“The LPI concept is able to revolutionise pathogen diagnostics worldwide. The key questions are inventive. The emphasis to tackle the problem by focusing on optical techniques is unique and has not occurred so far in an orchestrated fashion in a clinical environment. The potential for novel technology, novel sensing and novel lead compounds is enormous.”

PHOTONICS – A SHARP WEAPON IN THE FIGHT AGAINST INFECTIONS.

Antibiotic-resistant pathogens complicate the treatment of infections. Physicians need new active substances and alternative strategies against which germs cannot develop resistances.

Light is a powerful tool for understanding how microbes make us sick, how our body defends itself and how these processes can be influenced. It measures quickly, sensitively and without contact. Light contributes to understanding the causes of illnesses on a cellular level. Photonic technologies in combination with microfluidics, micro & nanotechnologies, biotechnology and molecular techniques will revolutionise diagnostics and companion diagnostics. Compact devices for fast and conclusive diagnosis of infections and new therapeutic approaches (e.g. with new anti-infective agents) are being researched and developed at the LPI.
Many steps are required to translate ideas into products.

If a proof of principle has been established the feasibility of specific applications has to be assessed, and the market potential must be subsequently quantified.

This entails many questions for technologists and basic researchers. How can I validate my idea in test series and clinical trials? How do I implement a market analysis? How do I develop a GMP-compliant production process? How do I obtain an authorisation or certification? Scientists as well as small and medium-sized enterprises do not have the necessary know-how and required resources. The realisation of a product is often not attained.
Investments in national research infrastructures open to users are necessary prerequisites for accelerating translations. The future viability of our healthcare system will be secured, and the technological leadership role of German medical technology will be expanded.

The infrastructure of the LPI enables clear transfer points and closes the gaps in the value-added chain, from basic research right up to specific sustainable solutions. It brings excellent technological research together with clinical users and companies. So LPI users are enabled to convert their research findings into diagnostic devices and systems as well as alternative therapeutic approaches. Critical phases in the innovation process are bridged. As a result, investments pay off for the patients as well as the economic and scientific location Germany.
As a platform open to users, the LPI provides a unique Europe-wide technology platform with highly-qualified personnel under the aegis of a university hospital. Users can be scientists from various disciplines right up to industrial researchers. The center combines state-of-the-art techniques with entirely new technological approaches for the whole spectrum: from molecule to small animal model. The platform covers the complete clinical workflow, from sampling and sample preparation to evaluation of images and data.

Structured processes with distinct transfer points within the LPI service pipeline include all necessary steps for product development: validation on real patient samples, support for product design and small-series production. Industry and regulatory authorities are involved from the outset – for a smooth market launch of innovative solutions. In addition to diagnostic methods, experimental treatments are also being pursued at LPI. Based on the medical needs of the patient, a therapeutic approach (e.g., with anti-infectives or immunotherapeutics) and accompanying diagnostics (companion diagnostics) will be compiled with the involvement of clinicians.

* An appropriate pipeline will also be provided for experimental therapies.
The LPI builds on the outstanding competencies of the Leibniz Association. And in Jena we rely on the expertise of the University Hospital and Friedrich Schiller University as well as the two Leibniz Institutes located here: the Leibniz Institute of Photonic Technology and the Leibniz Institute for Natural Product Research and Infection Biology.

It is based on numerous established research associations, special research fields of the German Research Foundation (DFG) and projects funded by the Federal Ministry of Education and Research (BMBF), such as the InfectoGnostics Research Campus. With these projects the supporting institutions integrate more than 150 German partners from the academic and economic sphere and have extensive international collaborations. The LPI sees itself as an open platform for users in Germany and abroad, and would like to contribute to a focus and increase in efficiency of research efforts in the sphere of infections. The translation of new diagnostic and therapeutic procedures will be sustainably accelerated as a result. Innovative solutions reach patients faster.