network with a unified secondary-school talent development system within one organizational framework, the program can guide the careers of Hungary's most talented youth. This support spans early identification, university studies in Hungary or abroad, and eventual return to a FRONTIERS Knowledge Center or a deeptech spin-off company.

## THE FUTURE OF HUNGARY

The impact of frontier research within FRONTIERS goes well beyond enhancing national identity or achieving Nobel Prizes in Hungary.

Hungary's long-term competitiveness depends on shifting its economy toward higher value-added activities. Frontier research that drives groundbreaking discoveries and disruptive innovations is essential to this transformation.

This is particularly relevant in Hungary's deeptech sectors, where scientific breakthroughs can directly create globally competitive technologies and industries.

Developing an innovation ecosystem based on frontier research will enable Hungary to grow the number of internationally competitive companies in emerging technology and industry sectors, driving economic growth and prosperity.

This progress requires frontier research to operate within a deliberately designed, well-funded, and internationally competitive system, rather than in isolation.

**FRONTIERS provides these conditions by fostering excellence, linking science with innovation, and establishing talent development pathways for future researchers and innovators. It is not just another program, but a strategic response to Hungary's most pressing challenge:**

**How can Hungary build a knowledge-based, globally competitive economy that creates high added value?**

