

Final report for projects funded by the Leibniz Association's Competition Procedures

**Project title: Leibniz Research Alliance “Leibniz Health Technologies”**

**Project number: W102/2024**

## Executive Summary

Between April 2021 and March 2025, the Leibniz Research Alliance “Leibniz Health Technologies” (LHT) advanced the interdisciplinary development and translation of innovative health technologies within the Leibniz Association. Expertise from life sciences, engineering, physics, materials science, and health economics was combined in five competence areas – Imaging Methods, Biomarkers, Point-of-Care Technologies, Plasma Medicine, and Bioactive Materials – to address pressing medical needs and societal health challenges.

A central achievement was the implementation of TRL-oriented roadmaps and the establishment of the Work Group on Translation, which coordinated strategies and linked LHT with infrastructures such as the Leibniz *Joint Lab “First in Translation”* (fiT), the *Competence Centre Diabetes Karlsburg* (KDK), the *Leibniz Lung Clinic* and the future *Leibniz Center for Photonics in Infection Research* (LPI). These provided the backbone for moving technologies toward clinical validation and application. The alliance comprised 18 Leibniz institutes and three spin-offs, reflecting controlled strategic growth. New partners, including the Leibniz Institute for Food Systems Biology (LSB), the Leibniz Institute for Composite Materials (IVW), and the Leibniz Centre for European Economic Research (ZEW), broadened expertise in biomaterials, data science, and health economics. This enabled systematic assessments of translation potential and market viability.

Despite restrictions during the COVID-19 pandemic, LHT maintained momentum by introducing digital formats such as the HealthTech Lectures and launching new internal funding instruments (Short-Term Scientific Missions, Conference Participation Initiative, Feasibility Studies). These effectively supported young researchers, strengthened collaboration, and facilitated early-stage technology transfer. The Scientific Advisory Board confirmed that LHT met its objectives and praised its emphasis on translation, spin-off formation, and outreach activities, including symposia, trade fair participation, and audiovisual content. Looking ahead, LHT is well positioned to expand clinical and industrial partnerships, intensify collaboration across competence areas, and further strengthen its translational role in disease prevention,

diagnosis, therapy, and monitoring, thereby reinforcing the Leibniz Association's position in health technology innovation and transfer.

## 1. Achievement of objectives and milestones

The Leibniz Research Alliance achieved its central objectives and milestones for this funding period. Interdisciplinary collaboration was consolidated across its five competence areas – Imaging Methods, Biomarkers, Point-of-Care Technologies, Plasma Medicine, and Bioactive Materials – and research advanced systematically from early discovery toward clinical validation and technology transfer.

A key element was the establishment of TRL\*-oriented roadmaps, regularly refined through workshops and reviews by the Scientific Advisory Board. These ensured alignment with clinical needs, market relevance, and evolving societal priorities.

During the reporting period, LHT members initiated 125 interdisciplinary projects that covered the LHT goals and research topics, ranging from fundamental research to transfer-oriented initiatives. Examples include the *SARSCoV2Dx* project on diagnostics, the *PlasmaPlusCorona* project on plasma-based antiviral therapy, and *μTISSUEfab* on scalable 3D tissue models for drug development. Strategic growth expanded the consortium to 18 Leibniz institutes and three spin-offs. New partners such as the LSB, IVW, and the ZEW broadened expertise in biomaterials, data science, and health economics, enabling systematic assessments of translation potential and regulatory pathways.

Financial and time planning, although affected by the pandemic, were met as proposed. Resources supported collaborative research, mobility, and outreach, with significant in-kind contributions from partners complementing Leibniz funding. Internal funding instruments further stimulated cooperation and early-stage translation. LHT established robust structures, implemented TRL-based strategies, expanded its partnership base, and integrated key infrastructures, thereby creating a strong foundation for further translation toward clinical application and market uptake.

### ACHIEVEMENTS (2021-2025)

- **Networking:** Organization of **35** own events (on-site/online), participation in **67** events
- **40 Conference Participation Initiatives, 14 Short-term Scientific Missions** for young researchers and **5 Feasibility Studies**
- **6 Training activities** for members on IP or regulatory topics organized
- Portfolio of **125** 3<sup>rd</sup> party-funded **interdisciplinary projects** and **12 transfer projects** (TRL > 6)
- **472 peer-reviewed publications** and **27 patent appl.**

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\* TRL: technology readiness level, a measure for technology maturation

## 2. Activities and obstacles

A central element of LHT's activities was the systematic advancement of research within the five competence areas, guided by common roadmaps. Projects covered a broad range of TRLs, from early discovery to near-clinical validation. Notable examples include single-photon and fiber-based neuroimaging (spin-offs Photonscore, DeepEn), blood plasma microRNAs as biomarkers for asthma therapy, SARS-CoV-2 diagnostics, PlasmaPlusCorona for antiviral cold plasma therapy, and  $\mu$ TISSUEfab hydrogel-based 3D tissue models. To foster collaboration, LHT launched three internal funding instruments: Short-Term Scientific Missions (STSMs), the Conference Participation Initiative (CPI), and Funding for Feasibility Studies (FFS). These low-threshold, rapid schemes effectively supported training and networking of early-career researchers, exploratory projects, and international visibility, with quality oversight from the Expert Advisory Board.

The COVID-19 pandemic delayed in-person networking and slowed the launch of internal instruments, but LHT adapted quickly through digital formats such as a new website and the HealthTech Lectures, which regularly attracted over 100 participants. This shift expanded outreach and community building. Pandemic-driven priorities also stimulated new infection-related projects and highlighted the importance of regulatory, societal, and economic aspects of translation. To address this, LHT integrated the ZEW, a milestone noted by the Scientific Advisory Board. Despite challenges, the alliance maintained its trajectory and expanded its network. Best-practice projects emerged in each competence area, demonstrating clear translation pathways. Additional partners (LSB, IVW) broadened expertise in data science and biomaterials, while collaborations with DZL and industrial actors such as Owkin enhanced translational potential and external visibility.

## 3. Results and successes

LHT partners produced 472 peer-reviewed publications and filed 27 patent applications, demonstrating both quality and impact. Of the 125 collaborative projects, 12 advanced beyond TRL 6 and are ready for clinical validation and industrial collaboration. Key translational infrastructures fit, KDK, and the LPI provided essential platforms for validating technologies in clinically relevant environments.

### Technology Transfer and Collaboration

Technology transfer was chosen as a strategic priority. The Work Group on Translation, now a permanent structure, aligns competence area roadmaps with clinical and industrial needs and coordinates use of infrastructures. This structural innovation was commended by the Expert Advisory Board. Intensive interaction with 6 spin-offs such as DeepEn, Photonscore, neoplas med, ResCure, and NanoTubeTEC, openUC2 illustrate successful translation and entrepreneurship. In addition,

collaboration with ZEW and its spin-off istari.ai enabled AI-supported market analyses, adding an economic and policy perspective to LHT's activities.

#### Outreach and Public Engagement

The *HealthTech Lectures* online series became a recognized platform with usual 50-150 participants, complementing strong representation at trade fairs (e.g. Medica, LASER World of Photonics, AMR Conference, German Biotechnology Days) and the organization of major in-person events such as the Symposium on Point-of-Care Technologies. LHT also contributed to the Leibniz Lab Pandemic Preparedness through the partner institutes and by providing two steering committee members. These efforts, together with workshops, white papers, and policy engagement, significantly strengthened visibility and positioned LHT as a showcase for the Leibniz Association at the interface of science, healthcare, and policy.

### 4. Equal opportunities, career development and internationalisation

The promotion of equal opportunities, support for young researchers, and internationalisation were integral to LHT's strategy. Women held leading roles throughout the funding period: between 2021 and 2024, three competence areas out of five were under female leadership, and since 2024 two areas continue. LHT also supported initiatives such as the Women Interactive Materials Award (WIMA, DWI Aachen) and Women in Photonics workshops (Leibniz-IPHT Jena), offering mentoring, networking, and visibility for female scientists.

Career development for young researchers is a strategic priority. The workshop series *Young Leibniz Researchers for HealthTech Innovations* enabled doctoral and postdoctoral researchers to present projects, receive expert feedback, and explore career paths in science and entrepreneurship. Additional support came through STSM and the CPI, which provided international mobility and conference participation. Internationalisation was further advanced through two EU-funded Innovative Training Networks – TIPAT<sup>†</sup> and PHAST<sup>‡</sup> – providing structured doctoral training and cross-border collaboration. Partnerships with international institutions and companies expanded LHT's global network and strengthened opportunities for collaborative research and technology transfer. A total of 146 master theses and dissertations have been conducted.

### 5. Structures and collaboration

LHT established stable governance structures early in the funding period. The General Assembly met twice a year, with one meeting rotating among partner institutes, serving as the central decision-making body. Management was provided by the spokesperson team and competence area leaders,

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<sup>†</sup> <https://tipat.eu/>

<sup>‡</sup> <https://www.phast-eu.unipr.it/>

supported by the Coordination Office for administration, events, and communication with the Leibniz Association. An Expert Advisory Board (EAB) with representatives from science, industry, healthcare, and regulation reviewed research roadmaps annually, advised on the project portfolio, and evaluated internal funding instruments to ensure strategic alignment and quality. The collaborative network expanded steadily. By 2024, it included 18 Leibniz institutes, three spin-offs, and a wide range of external partners from academia and industry (73 documented cooperations). International collaborations extended to Portugal, the UK, Switzerland, Australia, the USA, and Israel, strengthening LHT's global reach and research capabilities.

## 6. Quality assurance

Ensuring high scientific quality and compliance with good research practice was a core principle of LHT. All partners followed the Leibniz Association's guidelines, maintained rigorous review and documentation standards, and adhered to ethical and legal frameworks. Open science was actively implemented, with results published in open access and data deposited in suitable repositories. Quality assurance was reinforced through TRL-based roadmaps, annual reviews by the Expert Advisory Board, and quality criteria embedded in internal funding instruments (STSM, CPI, FFS). Where animal models were used, national and EU regulations were observed, applying the 3R principles (Replacement, Reduction, Refinement) to minimise use and ensure welfare.

## 7. Additional resources

LHT's activities were funded by the Leibniz Association and substantial partner contributions. Between April 2021 and March 2025, partners provided € 37,8 m in in-kind contributions and €187k in membership fees. These funds supported collaborative projects, training and mobility for young researchers, and outreach activities. Internal instruments were allocated via a steering committee that involves EAB members to ensure alignment with strategic goals.

## 8. Outlook

Building on the achievements of the funding period, LHT will further strengthen translation and cross-competence collaboration. Priorities include expanding the Work Group on Translation, intensifying the use of infrastructures, and launching new high-TRL projects for clinical validation and product development. LHT will also broaden outreach and consolidate its role as a central technology transfer platform within the Leibniz Association. By fostering interdisciplinary collaboration, expanding translational capacity, and strengthening its international network, the alliance aims to accelerate innovative health technologies – particularly integrated, connected systems – and contribute to improved prevention, diagnosis, therapy, and monitoring of relevant diseases.