

A publication of the European Project

OASiS

Open the Access to Life
Science Infrastructures for SMEs



BERLIN AND BRANDENBURG BIOPHOTONICS



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OpTecBB



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The OASIS PROJECT



OASIS - Open the Access to Life Science Infrastructures for SMEs

The OASIS project aims to improve the links between life science facilities, research projects and product development. The previous large investments in biophotonics are made more accessible to SMEs to allow a competitive advantage in new products development and validation.

Large scale research facilities and technology platforms are usually sets of laboratory equipment that are mainly available to academia and to a certain extent to industry. It can be very large-scale equipment, unique to a country or a continent as well as technological halls shared by a wide scientific and technological community, which develops competencies in a specific area.

In the field of the life sciences, the management of open access for researchers and world-class research programmes between these facilities is under consolidation through existing programmes like Instruct, EuroBioimaging, Biophotonics Plus and the network of excellence Photonics4Life.

Large companies have established strong collaborations with these facilities. However, there is still room for improving the economic outputs and the involvement of SMEs in order to create more value and jobs from early scientific results.

By February 2015, the OASIS consortium has performed an inventory and analysed about 120 companies, unmet needs from 14 hospitals and 14 agrifood companies and more than 70 Life Science facilities. Nine workshops are organised at each partners' premise during the life time of the project to promote exchanges and spread the information and results from the project.

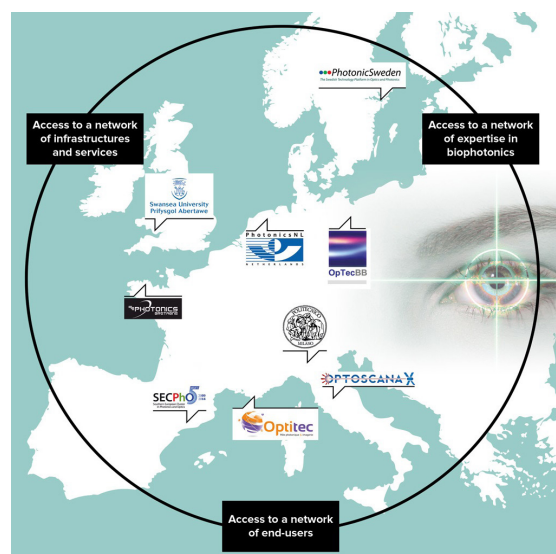
Website: <http://www.fp7-oasis.eu>

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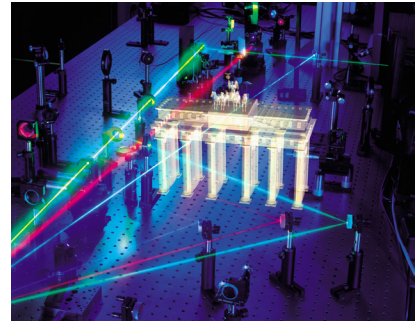
9 Photonics clusters involved in the project:

Optitec (Marseille, France); CNR–Optoscana (Florence, Italy); PhotonicSweden; OptecBB (Berlin-Brandenburg, Germany); Politecnico di Milano (Italy); SECPHO (Southern European Cluster in Photonics & Optics Association, Barcelona, Spain); Photonics NL (The Netherlands); Photonics Bretagne (Lannion, France) and Swansea University (UK).

Duration : 30 Months (Dec. 2013 to May 2016) Coordination: Cecilia Pinto, OPTITEC, Marseille.



Introduction to Photonics in Berlin and Brandenburg



Excellence in Photonics and Microsystems Technologies

There is a long tradition of optical technologies in Berlin Brandenburg. Their roots go back into the early 19th century and still today they are an important economic sector in the region. However, micro-system technology is a relatively young economic sector. It symbolically represents the demands of global competition that innovative products are facing: smaller, more powerful and more cost-efficient. That way, Berlin and Brandenburg and the Photonics Cluster are merging tradition and modernity with its optical technologies and micro-system technology. This builds the foundation for a sustainable development of the regional companies and the creation of new jobs in the sector and its numerous areas of application.

The innovative core of the cluster is represented by 390 technology companies (298 in Berlin and 92 in Brandenburg) as well as 10 universities and 26 non-university research institutions. From that, 11 are located in Brandenburg and 25 in Berlin. 16,600 employees are working in that core – a peak value in international comparison.

What distinguishes the Photonics Cluster in Berlin and Brandenburg from other photonics clusters is its strong scientific basis and the high number of specialized small and medium companies with wide-ranging know-how. This creates ideal conditions for a reciprocal transfer between science and industry and is at the same time a driver for innovation in different sectors. Globally, this highly dynamic development makes the capital region one of the leading photonics locations in Germany, in Europe and even worldwide. Over 4,000 newly created industry jobs in the last 10 years, an annual growth in sales on an average of 8%, an export share of 68% and a share of almost 17% of the total turnover that goes into research and development underlines this fact.

With OpTecBB e.V., Berlin Brandenburg offers an unparalleled industry platform for optical technologies and micro-systems technology. It acts as the central contact and coordinating agency for research experts, manufacturers and users of optical technologies and micro-systems technologies and has set itself the goal of effectively networking between industry and research in Berlin Brandenburg and to lobby for good framework conditions.



Competence Network for optical technologies in Berlin and Brandenburg

Optec-Berlin-Brandenburg e.V. (OpTecBB) is the competence network for optical technologies and micro-system technology in the region of Berlin Brandenburg. OpTecBB was founded on September 14th, 2000 by companies, research institutions, universities and federations supported by relevant ministries in Brandenburg and the Berlin Senate.

Since the foundation, the total number of members increased nearly tenfold and has expanded to more than 100 members until today. OpTecBB is the largest regional cluster of Optical Technologies in Germany. Nationwide, more than 500 organizations joined one of the regional clusters Optical Technologies, OptecNet Deutschland. OpTecBB is part of the national strategy process that started with the development of the "German Agenda Optical Technologies for the 21st Century" and that is fostering the development and strengthening of optical technologies in the Berlin Brandenburg region.

OpTecBB and its members have set the following mission:

- clustering and networking the potential of optical technologies and micro systems technologies that is present in the region Berlin Brandenburg,
- fostering knowledge and technology transfer between academia and industry,
- initiate R&D projects and support co-operations,
- form a platform for information exchange and communication,
- organize common marketing activities and trade fair presentations in order to promote the capabilities of the companies in the region,
- represent optical technologies and micro systems technologies towards politicians and associations,
- bring optical technologies and micro systems technologies to more public awareness by appropriate public relations activities,
- inform and consult regional governments and economic development agencies,
- develop and maintain contacts and relations to international clusters and organizations in the field of optical technologies and micro systems technologies.

OpTecBB is significantly involved in the definition of the cluster management in the photonics cluster in the German capital region. OpTecBB is outstandingly networked on a national and international level via associations like OptecNet Deutschland e.V. and European Photonics Industry Consortium (EPIC) as well as the active work in Photonics21.

Core areas and competences

Presently OpTecBB has the following technological focus groups that are derived from the competencies present in the region and that specify the profile of Berlin and Brandenburg in the academic and industry landscape of Germany:

*Biomedical and Ophthalmic Optics,
Laser Technology,
Lighting Technology,
Optics for Communication and Sensors,
Optical Analytics,
Micro Systems Technology.*

In a high tech industry like optical technologies and micro systems technologies education and further education become more and more important. This includes the young academic but also the secure access of companies in the region to qualified work forces. For this reason OpTecBB is engaged in provision of internships, the support of schools in partnerships, guest lectures, days of open doors and company visits. It is the aim to draw the interest of young people to the natural sciences so that it may become the basis for an apprenticeship and a work life in this exciting industry. Apart from educational issues OpTecBB is engaged in numerous activities to support photonics related start-up companies in the region. E.g., founder of photonics related start-ups can enjoy the benefits of an OpTecBB-Membership free of charge for three years after the foundation.

The advantages of the membership in the Optical Technologies network OpTecBB are as manifold as the structures of the network's members, e.g.:

- Easier access to knowledge, suppliers, customers and applications, new markets, and public funding,
- Contact to experts,
- Shorter "time to market",
- Marketing and communication support,
- Education, workshops, studies,
- Job board,
- Start-up support,
- discounts.

New members are always welcome!

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OPTECBB e.V. - Biophotonics related COMPANIES

Adlershof . WISTA - Management GmbH
art photonics GmbH
Berlin Partner für Wirtschaft und Technologie GmbH
Carl Zeiss Meditec, Location Berlin
Berlin-Fibre
Dr. Türk Ingenieurbüro für Optikentwicklung und Software
eagleyard Photonics GmbH
EPIGAP Optronic GmbH
FCC Fibre Cable Connect GmbH
FISBA Photonics GmbH

FOC GmbH
InBeCon GmbH
LEONI Fiber Optics GmbH
LTB Lasertechnik Berlin GmbH
OECA GmbH
Optikexpertisen Dr. Volker Raab
opTricon GmbH
OSRAM GmbH
Optotransmitter-Umweltschutz-Technologie e.V. (OUT e.V.)
PBC Lasers GmbH

Berlin Adlershof WISTA-MANAGEMENT GMBH

The Centre for Photonics and Optics is located in Germany's largest Science and Technology Park, Berlin Adlershof. This location is increasingly evolving to an internationally preferred address for students, scientists, and entrepreneurs, who learn, teach, research, develop, and produce in future-oriented technology fields. With a high quality infrastructure embedded into the economic, cultural and political environment in the metropolis of Berlin, the location provides a very appealing working and living place for people, who create the future.

Fields of Activity

On behalf of the State of Berlin, WISTA-MANAGEMENT GMBH establishes and manages state-of-the-art technology centres for:

- Photonics and optics
- Microsystems and materials
- Photovoltaics and renewable energy
- Information technology and media
- Biotechnology and the environment

Range of Services of WISTA-MANAGEMENT GMBH

- Marketing of rental space and properties
- Fostering the networking among science and business
- International and national co-operations
- Public relations for the entire development of Adlershof

Research & Development

10 non-university research institutes, six institutes of the Humboldt University and more than 1,000 businesses and organizations form a unique framework of know-how, knowledge transfer and co-operations.

Special Equipment

The six buildings of the Centre for Photonics and Optics cover a total rentable space of 18,500 square metres, consisting of modern laboratories and clean rooms, production halls as well as offices and workshop rooms.

art photonics GmbH

art photonics GmbH

the world's leading manufacturer and supplier for optical fiber solutions of a broad spectral range (from 200nm to 18µm) for OEM market.

Fields of Activity

Our goal is to engineer, design and manufacture the highest quality, cost-effective optical fiber solutions of spectroscopy fiber probes & fiber bundles, high power fiber cables for industrial and medical applications by using Silica, CIR and patented PIR fibers.

Research & Development Activities

sensor spectral measurement
laser power delivery
fiber optic spectroscopic probes

Current State-of-the-art Technologies

FlexiRay® cables produced for various lasers in broad spectral range – from Excimer to Diode, solid state, ER:YAG and gas CO- & CO₂-lasers.

FlexiRay® bundles & convertors designed for a broad spectral range from 0.2-18µm include arranged fiber bundles to measure emission spectra from UV to MIR and fiber combiners to deliver diode laser total power in multi kW range.

FlexiSpec® product line is a large family of various fiber probes for process-spectroscopy.

Near & Mid IR-fiber ATR-Probes produced for any type of FT-NIR, FT-IR and other IR-spectrometers, for IR-LED, QCL, and MEMS tunable filter spectral sensors.

Berlin Partner für Wirtschaft und Technologie GmbH

Berlin Partner for Business and Technology offers business and technology promotion for companies, investors and science institutes in Berlin. With carefully tailored services and excellent links to research, our experts provide an outstanding range of offerings to help companies launch, innovate, expand and secure their economic future in Berlin.

We support and advice companies and research institutions, which aim to establish business in Berlin or to further grow at the site, by providing comprehensive services and information within the fields of optical technologies and microsystems technology.

The Clustermanagement Photonics lies with Berlin Partner

for Business and Technology, as well as OpTec-Berlin-Brandenburg (OpTecBB) e.V. and ZAB Brandenburg Economic Development Board.

Range of Services

Berlin-Partner Network
Business Welcome Package
eBusiness Services
EU and International Services
Funding | Financing
Location Services
Patent Services
Talent Services
Technology Services
Business Promotion Berlin Districts
Service Packages

Carl Zeiss Meditec AG, Berlin

Carl Zeiss Meditec AG is one of the world's leading medical technology companies. The company offers complete solutions to diagnose and treat ophthalmic diseases. At our Berlin Carl Zeiss Meditec AG develops and manufactures intraocular lenses (IOL). These are implanted in patients who suffer from a cataract to restore vision.

Fields of Activity

Development of intraocular lenses and implantation systems

Implementation of pre-clinical tests and clinical trials for approval of medical devices

Range of Services

Optical design and simulation
Optical characterization of IOLs
Optometry and IOL calculation

CAD
Clinical studies

Research & Development Activities

Intraocular lenses and implantation systems
Physiology and psycho-physics of visual perception

Special Equipment

Optical laboratory
Chemical laboratory
Volume IOL manufacturing equipment

Current State-of-the-art Technologies

Precision manufacturing of intraocular lenses

Berlin-Fibre

Under the brand Berlin-Fibre we offer high quality, customer-specific fiber-optical systems for the entire industrial area of laser technology, sensors and spectroscopy over astrophotonics to medical technology and telecommunications.

Fields of Activity

laser technology
sensors/spectroscopy
astrophotonics
medical technology
telecommunications

Range of Services

We offer customer specific:
fibre cables

fibre bundles / fibre-arrays
cross-section converter
Y-cables
1/n multi-fibre-cables
hybrid cables
fibre/fibre-coupler
optical collimators
with own connector-designs and ST, FC-(A)PC, SMA, BF-D80, BF-10 (LLK-A)

consulting
engineering
manufacturing
repairs

Dr. Türcck Ingenieurbüro für Optikentwicklung und Software

Dr. Türcck Engineering provides services for development projects in the fields of optical and illumination systems. Construction and numerical modelling of optical components and systems is our business, be it for imaging optics, fiber optics or illumination systems. We provide support over the entire design process, from the early concept phase to simulation and modelling and to tolerance analysis and preparation of production.

Our job is not only to provide optimal solutions but also to empower the customer and to develop his skills. Therefore we also provide customer specific as well as open training seminars to introduce customers to using the optical design software Zemax® in the development process.

A further field of expertise is computer based data analysis. We support our customers in developing methods for processing and statistical analysis of large data sets ('big data'). Such data may be acquired during process development or from production monitoring. Statistical analysis of such data (data mining) will allow important conclusions and insights to underlying processes. Examples are the analysis of production processes in order to

improve yield or the development of evaluation methods for lab analytics.

Fields of Activity

Optics for imaging and analysis,
Fiber coupling for optical data communication,
Beam shaping for industrial measurement,
Optical measurement methods for medical diagnostics,
Systems for illumination and traffic lights,
Solar concentrators,
... and much more.

Range of Services

Construction and modelling of optical components and systems.
Training courses for the optical design software Zemax®.
Customer specific development and implementation of statistical analysis methods for large data sets.

(Zemax is a registered trademark of Radiant-Zemax LLC)

eagleyard Photonics GmbH

eagleyard Photonics develops and manufactures high power laser diodes – the key components for next generation laser systems. These high power laser diodes are produced in close cooperation with the renowned Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik and represent reliable product results of top research performances. Since its foundation in 2002, eagleyard Photonics, a highly innovative and rapidly growing company has become a leading provider of high power laser diodes with wavelengths ranging from 630 to 1120 nm. Customers worldwide integrate laser diodes "made by eagleyard" into their systems. The certified development, production and marketing processes are subject to rigorous quality standards required by ISO 9001:2008

Fields of Activity

Development, manufacture and sale of high power laser diodes ranging from 630 nm to 1120 nm.

Range of Services

The product portfolio covers Ridge Waveguide Lasers (Fabry Perot), Broad Area Lasers, Tapered Lasers, Tapered Amplifiers, DFB and DBR Laser, combining maximum power, high durability and excellent beam quality.

Research & Development Activities

We are part of a few research and development programs such as the development of Terahertz Quantum Cascade Lasers

Special Equipment

Own cleanroom facilities

Technology Partners

Ferdinand Braun Institut

Current State-of-the-art Technologies

Terahertz Quantum Cascade Lasers

EPIGAP Optronik GmbH

EPIGAP Optronik GmbH combines more than 14 years of experience in the field of optoelectronics.

From development through to production, we offer a wide range of standard and customized LED chips, LED's, photodiodes and CoB modules, in small and medium quantities.

Fields of Activity

We offer a wide selection of LEDs and bare chips in a range from 265nm to 1720nm and a wide variety of LED packages including thru-hole (5mm, 3mm), SMDs and excellent metal housings.

Our products are used in all areas of industry, with main market application in industrial measurement and sensor technology, automation and safety technology as well as medical and biotech technology.

Range of Services

Standard and customized solutions of LED chips, LEDs and Arrays.

Deep UV LEDs for UV curing, Biochemistry analyzer or sterilization with high reliability, long lifetime and high efficiency

Selective Photodiodes with wavelength sensitivity range in UV and infrared

customized monolithic display chips

Research & Development Activities

Customized copper based CoB modules for special high power application

FCC Fibre Cable Connect GmbH

FCC FibreCableConnect GmbH develops and manufactures fiber optic cables for laser beam delivery up to 1 kW laser power for industrial and medical applications. Also fiber bundles, probes for spectroscopy and optical coupler.

Fields of Activity

High Power Fiber Cable for industry
Laser beam delivery cables for medicine
Optical fiber bundle for probes and spectroscopy
Optical fiber coupler

Range of Services

Complete solutions from design develop through model a prototype and manufacture the line
Assembling of single- and multimode fibers in the range of wave length: UV-VIS-NIR
Development of tailored customer- and application-

specific solutions

Research & Development Activities

High power laser beam Delivery into single mode fibers.
KW-Power for multimode fiber cables.

Current State-of-the-art Technologies

100 µm fiber cable with SMA-Connectors for 500 W laser power

FISBA Photonics GmbH

FISBA Photonics GmbH is a subsidiary of FISBA AG, a world leader in optical systems and components based in St. Gallen/Switzerland. The engineering team is focused on the development of new cutting-edge laser light sources and optical microsystems.

Fields of Activity

Biophotonics & Life Science
Industrial Manufacturing
Sensors

Range of Services

Lens Design
Coating
Optical and Mechanical Manufacturing
Opto-Mechanical Design
Assembly of Optical Systems and Microsystems

Research & Development Activities

Medical Technology
Process Engineering

Laser Technology
Fabrication Technology

Special Equipment

Precision Glass Molding
Semi-Automatic Micro-Assembly
CNC-based and conventional Manufacturing of Optics
Optical Coating Shop
Clean Rooms

Technology Partners

WISTA Science and Technology Park Adlershof
Universities, Institutes and Commercial Partners

Current State-of-the-art Technologies

Isothermal Precision Glass Molding for aspherical and free-form Optics, Collimating Optics for Diode Lasers (FAC, SAC, FBT) in large Quantities, Assembly Technologies for Mounting of Laser Diode Modules, Micro-Optic Arrays and Optical Microsystems

FOC GmbH

FOC GmbH develops and manufactures passive optical components and systems meeting the most challenging customer requirements. The long-standing experience of our staff is the foundation for products, which are reliably employed in the fields of data transmission/telecommunications, industrial control engineering/sensor technology, laser/medical technology as well as in transportation and traffic.

Fields of Activity

Development and manufacture of passive optical components
Enclosures and connection equipment for optical networks
Assembly of optical connectors
Products and systems for commissioning and monitoring fibreoptical networks

Range of Services

Custom development and manufacture of CWDM-, DWDM-, ADM- and coupler modules
Development and manufacture of passive optical components for special wavelengths from 266nm to 1700nm

Integration of fibre-optical monitoring systems in existing customer networks

Research & Development Activities

Miniaturization and integration of optical functional modules
Development and integration of products for the passive monitoring of fibre-optical networks

Special Equipment

"FTTx-Lab" optical fibre test environment
Measuring and monitoring systems for testing of networks

Technology Partners

Fraunhofer Institute for Telecommunications, HHI
SENTECH Instruments GmbH

Current State-of-the-art Technologies

Class A low-loss connectors
"lilix" reflectors

InBeCon GmbH

InBeCon GmbH offers technical consulting and support for the design and the production of electro-technical components and modules. The emphasis of the extensive experience is in the fields of opto-electronics and microsystems technology e.g. in the adoption of micro-mechanics for the miniaturization of various components.

We support your product development as well as optimization in close collaboration with all partners by modelling of optics and multiphysics properties with FEM. InBeCon GmbH was assigned a "Certified Comsol Consultant" for such FEM simulations.

In the next step we consult about electronic packaging and assembly technology for the manufacturing of your products starting from sample manufacturing to volume production. Here we offer a 30-years experience with new production methods and the knowledge about the know-how of specialized foundry partners.

InBeCon GmbH supports you with the IP-management for the protection of your know-how e.g. for patent generation, patent assessment as well as patent defence.

Fields of Activity

Optical communication
Micro System Technology
Sensors
Laser technology

Range of Services

3d modelling of modules with FEM
Simulation of optical systems
Design of components and packages
Optimization of electronic packaging and assembly
Support for IP-management

Technology Partners

Comsol: appointed as "Comsol certified Consultant"

LEONI Fiber Optics GmbH

Your system partner for the entire value chain:

The Business Unit Fiber Optics of the LEONI Group is one of the leading suppliers of high-purity fused silica, preforms and rods, as well as optical waveguides for special applications in industry, optics, sensor technology and analytics, science, communications and in laser medicine. From fused silica to preforms and the fiber drawn from it to fiber optic cables and complete fiber optics systems with self-developed optical components, we offer all the expertise of a global company with more than 74,000 employees worldwide. As such you benefit from our fiber optic products for an integrated system solution.

Fields of Activity

Communication (cabling systems for industry and buildings)
Energy (wind, solar, oil, utilities)
Mechanical & Plant Engineering (drag chain cables, fieldbus cables, optical probes, switches and splitters)
Automation & Robotics (Industrial Ethernet, bus systems, material-processing high-power lasers)
Transportation Engineering & Automotive (Rolling Stock, transport, traffic control, MOST, special optical components for automotive

applications)

Industrial Laser Technology (active and passive fiber optic cables for laser welding / laser treatment)
Medical Devices & Life Science (laser probes, endoscopy components, diagnostics)
Sensor Technology, Analytics & Spectroscopy (colour, turbidity and gas sensor technology, environmental technology, chemical and food industries, astrophysics)
Naval & Maritime Engineering (control cable, marine universal & breakout cable, cable for ROV)
Optics (fused silica, preforms, rods, tubes, wafers, optical blocks)
Aerospace & Satellite Technology (optical fibers, fiber bundles, probes and control cables; special optical components, e.g. for the Pluto mission New Horizons)

Range of Services

Raw materials, fiber & cable production, assembly, medical devices and laser probes, special optical components, passive optical networks

Research & Development Activities

OEM & ODM development & service partner

LTB Lasertechnik Berlin GmbH

LTB Lasertechnik Berlin GmbH is an innovative developer and manufacturer of short-pulse lasers in the whole optical spectral range, and of different spectrometers and laser-based measuring technique, marketing its products world-wide.

Fields of Activity

Laser sources for industrial analytics and medical diagnostics
Highest-resolution spectrometers for the development and production of diode lasers and for laser lithography
Laser-based measuring technique for spectroscopic material analysis, process analytics and medical diagnostics (LIF, LIBS, Raman)

Range of Services

Customized solutions and engineering services with regard to optical applications in material and process analytics

Research & Development Activities

Industrial process control, material analysis and sorting (in-line/at-

line) based on laser-induced breakdown spectroscopy (LIBS)

Direct-switching solid-state power switches for gas lasers

Detection system for the early diagnostics of black skin cancer

Special Equipment

Application laboratories with a number of laser sources and spectrometer systems

Technology Partners

ISAS Berlin – Leibniz-Institute for Analytical Sciences,
Federal Institute for Materials Research and Testing (BAM)
Max Born Institute, ...

Current State-of-the-art Technologies

Laser cartridges in metal-ceramic technology
High-resolution echelle spectrometers
Ultrafast solid-state switches for lasers

OECA - OPTOELEKTRONISCHE COMPONENTEN UND APPLIKATIONS GMBH

Fields of Activity

opto-electronic components and units
laser and fiber optics
extended beam connectors
thermal print heads

Range of Services

opto-electronic assembly
hybrid assembly
thick film technology
DLC technology

Research & Development Activities

customized components
power over fiber
customized thermal print heads

Special Equipment

die and wire bonder, cap welding,

manual and semi-automatic adjustment equipment
active / passive fiber alignment (POF, MM, SM, PM)
fiber fusion splicer
gluing, laser welding
beam profile analyser

Technology Partners

customers in branches like:
datacom
measurement equipment
sensor systems
life sciences

ISO9001:2008 certificated

Optikexpertisen Dr. Volker Raab

Optikexpertisen is an enterprise for development, consulting, and intellectual property in the fields of lasers and optics. This is achieved by simulation and experimental verification in its own application laboratory. Specializations are semiconductor laser systems and customized optics for beam shaping, LED's, and fiber coupling.

Optikexpertisen helps mainly small and medium sized enterprises with its know-how and laboratories to realize optical measurements, simulations, and development.

Optikexpertisen Dr. Volker Raab und Dr. Corinna Raab GbR is active since 2006 regionally, Germany-wide, and in four other European countries.

Fields of Activity

Typical developments improve the beam quality of laser, wavelength stabilization and tuning, spectral multiplexing, and frequency conversion. Optical optimizations deal with complex fiber coupling, achromatic or astigmatic optics, and spectroscopy. Applications cover medical technology, metrology, and material processing.

Range of Services

Laser laboratory:
improve beam quality, wavelength stabilizing or tuning, Second Harmonics Generation, spectral multiplexing for power scaling

experimental feasibility:

testing, alignments, development of demonstrators, in own laboratory, in customer's laboratory

Optics design and simulation:

complex fiber coupling, laser resonators, beam shaping (astigmatism, beam quality), spectroscopy, dispersive elements, achromatic optics

Research & Development Activities:

Power scaling of semiconductor lasers by spectral multiplexing

Special Equipment:

R&D-capacity in hard and software among which are ZEMAX or physical wave propagation, spectroscopy, measuring, equipment for lasers

opTricon GmbH

Fields of Activity

The company opTricon, headquartered in Berlin, is an OEM (Original Equipment Manufacturer) developing and producing mobile analysis devices for the quantitative analysis of immunological rapid tests, so-called lateral flow assays (LFAs).

Furthermore opTricon is a service provider developing and producing fiber-optic components and modules for sensor and data transmission systems.

Range of Services

The opTrilyzer, a specially developed universal LFA reader system, can be used with all usual LFA test strip formats that require high-resolution measurement in the case of a low analyte concentration. By means of diverse applications of the device, the widest range of test strip technologies can be qualitatively and quantitatively analyzed, e.g. in clinical diagnostics, in the lab or in mobile applications.

The cube-shaped Cube reader has an edge length of approx. 41 mm, making it probably the world's smallest reader. Being cost-

effective and user-friendly, this "electronic eye" can help to obtain simple and objective readings for all kinds of rapid tests e.g. in home-testing or "in the field".

Both devices are individually configured for the corresponding LFA test and constantly further developed in close cooperation with the customer according to the customer's needs.

Concerning fiber-optic components and modules for sensor and data transmission systems we offer our experience and knowledge of fiber-chip coupling, alignment and packaging for modules and components.

opTricon focuses on customer applications in the fields of optical measurement, biophotonics and bioanalytics.

Special Equipment

opTricon is an innovative business, which is certified by the Technical Inspection Agency of the Rhineland (TÜV Rheinland) according to EN ISO 13485:2012 + AC:2012 as well as EN ISO 9001:2008.

OSRAM GmbH

OSRAM of Munich, Germany is one of the two leading light manufacturers in the world. The company's portfolio covers the entire value chain from components – including lamps, opto semiconductors like light-emitting diodes (LED) – to electronic control gears as well as complete luminaires, light management systems and lighting solutions. OSRAM has around 34,000 employees worldwide and generated revenue of 5,1 billion Euros in fiscal year 2014 (ended September 30th). Beside products for general lighting OSRAM in Berlin develops and manufactures customer specific light solutions for applications in industry and medicine. Especially by integration of highly specialized partner companies from various branches we are able to develop custom-engineered innovations.

Additional information can be found in the internet at www.osram.com

Fields of Activity

Development and production of light sources and optical systems

Range of Services

Development and production of customized lighting solutions
Project support from prototype to mass production

Research & Development Activities

Solid-State light sources, phosphors, optical systems for industry

Current State-of-the-art Technologies

High luminance light sources

Optotransmitter-Umweltschutz-Technologie e.V. (OUT e.V.)

The OUT e.V. was founded as an innovative external research institution. OUT e.V. is a industrial research organisation. The statutory aim of OUT e.V. is to promote science and research, especially in the fields of optoelectronics as well as environmental technologies.

Fields of Activity

LED-Technology
Thin film technologya
Sensors

Range of Services

Contract research services
Magnetron sputtering and PECVD of semiconductor and contact layers
Mechanical, optical and electrical characterization of thin films
Optical and thermal simulations
Measurement services
Rapid prototyping (3D-printing)

Research & Development Activities

Thermal management of high-power-LED
Daylight simulation and photon generator
UV-transmitter and fluorescence detectors
Production and optimization transparent contacts
VHF-PECVD-technology for layer deposition at low temperatures
Development of TOF-Sensors for 3D-measurement
Optical technologies for security applications

Special Equipment

Optical laboratory for measurement of all optical and electrical, parameters of radiation emitters, (Ulbricht spheres up to 1 m), vacuum deposition (CVD and magnetron sputtering)
Flash lamp annealing (DTF-FLA100)
X-ray diffractometer D2-PHASER
Scanning Electron Microscope (SEM) + XRD
Laser soldering equipment (50 µm resolution) 3D-microscope
Large scale test environment (11 x 4 x 4 m³)

PBC Lasers GmbH

PBC laser develops and sells high brightness and high power laser diodes and laser diode based modules and systems at wavelengths of 980 nm and 1060 nm for applications in the fields of industrial material processing.

Fields of Activity

Development of narrow-stripe single laser diodes
Development of multi-stripe laser diode mini bars
Development of active heat sinks for bar modules
Development of external resonators for laser bars

Research & Development Activities

Development of laser diodes based on Photonic Band Crystaltechnology. Those lasers contain 10-15 microns wide waveguides which lead to single mode emission in vertical and lateral direction with narrow far-field divergence and very good beam quality. Power scaling is done by coherent coupling of multi stripes in external resonators.

Special Equipment

Laboratory equipment for complete electrical and optical characterization of laser diodes in the wavelength range of 900-1100 nm. Optical table for external resonators. Eutectic die bonder for positioning and soldering laser bars.

Technology Partners

Technische Universität Berlin – Zentrum für Nanophotonik, Universität Potsdam, C2GO inprocess solutions GmbH, InBeCon GmbH, Lumics GmbH, Raab Photonik GmbH, Picoquant GmbH

Current State-of-the-art Technologies

Single stripe laser diodes with max. optical power of 1.7 W cw at 1060 nm, beam quality M₂ <1.5 built as a free space module on passive copper cooler.

OPTECBB e.V. - Biophotonics related INSTITUTES / Associations

Beuth Hochschule für Technik Berlin
Fraunhofer-Institut für Angewandte Polymerforschung (IAP)
Helmholtz-Zentrum Berlin für Materialien und Energie GmbH
IAP – Institut für angewandte Photonik e. V.
Leibniz-Institut für Analytische Wissenschaften – ISAS – e.V.
Laserverbund Berlin - Brandenburg
Laser- und Medizin-Technologie GmbH, Berlin (LMTB)
Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (MBI)
Physikalisch-Technische Bundesanstalt (PTB)
Technische Hochschule Wildau, AG Photonik, Laser- und Plasmatechnologien
Universität Potsdam und innoFSPEC Potsdam

Beuth Hochschule für Technik Berlin

Fields of Activity

Education for Ophthalmic Opticians / Optometrists B.Sc. for self-employed high quality professionals for optometry, ophthalmology and related professions

Range of Services

Education on a high quality international accepted level, defined by the European professional organization ECOO in the European Diploma and established by the German professional organization ZVA in the quality guidelines of the German Optometry profession. Main part of education beside the basic theory is to learn comprehensive competencies of the professional and clinical practice of optometry. The competencies are assessed by more than 70 single examinations during the 7 semester program of the university.

Research & Development Activities

Large laboratories for the areas Optometric Examinations,

Spectacles, Contact-Lenses and Low Vision.

Modern high quality equipment for the anterior and posterior segment of the eye (including loans of the German and international ophthalmic industry)

Special Equipment

Education with a high variety of modern instruments from Germany and all over the world

Technology Partners

Cooperation with the German professional organization ZVA, the different German scientific organizations WVAO, VDCO, IVBS and the international professional organizations EAEO and IACLE, Cooperation contracts with different ophthalmology institutions, Member of OptecBB

Current State-of-the-art Technologies

Fundus examinations with modern OCT technology
10 years longtime study on orthokeratology contact lenses

Fraunhofer-Institut für Angewandte Polymerforschung (IAP)

Tailored on customer needs Fraunhofer IAP offers a complete range of research and development services on different fields of polymer chemistry, polymer physics and processing development. One key aspect covers on an interdisciplinary base the synthesis and development of optical and photosensitive materials, material processing and structuring and the fabrication of optical functional elements and devices.

Range of Services

Application-oriented R&D projects for partners in the chemical and optical industry
Feasibility studies
Custom development of materials, processing technologies, functional elements and devices
Characterization of optical materials, thin films and optical elements
Topological characterization of micro- and nanostructured surfaces (AFM)

Research & Development Activities

All-optical micro/nano-structuring of surfaces

Photo orientation of polymers and photo alignment of liquid crystals; polarizing elements
Electrically tunable diffractive optical and photonic elements, polymeric DFB laser
Development of polymer based sensors and actuators
Semi-conducting and electro-luminescent polymers and nanocomposites applicable for organic light-emitting diodes (OLED) and organic photovoltaic
Flexible displays, electrochromic displays
Optical functional layers for biosensors
Structured biofunctional surfaces
Optical probes for life sciences
Smart windows based on chromogenic polymers
Thermochromic and electrochromic polymer composites

Special Equipment

Holographic labs
Extrusion processing facilities
Application Center for Innovative Polymer Technologies (clean room facilities, processing of polymer layers and polymer devices)

Helmholtz-Zentrum Berlin für Materialien und Energie GmbH

HZB is driving research on energy materials. These are novel materials for energy transformation or more efficient energy use, for instance for solar watersplitting, next generation solar cells, future information technologies and other fields.

For this research HZB operates two large scale facilities, which are open for external scientific users as well: the electron storage ring BESSY II, Adlershof. BESSY II, producing an ultra bright photon beam and the neutron source BER II, Wannsee.

HZB employs approximately 1,150 staff and cooperates with more than 400 partners at German and international universities, research institutions and in companies.

Range of Services

Every year, HZB's user service enables some 3,000 external scientists to access measuring methods, which in some cases are quite unique.

Research & Development Activities

Structure-property relationship of materials, atomic and magnetic structure, inner dynamics and phase transitions in condensed matter.

Research for the next generation of solar cells, including new classes of materials and innovative cell structures.

New materials for solar fuel generation.

Development of instrumentation.

Special Equipment

Synchrotronlightsource of 3. Generation, Neutron source, extreme sample environments (high magnetic fields, low temperatures). Development of nanometre optical technologies and high quality optical components and systems.

Technology Partners

To improve transfer of new technologies HZB has cofounded the Competence Centre Thin-Film- and Nanotechnology for Photovoltaics Berlin PVcomB in Adlershof, Berlin.

IAP – Institut für angewandte Photonik e. V.

The Institute for Applied Photonics (registered association) was founded in 1999 as a non-profit, non-university research facility for the advancement of science, research and education in the field of photonics. The focus of activity is the development of various spectroscopic methods for material testing close to the process.

Fields of Activity

X-ray fluorescence analysis
THz time-domain spectroscopy
Glass technology

Range of Services

Contract research / development
Manufacturing and implementation of prototypes and techniques
Granting licenses
Training in the field of X-ray analytics
Development of evaluation software

Research & Development Activities

Recycling and waste sorting
Analysis of slag and sludge
Glass compositions for X-ray optics
Film thickness analysis with THz time-domain spectroscopy
Geology

Special Equipment

Various XRF spectrometers
X-ray colour camera for simultaneous 2D-XRF
Microscopy (SEM, AFM, light microscopy)

Technology Partners

IfG GmbH, BLIX / TU Berlin, BAM, PTB, GFal, First Sensor AG, artPhotonics GmbH, Bruker Nano GmbH, LTB GmbH

Leibniz-Institut für Analytische Wissenschaften – ISAS – e.V.

ISAS (Leibniz-Institut für Analytische Wissenschaften – ISAS – e.V.) is a research organization dedicated to advancing analytical technologies as a driver of scientific, social and economic progress by making measurable what cannot be measured today, and through combining the knowledge from chemistry, biology, physics, and computer sciences.

Fields of Activity

Our research focuses on providing methods for the multi-parameter analysis of bio materials. With our innovations we aim to enable an earlier detection of diseases and their associated risk factors, and a faster and more precise therapy.

At our Berlin site, we develop optical spectroscopy methods to characterize "new" and biologically functionalized materials as well as interfaces.

Research & Development Activities

Experimental equipment and evaluation procedures for in situ studies of surfaces (vibrational spectroscopy, reflectance

anisotropy spectroscopy (RAS), ellipsometry, Raman and infrared (IR) spectroscopy, IR microscopy, IR mapping ellipsometry)

Developing measurement concepts for faster analyses, higher sensitivity and better lateral resolution. Those methods are then used for analyzing functional layers and molecule absorption on such layers (e.g. specific linkers for solar cell applications, functional polymer films for biosensors)

Development and application of optical polarization methods in the IR to VUV range, e.g. RAS, Raman spectroscopy and VUV ellipsometry

Current State-of-the-art Technologies

Polarisation-dependent infrared spectroscopy and ellipsometry
VIS/VUV ellipsometry

Laserverbund Berlin - Brandenburg

Fields of Activity

The Berlin-Brandenburg Laser Association e.V. is an organisation whose members are specialists from companies, universities, research facilities and associations.

Our aims are:

To promote contacts between science, business and industrial partners with regard to laser research, development and applications in the Berlin/Brandenburg region.

Range of Services

Our services:

we set up / support interdisciplinary projects and collaboration between science and business

we demonstrate the region's industrial potential in the laser technology field

we provide information on laser technology issues

Research & Development Activities

We hold:

workshops, seminars and user groups

advanced training courses

regular informal gatherings to discuss laser technology issues

a "LASER" newsletter

Special Equipment

Wide infrastructure of our members.

Technology Partners

The Berlin-Brandenburg Laser Association e.V. was founded in 1993 and currently has more than 110 members from companies, development departments and public sector institutions.

Current State-of-the-art Technologies

See members

Laser- und Medizin-Technologie GmbH, Berlin (LMTB)

Fields of Activity

The historically rooted dual-way of the LMTB offers chances for business development which have been further enhanced since the two locations were merged in 2010. In addition to innovative technologies developed for the processing of brittle and transparent materials, the field of applied laser technology enables the manufacturing of improved diffusor fibers for laser therapy. With photonics methods an ever increasing number of solutions for the medical technology in the areas of spectroscopy and sensor technology is provided.

Range of Services

Scientific contract research

Consultation and Training

Feasibility studies

Production of prototypes and small series

Laser precision manufacturing

Process development and validation

Design and development of optical equipment and medical devices

Research, needs analyses, market studies, protection of ideas /

intellectual property rights

Technology transfer

Research & Development Activities

Tissue optics of turbid media

Optical blood analysis and sensor technology

Raman Spectroscopy for tumour diagnosis and analytics

Laser machining of brittle materials

Bulk laser processing of transparent materials (micro dots), especially diffusor fibers

Development of system components for laser micro processing

Special Equipment

Measuring station for optical properties in turbid media with simulation software for light propagation

Several laser systems for micro machining

Technology Partners

Cooperation treaty with the three big Berlin Universities

Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (MBI)

The Max-Born-Institute (MBI) for Nonlinear Optics and Short Pulse Spectroscopy in the Forschungsverbund Berlin e.V., an institute of the Leibniz Association, conducts basic research in the field of nonlinear optics and ultrafast dynamics arising from the interaction of light with matter, and pursues applications that emerge from this research. It develops and uses ultrafast and ultra-intense lasers and laser-driven short-pulse light sources in a broad spectral range from the far-infrared to hard x-rays in combination with methods of nonlinear spectroscopy.

Fields of Activity

The research program is based on the unique potential of nonlinear and ultrafast light-matter interactions to unravel most directly how nature operates on ultrashort time and atomic length scales, and – vice versa – to understand why functional microscopic processes are ultrafast. Lasers represent both a subject of research and the essential tool for experimental studies of light-matter interaction. Beyond the most advanced methods of ultrafast nonlinear spectroscopy, new ultrafast probes of transient electronic and atomic structure on atto- to femtosecond time scales represent a major component of MBI research.

Research & Development Activities

new sources for ultrashort and ultraintense light pulses, pulse shaping, pulse characterization, and measuring techniques for ultrafast processes in a broad spectral range from the mid-infrared to the x-ray region ultrafast and nonlinear phenomena with special emphasis on

- atoms, molecules, and plasmas
- and surfaces and solid state.

Range of Services

In the application laboratories the MBI concentrates its specific experimental resources aiming at a most flexible, versatile and cost efficient use of expensive, state of the art equipment by internal researchers from different research projects as well as by external partners from science and industry.

Special Equipment

Femtosecond Application Laboratory

High Field Laser Laboratory

BLiX Berlin Laboratory for Innovative X-ray Technologies

Physikalisch-Technische Bundesanstalt (PTB)

Fields of Activity

Radiometry from THz to X-ray spectral range
Reflectometry, scatterometry, X-ray and IR (micro-) spectrometry with synchrotron radiation
Quantitative nanoanalytics, e.g. for nanolayers or characterization of nanoparticles
Development and application of radiometric procedures for remote sensing and astronomy
Medical physics and measuring techniques of biomedical optics

Range of Services

Calibration and characterisation of detectors and radiation sources from THz to X-ray spectral range
Characterisation of optical components (e.g. mirrors, filter, gratings) for THz to X-ray spectral range
Characterisation and calibration of instruments for remote sensing and astronomy
Development and provision of reference measuring procedures in laboratory medicine

Optical measurement and imaging for medicine and biomedicine

Special Equipment

Metrology Light Source (MLS) electron storage ring with experimental stations from THz to extreme UV (EUV) spectral range
PTB laboratory at BESSY II with experimental stations from extreme UV (EUV) to X-ray spectral range
Primary detector standards
Radiometric measurement facilities for THz to UV spectral range based on various radiation sources (black body radiators, plasma sources, lasers, lamps)
Measurement facilities to determine spectral emissivity
Reference measuring procedures for flow cytometry
Measurement facilities for quantitative microscopy
In vivo measuring and imaging devices for tissue optics

Technische Hochschule Wildau, AG Photonik, Laser- und Plasmatechnologien

Fields of Activity

Photonics, integrated optics and optoelectronics, optical measurements and sensorics, coatings / thin film technology, surface modification and surface diagnostics, material research, laser spectroscopy, laser material processing, plasma diagnostics, plasmonics

Range of Services

Education (Engineering Physics, B.Eng., Photonics, M.Eng.), research and development projects in the described fields of activity

Research & Development Activities

Silicon and hybrid photonics, graphene and carbon layers, optical and functional coatings, fiber-optic sensors, optical multi-layer systems, broadband absorber layers, materials for sensorics and nonlinear optics, simulation and design of optical systems (Zemax, VirtualLab, Unigit, Comsol)

Special Equipment

Laser lab with tunable ns, ps and fs lasers, spectral ellipsometer, Raman microscope, UV/VIS/NIR spectrophotometer, FT-IR spectrometer, impedance measuring station, Hall effect measuring set-up, AFM, STM, laser triangulation, REM, focused ion beam set-up - FIB, several sputtering and vapor deposition facilities, PE-CVD and IC-CVD / cryo-etching cluster, laser materials processing (marking, cutting, welding, structuring), high speed camera, labs for materialography and chemical synthesis

Technology Partners

Leibniz-Institute for High Performance Microelectronics (IHP) Frankfurt (Oder), Technical University of Applied Sciences Brandenburg, University of Rome Tor Vergata, Technical University Berlin, partners (institutes and enterprises) of the network „Protection and Refinement of Surfaces“ and of the Laser Application Network Berlin-Brandenburg.

Universität Potsdam und innoFSPEC Potsdam

The Faculty of Science and of Human Sciences of the University of Potsdam perform fundamental and application-oriented research within different fields of optical technologies. As an interdisciplinary joint program between the Leibniz Institute for Astrophysics Potsdam (AIP) and the Institute of Chemistry/Physical Chemistry University of Potsdam, innoFSPEC Potsdam works in the field of fiber sensing and spectroscopy.

Fields of Activity

photonics, physical chemistry, laser physics and spectroscopy, nano-biophotonics, quantum optics, nano-materials, femtosecond X-ray scattering, NIRS-imaging

Range of Services

research and education in the above mentioned fields

Research & Development Activities

optical sensing and analytics, optical in-vitro and in-vivo diagnostics, optogenetics, process analytical technologies, fiber-optical spectroscopy, ultra short time X-ray technology, quantum state

selective excitation and probing, optical sensors for life sciences, microscopic techniques, biosensor platforms, single molecule spectroscopy

Special Equipment

excellent infrastructure and instrumentation in photonics, laser and detector technologies, optical microscopy, imaging techniques, multiplex Raman spectroscopy, reactors with optical process analytics, particle size analysis, X-ray technology, AFM nano-fluidics, microscopy applications lab

Technology Partners

optical sensing and analytics, biomedical optics, laser technology, X-ray optics, optoelectronics

Current State-of-the-art Technologies

photon-density-wave spectroscopy, multichannel- and multiplexing spectroscopy, super-resolution technologies, ultra fast reciprocal space mapping, time-resolved terahertz spectroscopy

Charité - Uni-Klinik für Dermatologie, Venerologie und Allergologie Bereich Hautphysiologie
Elisabeth Klinik Abteilung für Lasermedizin

Charité - Uni-Klinik für Dermatologie, Venerologie und Allergologie Bereich Hautphysiologie

Fields of Activity

Intercellular and follicular penetration of topically applied substances, inside-out penetration;
interaction of antioxidants and free radicals in the skin;
sunscreens;
treatment of the skin with tissue-tolerable plasma;
determination of physiological parameters of the skin and skin lesions;
prevention and therapy of the hand-foot syndrome.

Range of Services

Investigating the penetration of topically applied substances;
particles for drug delivery: prospects and risk assessment;
Microscopic investigations of tissue structure and cell morphology (tumor diagnostics, therapy control in the case of inflammatory skin diseases);
Development and assessment of anti-aging strategies;
Performance of cosmetic and clinical studies based on the German Medical Products Law (MPG);

Characterization of sunscreens/light protection.

Main Research & Development Activities

Loading nanocarriers with drugs, transporting them into the tissue and releasing the drugs from the nanocarriers inside the cells and the skin,
Using plasma technology for wound healing,
Determining free radicals and antioxidants in the skin and in cutaneous cells,
New methods to determine the light protection factor.

Special Equipment/State-of-the-Art Technologies

In vivo laser scanning microscope, multiphoton/CARS tomographic system, optical coherence tomographic system, in vivo electron paramagnetic resonance spectrometer, in vitro electron paramagnetic resonance spectrometer, in vivo Raman microscope, tissue-tolerable plasma jets, integrating sphere setup

Elisabeth Klinik Abteilung für Lasermedizin

The Department for Laser Medicine in the Ev. Elisabeth Hospital is a multidisciplinary team of physicians, medical physicists and nurses. The indications for laser treatments are broadly spread and touch on almost all medical fields.

Fields of Activity

The medical laser treatment of
vascular malformations
urogenital and proctological diseases
tumour related sufferings
respiratory diseases
systemic disorders

Due to the wide range of applications patients of all ages and from all areas of Germany and abroad are treated.

Range of Services

vascular malformations, port-wine stain, hemangiomas
HPV induced diseases and dysplasias of the skin
Morbus Osler

second opinion
consultations for women by women
interdisciplinary examination of clinical genetics
private consultations by Dr. med. Carsten Philipp

Research & Development Activities

Optical diagnostics and process control, photobiology, laser surgery and photo dynamic therapy

Special Equipment

Diverse medical lasers are available including interstitial and other techniques (ITT) and photodynamic therapy (PDT)

Technology Partners

Acatech – National Academy of Science and Engineering, universities and technical colleges in Berlin and Brandenburg, companies that are engaged in the medical and optical industry

