Keeping room for discovery: why Luxembourg still needs a bottom-up research channel

Position paper of the Section des sciences naturelles, physiques et mathématiques of the Institut grand-ducal de Luxembourg

We write in support of Luxembourg's research policy, including its commitment "*de financer et de promouvoir le développement d'activités de recherche fondamentale et appliquée dans le secteur public, qui répondent à des critères d'excellence scientifique.*" The Section des sciences naturelles, physiques et mathématiques of the Institut grand-ducal recognises that thematic prioritisation is a legitimate and necessary strategy for a small country, that the four national priority areas are well chosen[1], and that the government's commitment of €362 million to the Luxembourg National Research Fund (FNR) for 2026–2029[2] alongside its research and innovation institutions is a substantial act of confidence in the research base. Our concern is the lack of funding for curiosity-driven research outside of the National Research Priorities. With the discontinuation of the OPEN and NCER programmes and the requirement that all PRIDE, CORE and INTER projects comply with the priorities, Luxembourg has become one of the very few European research systems with no competitive funding channel for excellent investigator-driven research outside designated themes. The same narrowing now extends to the training of the next generation in Luxembourg: the open, candidate-led Aides à la Formation Recherche (AFR) scheme has been discontinued, and the doctoral aid introduced by the new FNR law is reserved for candidates who carry out their doctorate at a foreign public research institution or in a company based in Luxembourg, so that FNR funding is no longer available to those who wish to pursue their PhD in a non-thematic area at the University of Luxembourg or at the public research institutions. We believe that these gaps carry a strategic risk disproportionate to the money involved. Several arguments support maintaining such a funding avenue even in a small country.

Nobody can predict where the next great leap will come from. This is not a rhetorical claim but the central empirical lesson of research policy. The priority areas were designed to reflect what is foreseeable; the returns that transform an economy typically are not. The pace of change has also accelerated sharply recently: in three years, artificial intelligence has redrawn the methods, timescales, and disciplinary boundaries of scientific research, and it is now reshaping how discoveries are made as much as what is discovered. For example, AlphaFold, based on deep learning, has solved the fifty-year-old challenge of predicting protein structure from amino acid sequence, a breakthrough recognised by the 2024 Nobel Prize in Chemistry. Major advances have come from curiosity-driven research, whose applications were not immediately obvious and became clear decades later. We can expect this pattern to continue, with rapidly shortening timescales. A framework revised every four years, or more, cannot keep pace; even an expert steering committee can miss important new developments. The rational response to genuine uncertainty is not better forecasting but a hedged portfolio, a small, deliberate allocation to work that no priority list anticipated. A system that funds only what it can already justify is optimised for a future it has assumed rather than the one that arrives; it lacks adaptability.

The current portfolio is, by design, risk-averse. When every proposal must demonstrate alignment with a stated priority, the selection process rewards the well-framed, incremental project over the genuinely uncertain. Luxembourg thus risks following innovation rather than leading it, arriving competently in fields others have opened. Catching up afterwards is difficult and costly. Once a field is widely considered important, as deep learning and generative AI now are, its leading researchers can choose freely. They are drawn to institutions with recognised expertise in adjacent areas; an institution without that neighbouring strength struggles to reliably identify and attract these

[1] FNR, "National Research Priorities revised", accessed 22 September 2026, https://www.fnr.lu/national-research-priorities-revised/

[2] FNR, "€362 million financial contribution to fund research: the Government and the FNR sign the 2026–29 agreement", accessed 22 September 2026, https://www.fnr.lu/e362-million-in-financial-contribution-to-fund-research-the-state-and-the-fnr-sign-the-2026-29-agreement/

people. High-risk, high-gain research is precisely what a bottom-up channel funds, and it is the part of the portfolio that can produce an advantage no one else has. Supporting outstanding research through high-risk, high-gain funding is the mission of the European Research Council (ERC). Such funding is part of the portfolios of many national research agencies in leading economies. In Luxembourg, this kind of investigator-driven research has allowed several scientific domains to reach a worldwide-recognised level of excellence.

The current situation creates tension with the talent strategy of the country. Luxembourg has invested heavily and successfully in attracting excellent researchers and now hosts a talent pool disproportionate to its size: the country ranks first in the EU for the attractiveness of its research system and second for the share of publications among the world's ten per cent most cited[3]. The clearest hallmark of that quality is the country's record with the ERC. Under Horizon 2020, Luxembourg-based applicants achieved a 19% ERC success rate, the highest of any EU member state[4]. The University of Luxembourg alone has secured twenty of these grants since 2014[5]. The ERC is Europe's most competitive research funder and the benchmark by which research systems are judged. Selection is by scientific excellence alone, with no thematic constraint whatsoever. This approach is vindicated by the fifteen Nobel Prizes and six Fields Medals subsequently awarded to researchers supported by the ERC[6]. Luxembourg's success there is directly relevant to the present question: it is evidence that the country's researchers compete at the highest level precisely in the open, investigator-driven mode that national funding is now closing off. It is difficult to explain to these researchers, or to those we hope to recruit next, that the work for which Europe's most competitive funder selected them has no national funding device. Retention depends on whether people can do their best work here. The ERC Proof of Concept grants regularly generate spin-offs from topics with no priority; they demonstrate that the innovation chain can begin far from any designated theme.

A mission of the FNR is "*de renforcer les coopérations scientifiques aux plans européen et international, en articulant sa programmation avec les initiatives européennes et internationales*." Investigator-driven programmes attract talent and foster a research pool that can compete in EU programmes, resulting in additional research funding flowing to Luxembourg. Binational and multilateral funding schemes such as INTER demand proposals that are competitive with all involved research agencies. When a partner agency does not share the same research priorities or does not require conformity with set research priorities, Luxembourg-based researchers risk being at a disadvantage.

The quality of Luxembourg's research base has risen faster than the means to fund it. The FNR's own analysis is striking: eligible CORE proposals grew by more than 66% between 2015 and 2024, the share rated "excellent" or "very good" rose from 23% to 40%, and yet the success rate fell from 24% to 18%, with only 37% of "very good" proposals funded in 2024[7]. Luxembourg is already turning away a great deal of demonstrably excellent science. Until 2025, a principal investigator could lead more than one CORE proposal in a call, so a 37% success rate for "very good" proposals still left an excellent group several routes to funding across a three-year period[8]. New limits on CORE applications in 2026 would seem to narrow that funnel at the same moment as thematic eligibility

[3] European Commission, “European Innovation Scoreboard 2025 - Country profile Luxembourg”, accessed 22 September 2026, https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-lu.pdf
[4] FNR, "ERC grants made in Luxembourg“, accessed 22 September 2026, https://www.fnr.lu/research-with-impact-fnr-highlight/erc-grants-made-in-luxembourg/
[5] University of Luxembourg, "EU funding and high-profile grants“, accessed 22 September 2026, https://www.uni.lu/research-en/eu-funding-high-profile-grants/
[6] European Research Council, "Scientific prizes — Nobel Prize", accessed 3 October 2026, https://erc.europa.eu/projects-statistics/scientific-prizes/nobel-prize
[7] FNR, “Rising Competition in CORE: A decade of increasing demand, improved proposals and tougher choices“, accessed 22 September 2026, https://www.fnr.lu/research-with-impact-fnr-highlight/rising-competition-in-core-a-decade-of-increasing-demand-improved-proposals-and-tougher-choices/
[8] FNR, "Launch of 2026 CORE Call", accessed 3 October 2026, https://www.fnr.lu/launch-of-core-call/

narrows. We note that discovery itself, the advancement of knowledge, is a legitimate criterion of excellence and merit, and one that stands alongside, rather than beneath, societal and economic considerations.

Process matters as much as substance. Luxembourg has a strong tradition of consulting its scientific community on the direction of national research: the 2007 FORESIGHT exercise, the 2019 revision of the National Research Priorities, and the 2023 Megatrends foresight conference all engaged the research base directly and produced better, more legitimate outcomes. The 2025–26 revision and the decision to end OPEN were taken without a comparable consultation, through the Strategic Steering Group of institutional executives. At the same time, the new FNR law abolishes the scientific council, removing the standing body whose explicit purpose was scientific judgement and excellence. As a result, Luxembourg is not drawing on the expertise it has spent two decades paying to attract. This is a missed return on investment.

Three measures would mitigate the risks set out above:

1. A bottom-up, investigator-driven, curiosity-driven FNR funding programme in some form. This could be a successor to OPEN, a reserved share within CORE, or a periodic call, sized modestly and evaluated on scientific excellence alone, complementary to the priority-oriented programmes. Maintaining a broad scientific base is essential for adaptability, interdisciplinarity and long-term competitiveness, as well as for the attractiveness of Luxembourg for top researchers. The scale required is small: the final OPEN call in 2025 awarded €922,000, around one per cent of the FNR's annual state contribution[9]. The insurance is inexpensive; the exposure is not.
2. A national scientific advisory body, composed of active researchers, to advise on programme design and the scientific coherence of the national portfolio, filling the gap left by the FNR's former scientific council.
3. A return to a consultative model for the next revision of the National Research Priorities, as in 2007, 2019 and 2023, with an open consultation for input from the research community.

"*Luxembourg cannot afford to miss the future. Continued support for outstanding, curiosity-driven research is the surest way to ensure that Luxembourg can both deliver on the themes it has chosen and remain able to seize the ones it has not yet imagined.*"

The Section des sciences naturelles, physiques et mathématiques of the Institut grand-ducal
Created in 1850, the Section des sciences naturelles, physiques et mathématiques of the Institut grand-ducal has played an important role in developing science and its applications in Luxembourg. The Section contributed to producing and disseminating knowledge in a multilingual, cross-border context, closely tied to the country's socio-economic development. The early works in geology, mineralogy, and chemistry – including the geological mapping of Luxembourg and the analysis of oolitic iron ore – provided, for example, the scientific foundation for mining and later industrial development. Today, the Section des sciences, with its more than 250 members covering the various natural science domains, has, among others, two main missions: 1) promote high-quality research across various scientific disciplines; 2) act as a bridge between science and policy, providing evidence-based recommendations to policymakers to inform decisions on scientific issues.

For the Section des sciences naturelles, physiques et mathématiques of the Institut grand-ducal

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[9] FNR, "Results 2025 OPEN Call", accessed 22 September 2026, https://www.fnr.lu/results-2025-open-call/

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