

Quantum Forward Challenge

Life Sciences & Health

A National Initiative to Pioneer Quantum Innovation in Life Science & Health

Issued by: Quantum Delta NL (QDNL)

Call Launch: October 13th, 2025

Funding Volume: €2M

Call for Applications

Type: Feasibility Study

1. Vision and Strategic Ambition

Quantum Delta NL (QDNL) is launching the first call in its Forward Program: the Quantum Forward Challenge –Life Sciences & Health as part of its new challenge-based approach. This initiative invites ambitious stakeholders and consortia to develop and demonstrate quantum-powered solutions that address critical bottlenecks in healthcare and life sciences.

Building on the success of QDNL's Catalyst Programs and Action Lines in Phases 1 and 2, this new challenge-based approach supports use-case-driven innovation through focused, competitive funding. It reflects QDNL's core mission: To unlock transformative breakthroughs with quantum technologies for real-world needs. We can address real-world needs beyond focusing on incremental processes. By connecting leading capabilities in quantum computing, sensing, and systems engineering with health and life sciences priorities, this program aims to position the Netherlands as a key European partner in quantum health innovation—and as a magnet for international collaboration, talent, and investment.

2. Strategic Goal: A National Quantum Platform for Life Science & Health Innovation

The **Quantum Forward Challenge** represents a foundational step toward building a **collaborative platform for quantum-enabled LSH innovation**. This initiative lays the groundwork for a **mission-driven, interdisciplinary coalition**—uniting researchers, technologists, clinicians, and end-users to co-develop solutions with measurable impact.

This platform aims to:

- Create new collaborations across the quantum, life sciences and health, and industrial domains
- Serve as a national interface for piloting, validating, and scaling quantum solutions in real-world life science & health settings
- Provide a flexible template for developing similar innovation capabilities in adjacent sectors such as chemistry, diagnostics, biotechnology, or medical logistics
- Drive quantum adoptability and use in the Life sciences and health, stimulating investments in and uptake of quantum capabilities in the core business.

3. Challenge Scope and Topics

Can quantum technologies solve bottlenecks in healthcare and life sciences with measurable, near-term progress toward real-world application?

QDNL seeks to identify and validate quantum-powered solutions to concrete, high-impact challenges in Life Sciences & Health (LSH). The aim is to lay the foundation for real-world deployment.

Proposals within this challenge must focus on building a solid foundation for groundbreaking R&D within this Feasibility study and must clearly articulate the targeted bottlenecks and the pathway to validation.

Projects may address challenges such as (but not limited to):

- **Drug discovery bottlenecks:** Simulating complex molecules (e.g., transition-metal-containing compounds) that are intractable for classical methods or optimizing reaction pathways in drug synthesis using quantum algorithms.
- **Biomarker detection and sensing:** Using quantum technology to identify early-stage biomarkers (e.g., neurodegenerative diseases; cancer) with sensitivity beyond classical spectroscopic tools.
- **Clinical decision support or scheduling optimization:** Applying quantum optimization or hybrid methods to reduce treatment planning time, match patients to trials, or optimize surgical throughput in hospitals.
- **Medical data trust and security:** Using quantum-safe encryption or secure multi-party computation to enable new cyber security measures or meet GDPR-compliant sharing of sensitive patient data across institutions.
- **Personalized digital therapeutics:** Quantum-enhanced modelling of biological feedback loops for adaptive drug dosing or home-based monitoring systems.

The above examples are illustrative — proposals targeting other LSH-relevant bottlenecks with clear potential for quantum advantage are also welcome.

4. Funding

This program is designed to encourage bold, disruptive feasibility projects. These high risk-high gain projects require high investments and solid preparation. The approach ensures both early risk-taking and structured follow-through, enabling breakthroughs to move from concept to application.

Feasibility study: Disruptive Exploration and Strategic Positioning

Duration: Up to 12 months

Call Budget: €2M

Maximum Funding per Project: €0.5M

This phase will support **up to 5 high-risk, high-impact stakeholders/consortia** addressing the described critical challenge through **quantum-first approaches**. The emphasis is on **radical innovation**, not incremental improvements to existing technologies or workflows.

In this case, a feasibility study for an R&D project is defined as: the evaluation and analysis of the potential of a project, which aims at supporting the process of decision-making by objectively and rationally uncovering its strengths and weaknesses, opportunities and threats, as well as identifying the resources required to carry it through and ultimately its prospects for success.

Key expectations include:

- A clearly articulated hypothesis for quantum advantage (e.g. NISQ, FTQC, PQC, QKD, or quantum sensing)
- Early testing addressing specific, high-value bottlenecks
- Building active involvement in the value chain with possible end-users, stakeholders, or manufacturers.
- If needed: small scale lab testing exploring specific, high-value bottlenecks
- Clear roadmaps for IP strategy, valorization and commercialization.

During the feasibility study, consortia will undergo multiple **interim and final evaluation steps**. Based on these assessments, QDNL may choose to **reshape, consolidate, or discontinue** specific directions to ensure strategic alignment with the most promising and impactful opportunities.

5. Participation Guidelines

Who can apply:

We welcome applications from a broad range of stakeholders within the Dutch innovation ecosystem with R&D operations which benefit the Dutch economy or other Dutch interests:

- Academic institutions, public research organizations, startups, SMEs, corporates, and non-profit institutes,
- Proposals must include at least one end user as team member, i.e. from a relevant healthcare, pharmaceutical, technological, or data infrastructure domain that uses the technology, or include a major project deliverable for this feasibility study to engage one or more end users in further development.

Proposal requirements:

Applicants are expected to submit a clear, ambitious proposal that demonstrates strong use-case orientation, technical excellence, and ecosystem alignment. Each proposal must include:

- A clearly defined quantum-enabled use case with disruptive potential in health or life sciences
- A consortium overview detailing roles, affiliations, capabilities, and relevant track record
- Defined technical objectives, milestones, and measurable deliverables for the feasibility study
- A coherent plan for the development of IP strategy, valorization and commercialization, and risk management

Applicants must use the template provided by QDNL.

6. Evaluation

This program follows QDNL's newly established challenge-based model, which emphasizes competitive selection, stage-gated monitoring, and adaptive funding to maximize both technological impact and ecosystem value. Proposals must prove strong use-case orientation, technical excellence, and ecosystem alignment. We are looking for a clearly defined quantum-enabled use case with disruptive potential in health or life sciences, gain a competitive advantage, develop a control point or solve an essential solution shortage compared to the international solutions. Therefore, assessment will also be based on the KPIs of the Quantum Delta NL program and the feasibility to reach the goals with the proposed resources in an efficient manner.

Appendix 1: KPIs

This table provides an overview of expected directly impacted KPIs from the call and thus from the project proposals.

High level KPIs	
Startups	Cumulative number of quantum tech startups based in the Netherlands.
Industry involvement	Annual number of companies in the Netherlands executing quantum-related activities in R&D, production, fabrication, and development (excluding quantum startups and spinouts).
Private co-funding	Annual share of (inter)national private co-funding in QDNL activities, derived from private entities and self-generated revenue.
End-user engagement	Annual number of end-users utilizing products (incl. software), services or infrastructure developed through QDNL activities aligned with its focus areas: quantum sensing, computing, and communication.
International leads	Cumulative number of international quantum companies that have established operations in the Netherlands.
CAT1	
Non-academic Tech developers	#Non-academic project partners (tech developers) from industry and/or government in CAT-1 funded projects (excluding CAL end-users).
Co-funding CAT-1	Funding attracted from other sources, segmented by public (National government, EU) and private.
End users	Number of end users engaging in projects at QAL, co-funded by companies (in-cash or in-kind) for at least 25% of the total project budget.
CAT2	
Non-academic Tech developers	#Non-academic project partners (tech developers) from industry and government in CAT-2 funded activities. (cumulative)
Co-funding CAT-2	Funding attracted from other sources, segmented by public (National government, EU) and private (Per year).
CAT3	
End users	Annual number of end-users utilizing products (incl. software), services or infrastructure developed through QDNL activities aligned with quantum sensing
Non-academic Tech developers	#Non-academic project partners (tech developers) from industry and government in CAT-3 funded activities.
AL2	
Startups	Cumulative number of international quantum startups that have established operations in the Netherlands, either with >2 FTE or by joining the Infinity program.
Scaleups	#quantum start-ups that reached series A funding
International leads	Cumulative number of international quantum companies that have established operations in the Netherlands, either with >2 FTE or by joining the Infinity program.
Business involvement	Number of lighthouse projects with industry and/or government participation AL2 will work on defining, with a total contract value >= 500k Euro.
Quantum-related jobs	Cumulative number of quantum-related jobs in the Dutch ecosystem, including startups, scale-ups, industry, fundamental and applied research.
Valorization IP	Annual number of patents/patent applications (both QDNL and non-QDNL funded) that have been licensed or transferred to third parties.
Tech Transfer	Number of patent applications filed per year in the Netherlands (industry and academia) in quantum computing, quantum communication and quantum sensing
Tech Transfer	Annual number of patents/patent applications (both QDNL and non-QDNL funded) that have been licensed or transferred to third parties.
Tech Transfer	Number of projects with industry and/or government participation AL2 will work on defining, with a total contract value between 50k and 500k Euro.