



PHOTONIC TECHNOLOGIES 4.0

Your Company's Ultimate R&D Location
Switzerland Innovation Park Innovaare



SPARKING INNOVATION

LASERS & PHOTON SOURCES, DETECTION & IMAGING,
MANUFACTURING & PROTOTYPING, SYSTEMS & SOFTWARE



SWITZERLAND
INNOVATION
PARK INNOVAARE



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OUR GOAL

To create a leading ecosystem in the photonics industry within the heart of Switzerland, focusing on the following competences:

- Photon Sources Laser Technologies
- Detection & Imaging
- Manufacturing & Prototyping
- Systems & Software

These main focus points at Park Innovaare include the following technological areas:

- Smart Sensors & Electronics
- High-Tech Design
- Advanced Manufacturing
- Quality Control Tools
- Data & Computing

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How?

In collaboration with its strategic research partners – the Paul Scherrer Institute (PSI), ETH Zurich (ETHZ), EPF Lausanne (EPFL) and the University of Applied Sciences & Arts Northwestern Switzerland (FHNW) – Switzerland Innovation Park Innovaare enables large companies, SMEs and startups to gain competitive advantage via interdisciplinary collaboration, technology and knowledge transfer, networking and business development consulting.

»PHOTONICS-RELATED TECHNOLOGIES PLAY A PIVOTAL ROLE IN INDUSTRY 4.0. IN COLLABORATION WITH ITS STRATEGIC PARTNERS, SWITZERLAND INNOVATION PARK INNOVAARE IS UNIQUELY EQUIPPED TO ENSURE THE SUCCESSFUL IMPLEMENTATION OF THE FOURTH INDUSTRIAL REVOLUTION IN EUROPE.«
— Benno Rechsteiner, CEO Park Innovaare



Park Innovaare | ©PSI/Markus Fischer

WHERE?

Park Innovaare, as one of six sites comprising the Switzerland Innovation network, is located strategically in Canton Aargau, Switzerland, within 40 minutes of Zurich Airport & 60 minutes of EuroAirport Basel-Mulhouse-Freiburg by car. Moreover, Park Innovaare is located in close proximity to our partner the University of Applied Sciences & Arts Northwestern Switzerland (FHNW), one of Switzerland's leading universities of applied sciences. Actively involved in teaching, research, further education and the provision of services – both innovative and praxis-oriented – the FHNW has become a much sought-after partner for industry.

Switzerland-wide Research Network — ETH Domain:

The ETH Domain includes two world-class technical universities – ETH Zurich and EPFL Lausanne (the two Swiss Federal Institutes of Technology) and three further cutting-edge research institutes.

1 — PAUL SCHERRER INSTITUTE

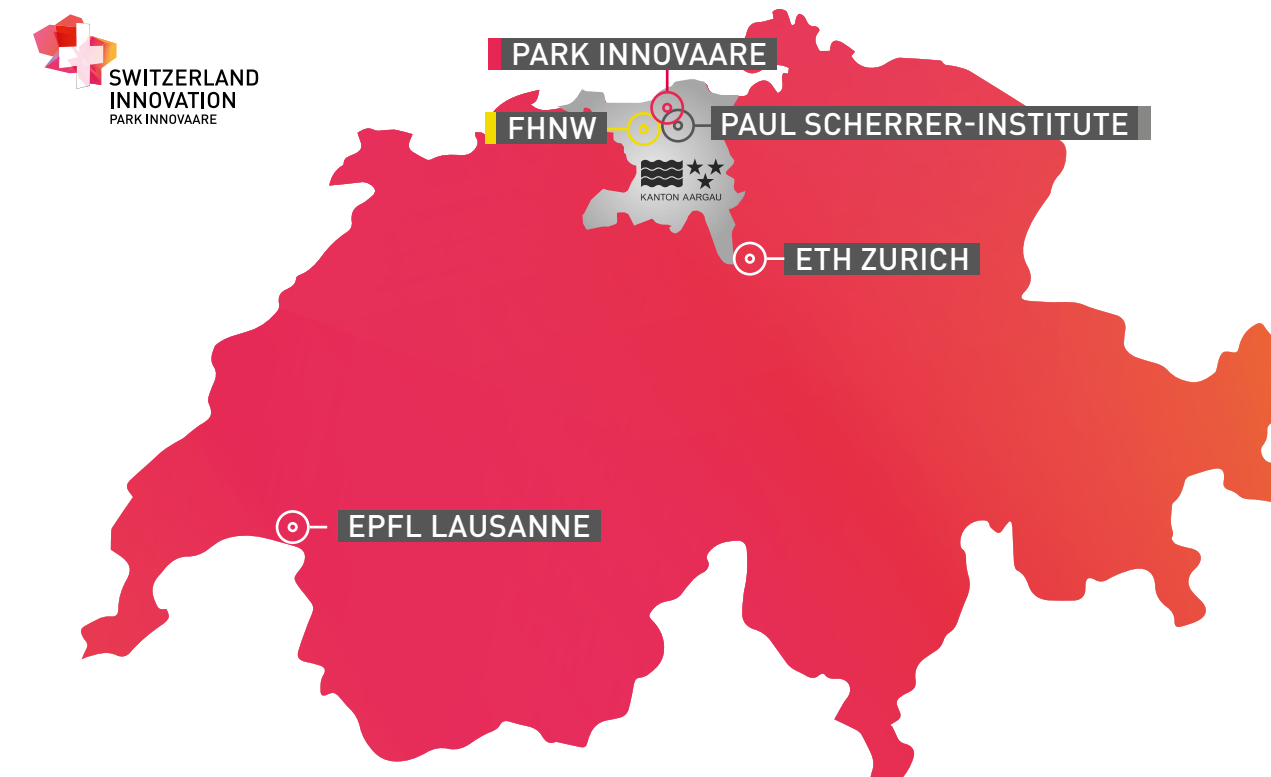
Our partner and neighbour the Paul Scherrer Institute, with its state-of-the-art research facilities & cutting-edge know-how, is the largest research institute within the ETH Domain. The ETH Domain includes two world-class technical universities ETH Zurich and EPF Lausanne (the two Swiss Federal Institutes of Technology) and three further cutting-edge research institutions. The four focus areas of research at PSI include: Energy & Environment, Advanced Materials & Processes, Human Health and Accelerator Technologies.

2 — ETH ZURICH

The Swiss Federal Institute of Technology Zurich (ETH Zurich) is located 38km from Park Innovaare. It is tightly linked to the Paul Scherrer Institute PSI as both organisations are part of the ETH Domain, have common research areas and shared professorships.

ETH Zurich is a worldwide leader in areas such as:

- Ultrafast laser, Terahertz & X-ray Science
- Photonics & Electronics
- Quantum Photonics and Nanophotonic Systems
- AI (ETH AI CENTER)
- Electromagnetic Radiation Detectors & Imaging (EXCITE)
- Micro & Nanosystems as well as Advanced Manufacturing
- Systems & Software Engineering



3 — EPFL

The Swiss Federal Institute of Technology Lausanne (EPF Lausanne) is home over 350 laboratories and research groups, each working at the forefront of science and technology. EPFL says: «We a goal to better understand our world and we aime to improve it.» EPF Lausanne also belongs to the ETH Domain and, as is the case with ETH Zurich, is closely intertwined with the Paul Scherrer Institute PSI as a result of common research areas and shared professorship positions.

EPF Lausanne is a leader in the areas of:

- Micro- & Nanotechnology
- Data & Machine Learning
- Imaging
- Ultrafast laser, Terahertz & X-ray science
- Photonics, Optoelectronics & Quantum Optics

4 — UNIVERSITY OF APPLIED SCIENCES & ARTS NORTHWESTERN SWITZERLAND (FHNW)

The Proximity to the FHNW School of Engineering (a 10-minute drive away from Park Innovaare's innovation campus), facilitates collaborative opportunities such as feasibility studies, product development – from prototype design to market launch.

Areas in which FHNW offers practical manufacturing solutions include, but are not limited to:

- Customer-specific sensors
- Sophisticated measuring systems
- Signal processing
- Laser micro-machining
- 3D measurement techniques

The partnership of PSI and FHNW in the area of micro and nano manufacturing and their location in close proximity to our campus presents your company with a unique opportunity to develop its next generation of products and launching them on existing and newly identified markets.

ETHZ | Swiss Federal Institute of Technology Zurich (QS World, 6th, 2020)



EPFL | Swiss Federal Institute of Technology Lausanne (QS World, 18th, 2020)



PSI | Paul Scherrer Institute



Empa | Swiss Federal Laboratories for Materials Testing



WSL | Swiss Federal Research Institute for Forestry, Snow and Landscape



Eawag | Swiss Federal Institute for Water Resources and Water Pollution Control



A GROWING INNOVATION CAMPUS

At Park Innovaare, high-tech companies will be given the opportunity to develop and expand within a dynamic and innovative ecosystem, which is supported by an exceptional pool of talent, a portfolio of services, an outstanding scientific network located on site, and the industrial landscape of the surrounding Canton of Aargau.

Park Innovaare celebrated the topping-out of the brand-new, modern innovation campus buildings in September 2021, less than two years after the ground-breaking ceremony and despite the pandemic hanging over the world.

Its buildings are specifically tailored for industrial research and development and designed to meet the needs of its current and future member companies.

The final technical inspection and approval of the buildings is scheduled for 2023, after which the campus will enclose a useable surface area of approximately 23,000m², complete with customisable laboratories, vibration-free areas meeting VC-E criteria, cleanrooms (compliant with ISO 5 & ISO 6 standards), prototype workshops, meeting and conference rooms, as well as an in-house refectory just across the street from PSI. An additional point to note is that a site for expansion and to build an additional 46,000m² of innovation space has already been acquired.

Park Innovaare
Visualization Homberger Architekten AG

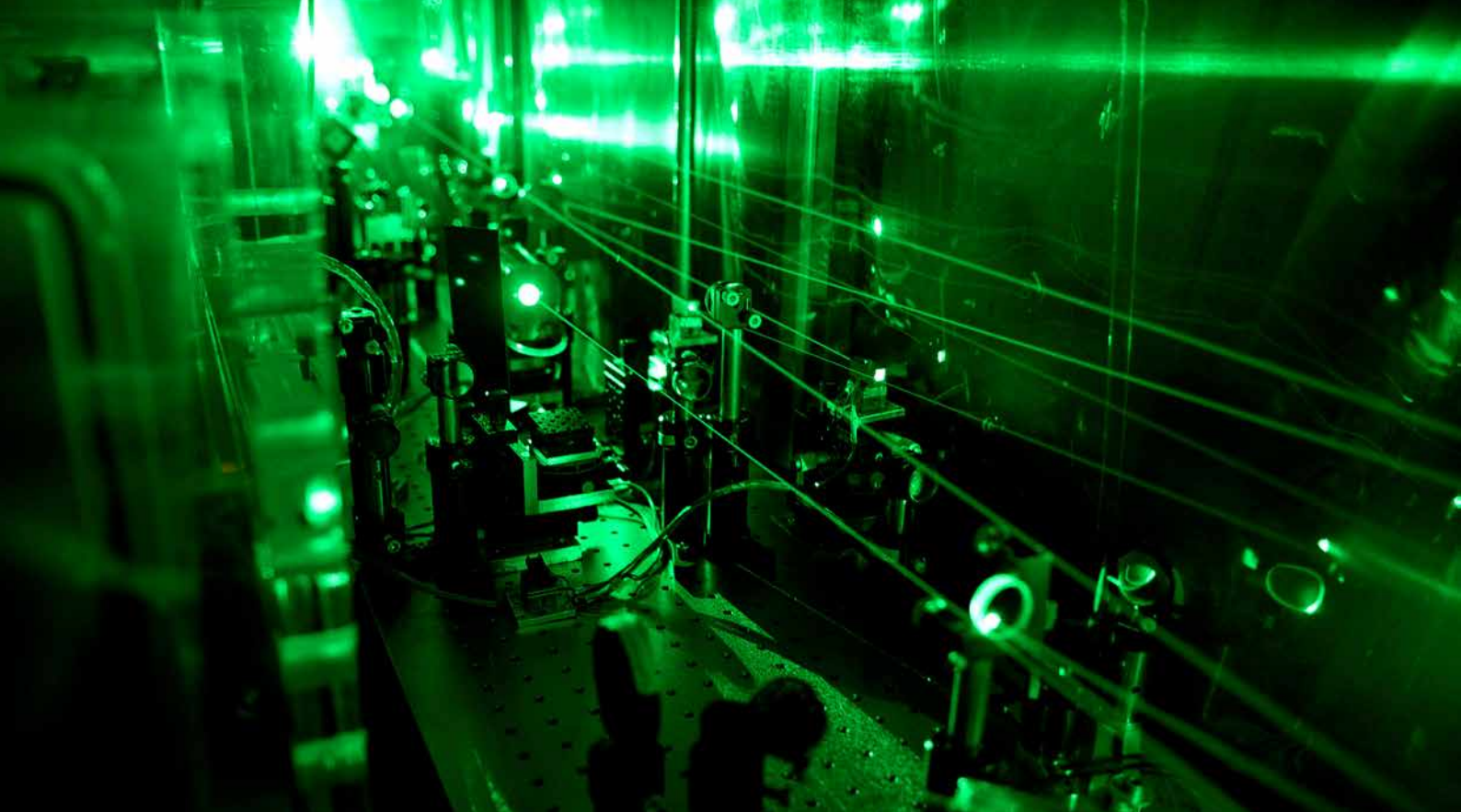


Park Innovaare | ©PSI



Park Innovaare | ©PSI





Part of the laser system, infrared laser pulses are transformed into green laser light | PSI/Markus Fischer

SHARING FACILITIES WITH PSI'S PHOTON SCIENCE DIVISION (PSD)

A research core competence at the Paul Scherrer Institute PSI is photonics. The institute's large-scale research facilities, including the Swiss Light Source (SLS), one of the most advanced light sources, as well its Swiss Free Electron Laser (SwissFEL) and additional laser technologies, place it at the forefront of development in photon science applications and solutions.

When locating at Switzerland Innovation Park Innovaare, high-tech companies working in the field of photon sciences will occupy the same building as PSI's Photon Science and Accelerator Divisions and will have the opportunity to access the laboratories operated by PSI, including state-of-the-art clean rooms and prototyping facilities. The aim of such proximity is to facilitate the exchange of ideas and optimise the cross-fertilisation of technological solutions.

Photon Sources & Laser Technologies

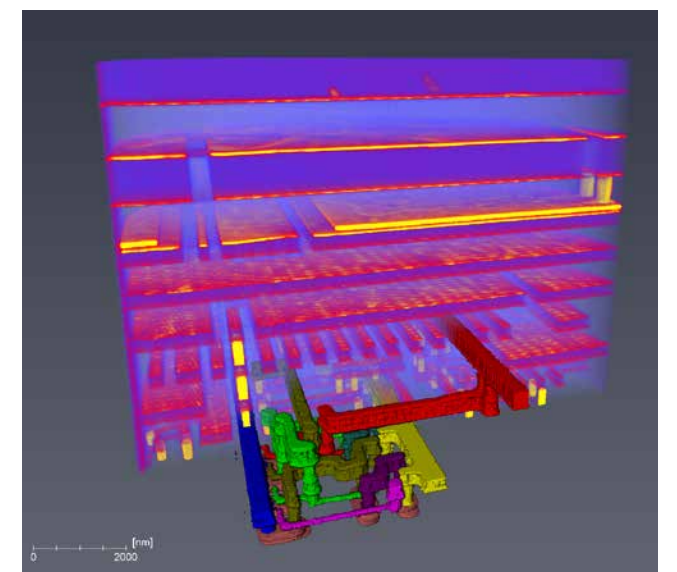
The laser technologies and photon sources at PSI range from Terahertz to hard X-rays, with additional focus on soft and tender X-rays, ultraviolet, infrared and visible light. Researchers at PSI develop components and sub-components for these systems, pushing the boundaries of what is already referred to as cutting-edge.

Detection & Imaging

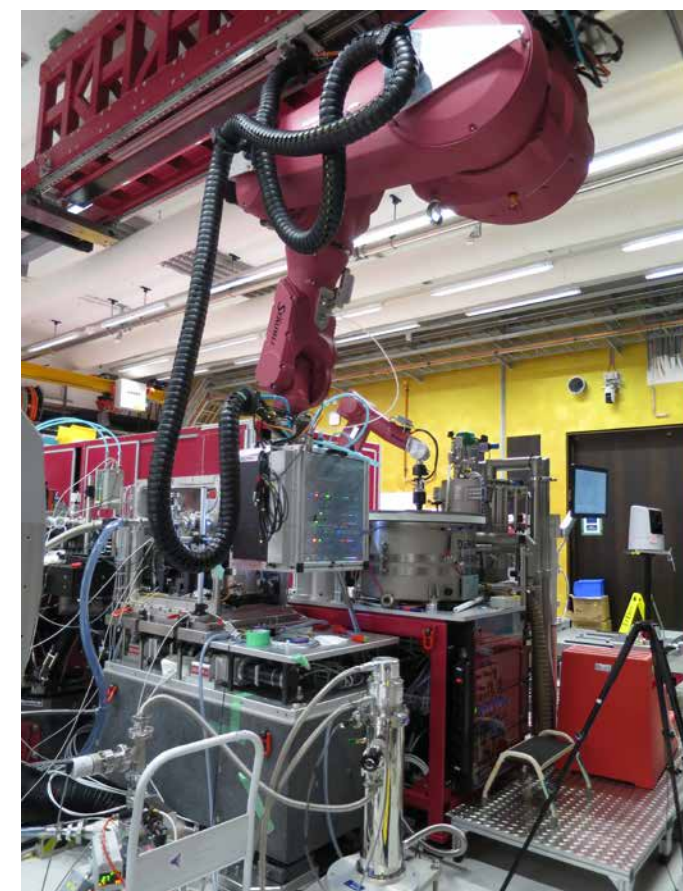
Detector groups at PSI continue to push the boundaries of what is possible, creating some of the world's leading detector technologies, including the development of novel sensor materials as well as the design of chips, electronic interfaces and associated data capture hardware. For example system designed by X-ray detector group permit data acquisition from single photon events up to data flows of tens of gigabytes per second.

Building on breakthroughs made in photonic technologies, PSI is continuing to create novel imaging methods and to optimise existing ones.

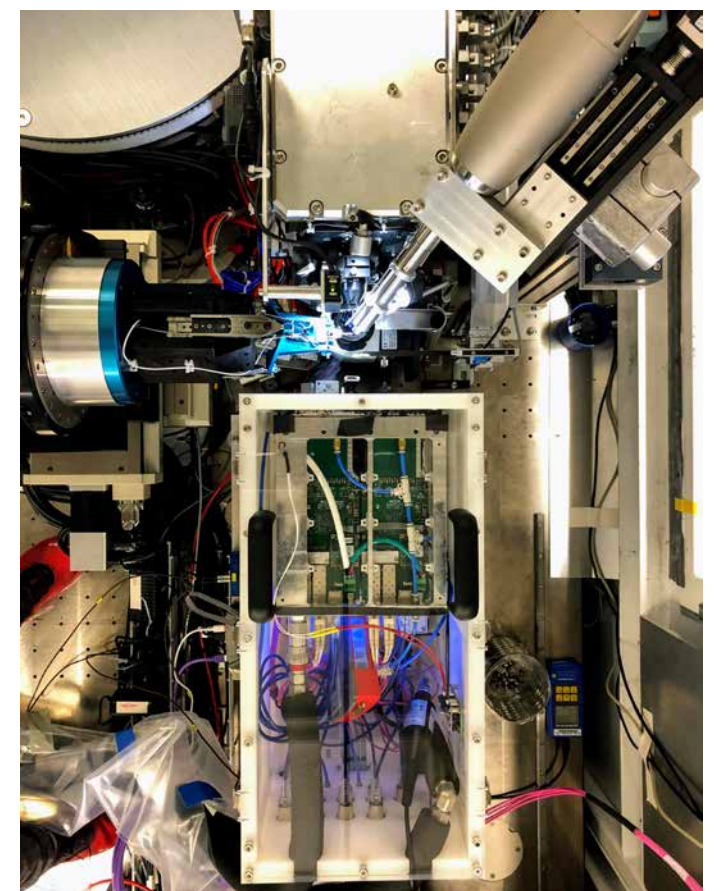
This ongoing evolution involves the development of technical instruments and of machine learning algorithms.



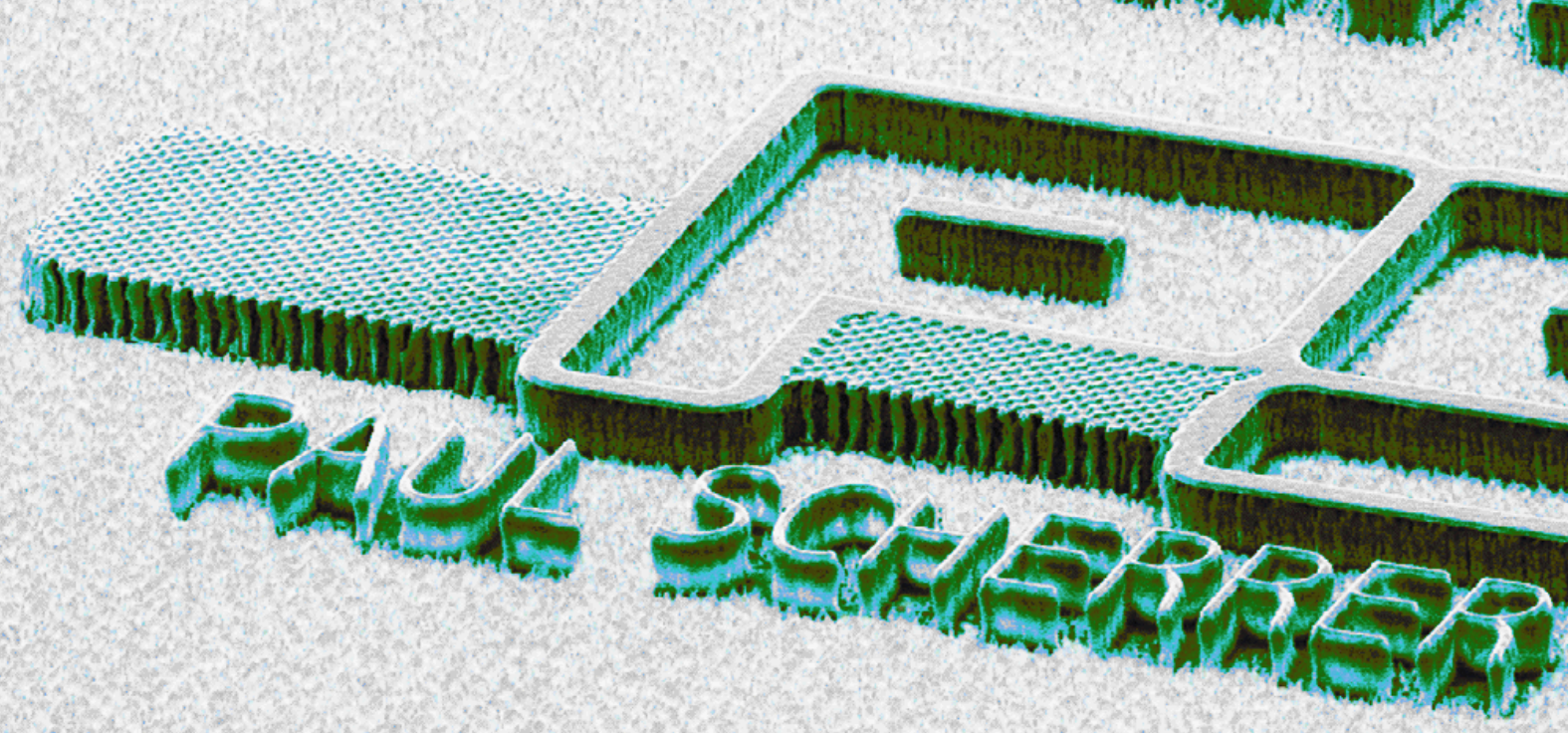
Ptychographic X-ray computed tomography image of a detector ASIC chip ©PSI/Mirko Holler



PSI/Vincent Olieric, Jungfrau detector setup at SwissFEL



PSI/Vincent Olieric, same close up



PSI logo created with lithography with nanometer sized structures ©PSI logo bmp

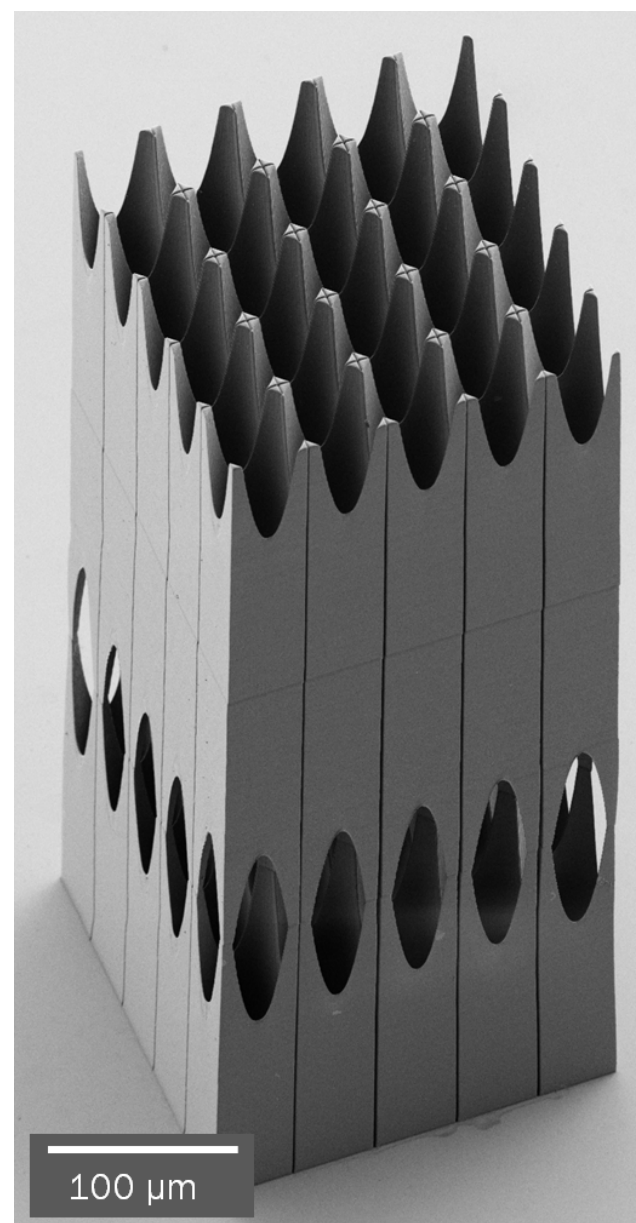
Manufacturing & Prototyping

As large research facilities have unique needs requiring custom-made solutions, PSI adapted accordingly and became a massive prototyping laboratory. This is why at PSI you will find high-precision machining workshops capable of designing, manufacturing and commissioning instrumentation covering a wide range of scale – from hundreds of meters down to a single nanometer. The particular focus of these prototyping laboratories remains the application of light or the development of components and surfaces that interact with photons.

Combined with its **leading expertise in imaging techniques**, PSI's areas of research extend into **micro and nano fabrication**, with particular emphasis on the application of light or the development of components and surfaces that interact with photons.

Areas in which PSI is offering world-class solutions and prototyping capabilities include, but are not limited to:

- Accelerators
- Lasers and interferometers
- EUV, electron and laser lithography
- Microlens fabrication and nano 3D structure generation for photon manipulation
- Micro- and nano-machining processes by deposition, etching, imprint



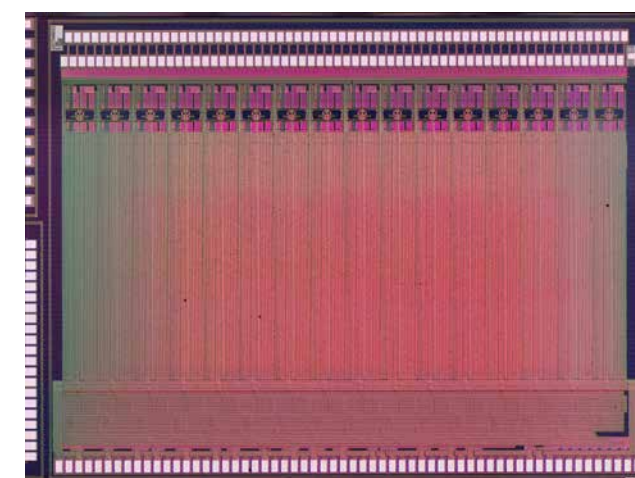
X-ray lens array
produced at PSI
LXN/Christian David

Systems & Software

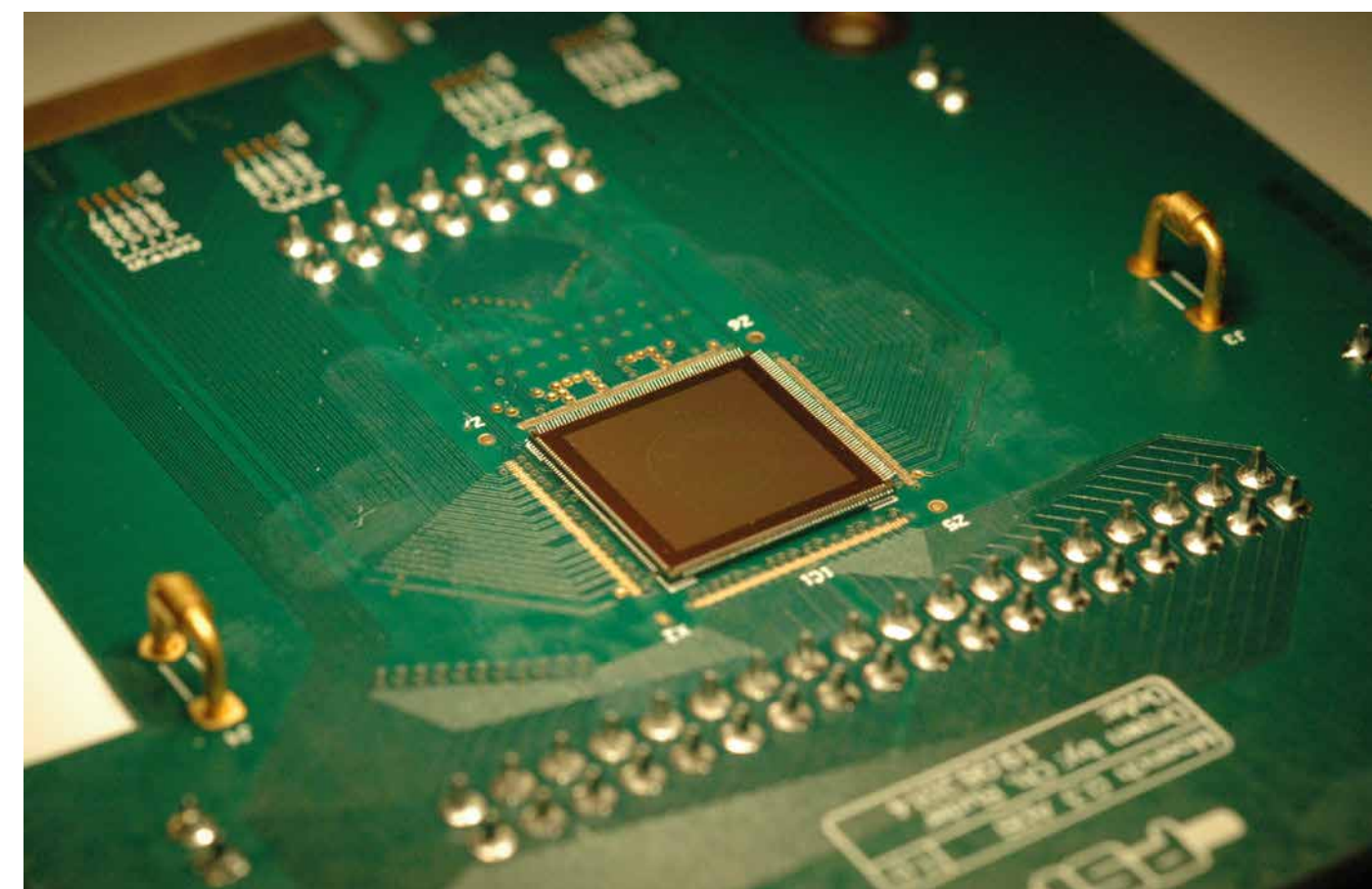
In order to operate such machinery and ground-breaking devices, scientists at PSI are in regular need of innovative systems and novel software.

In response to this need, a competence center was established at PSI for the control and monitoring, data acquisition, development and maintenance of hardware, firmware, and software systems required for the operation of the electron and proton accelerator facilities.

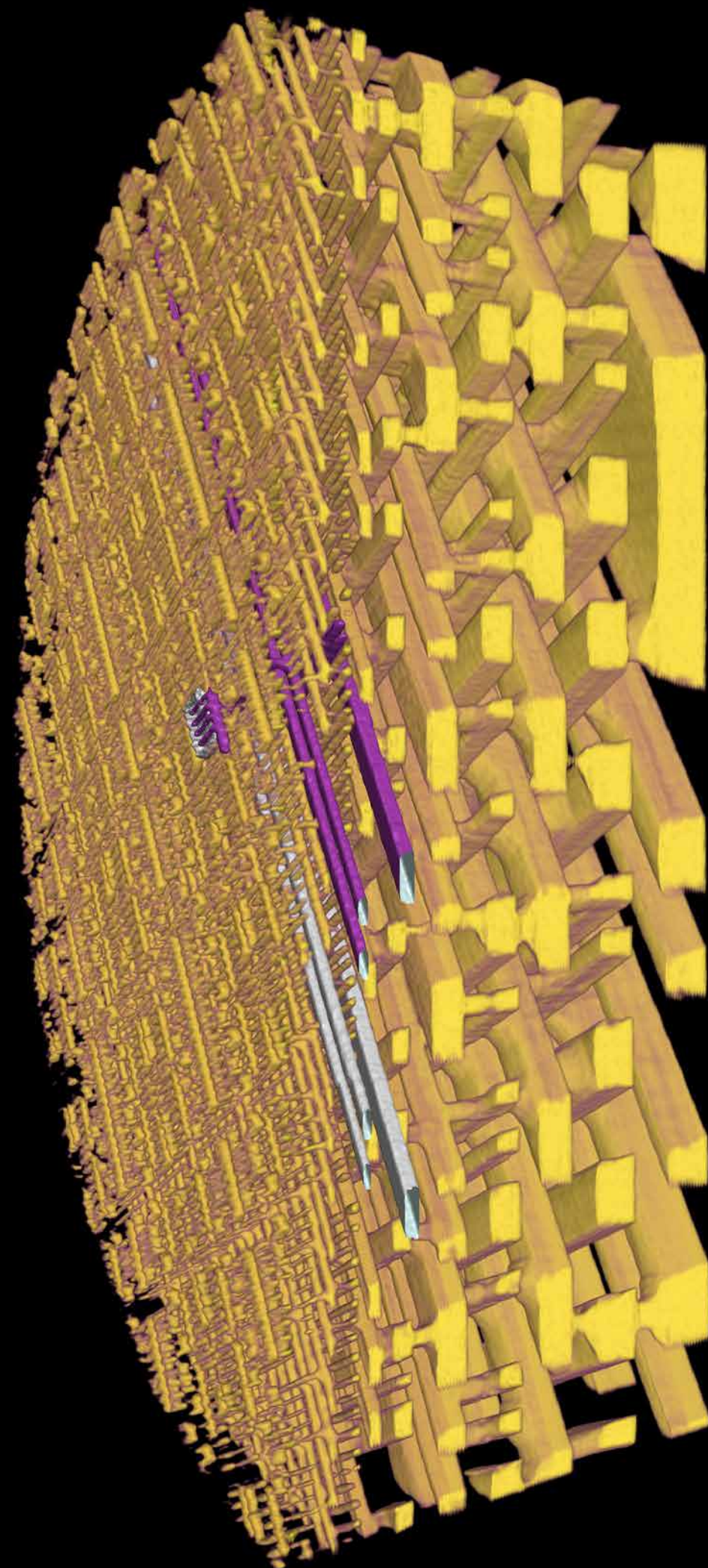
Teams of technicians, electrical engineers, software engineers and physicists design, develop and operate a variety of highly specialized hardware and software sub-systems, define new file and data formats, as well as information processing routines and algorithms in close collaboration with the experts of the different accelerator technology groups, operation teams, beam physicists and beamline scientists. These developments are well reflected in LeadXPro, a company founded at PSI in 2015.



PSI/Jiaguo Zhang/Gotthard II



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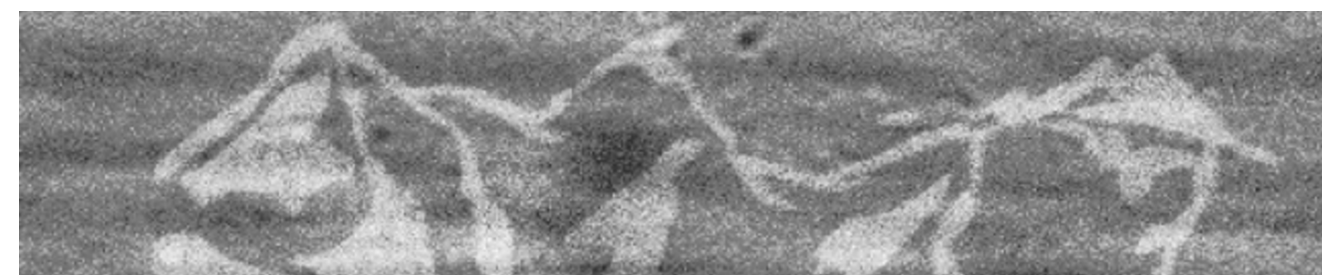
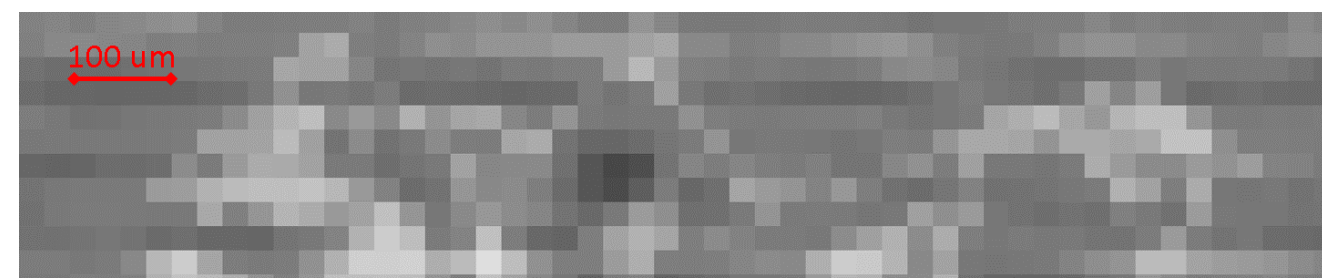


A STORY PRODUCED BY PSI'S X-RAY DETECTOR GROUP

In the top images three single modules of detectors named after the Swiss mountain peaks Eiger, Mönch and Jungfrau are shown ready for an experiment at a beamline.

This naming follows a long-standing tradition introduced in the X-ray detector group at PSI. Mönch was used to measure the absorption image of a mask showing Eiger, Jungfrau and Mönch. The mask was carried out at the

PSI's LMN laboratory, based on the photo of the mountains shown in the second image. The direct absorption image is shown in the third image. The resolution is limited by the pixel size of Mönch which is 25micron. Applying interpolation for every single photon we obtain the fourth and final image, in which the resolution is improved dramatically and we can resolve structures with a few microns like the flag on top of Mönch.



©PSI
Anna Bergamaschi

Eiger

Mönch

Jungfrau

INNOVATE WITH US

Benefits awaiting your
Company include ...



INFRASTRUCTURE

Proximity to the Photon Science
Division of the Paul Scherrer
Institute (PSI).



FUNDING

Access to research funding,
investors & venture capital.



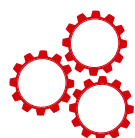
INNOVATION SERVICES

Most innovative country in the world.
Industrial liaison officers to support
R&D projects.



SCIENTIFIC TOOLS

Access to scientific labs and tools
(HPLC, TEM, SEM, AFM and more).
Introduction and support for novel
methods.



BUSINESS

Efficient government infrastructure
with favourable conditions for new
businesses.



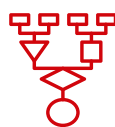
ENTREPRENEURSHIP

Breakthrough technologies introduced
into industry through state-of-the-art
spin-offs & start-ups.



ACADEMIC EXCELLENCE

Collaboration with world-class aca-
demic partners. Easy access to highly-
qualified talent & researchers.



INDUSTRIAL PARTNERSHIPS

PSI and FHNW have a long history of
efficient technology and know-how
transfer with companies worldwide.



SWITZERLAND

High quality of life, political stability,
attractive living environment. Centre
of Europe.



INTERCONNECTION VIA PARK INNOVARE

Contacts with scientists at PSI and
FHNW as well as industrial partners.
Connection with problem-solvers at
cantonal and national level. Evaluation
of funding possibilities





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