

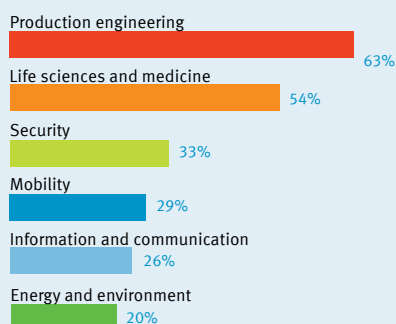
Optics.

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Customers worldwide rely on the unique expertise of the Thuringian optics industry. High-powered diode lasers, laser scanning microscopes and aspherical lenses for special optical filters are prime examples of sophisticated Thuringian-made technology. Multinational powerhouses such as Carl Zeiss, Schott and JENOPTIK got their start in Thuringia. Today, they set the international standard for optics.

Applications of the products



(Source: OptoNet e.V. 2015, multiple mentions allowed, percentage share of companies)

Thuringian optics industry at a glance:

- › 175 companies
- › 15,200 employees
- › around 4,000 optics and laser technology students
- › roughly 1,300 employees at nine university and non-university research institutions
- › over 630 trainees in optics-related professions
- › EUR 2.8 billion in revenue
- › export ratio of 66 %

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Networking to advance optics.

Optics is a cutting-edge key technology that cuts across disciplinary lines. Thuringian clusters effectively link research and production in this field.

OptoNet

OptoNet is a Thuringian optics cluster that represents over 90 market players. As a networking platform, it stimulates collaboration in the industry.

As far as cooperation projects are concerned, there is a division of responsibilities between OptoNet and the OptoNet CoOPTICS GmbH, a 100% subsidiary of OptoNet e.V. Whereas the former one strengthens and fosters the cooperation network in general, the GmbH primarily focuses on initiating, applying for and accompanying research and development projects. It actively monitors trends and technologies and offers consultation about financing options, too.

OptoNet also supports optics-related networks and initiatives such as medways or MNT.

Green Photonics

Green Photonics is a Fraunhofer innovation cluster that brings together academic and business leaders with state and federal government officials. Its mission is to develop new ways to use light to solve pressing problems of the future, enter new markets and lay the groundwork for sustainable growth in Germany.

Skills for success.

As a traditional optics stronghold, Thuringia has a deep pool of specialists for all aspects of optical technology.

Thuringian universities have special degree programs and departments:

- › Photonics at the Friedrich Schiller University Jena (FSU)
- › Combined Master's and PhD programs in optics and photonics at the Abbe School of Photonics (FSU)
- › Optical system technology and optronics, as well as mechatronics, microsystems and nanotechnology at the Ilmenau University of Technology (TU Ilmenau)
- › Laser and opto technologies, ophthalmic optics/optometry and optometry/vision science at the Ernst Abbe University Jena

Thuringia's companies put a high priority on ongoing employee training. The Jena Training Center, for example – a joint venture of Schott, Carl Zeiss and Jenoptik – produces highly trained specialists. Various universities provide relevant continuing education programs. Also, the Carl Zeiss AG and Thuringian research institutions jointly organize regular JENA Carl Zeiss Optics Colloquia on a range of topics.





Jena research drives the industry.

The institutes and universities in Jena and the Ilmenau University of Technology have long been a hotbed for optical technology research in Thuringia. Jena is one of the German hubs for optical technologies.

Major research institutions in Jena include:

- › Institute for Applied Optics, FSU Jena
- › Institute of Optics and Quantum Electronics, FSU Jena
- › Institute of Condensed Matter Theory and Solid State Optics, FSU Jena
- › Institute of Applied Physics, FSU Jena
- › Otto Schott Institute of Materials Research (OSIM), FSU Jena
- › Abbe Center of Photonics, FSU Jena
- › IPHT Institute of Photonic Technology, Jena
- › IOF Fraunhofer Institute for Applied Optics and Precision Engineering, Jena
- › Günther Köhler Institute of Joining Technology and Materials Testing, Jena
- › Lighting Engineering Department, TU Ilmenau
- › Technical Optics Department, TU Ilmenau
- › Optical Design, Modeling and Simulation Optical Systems (TU Ilmenau)
- › Inorganic Nonmetallic Materials Department at the Institute of Materials Engineering, TU Ilmenau

In micro- and nano-optics, several Jena institutes have exceptional capabilities in basic research and technology development:

- › “ultra optics” (Center for Innovation Competence - ZIK)
- › Center for Advanced Micro- and Nano-Optics
- › Application Center for Microoptical Systems

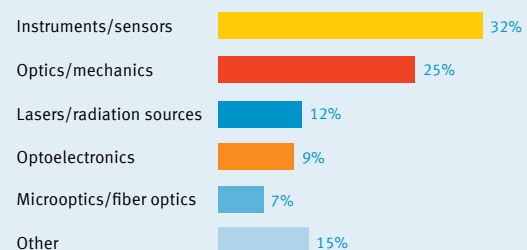
Other research outfits in Thuringia:

- › Institute for Microelectronic and Mechatronic Systems (IMMS), Ilmenau and Erfurt
- › CiS – Research Institute for Microsensors, Erfurt

Technology for demanding applications

Thuringian organizations cover key optical technologies in a breadth that is unmatched anywhere else in Germany: from generating and transmitting light to modulating it over space and time.

Product and technology focuses



(Source: OptoNet e.V. 2015, multiple mentions allowed, percentage share of companies)



Thuringia: where success is made.

The state is home to world-class companies that set international standards in optical technologies.

Carl Zeiss Group

The Carl Zeiss Group is a global leader in the optical and optoelectronic industry. The divisions Semiconductor Technology, Medical Technology, Microscopy and some of the central research operations are located in Jena, the Group's founding city. Carl Zeiss produces analog and digital planetarium systems in the city, too. Jena is also home to the central production company. All told, the Carl Zeiss Group employs around 1,700 people in Jena.

JENOPTIK AG

As an integrated optoelectronics group, JENOPTIK AG operates around the globe in five divisions: Lasers & Material Processing, Optical Systems, Industrial Metrology, Traffic Solutions and Defense & Civil Systems.

LEONI Fiber Optics GmbH

LEONI Fiber Optics GmbH is a leading provider of fiber optic cables for special applications in manufacturing, sensor technology, analytics, science, communications and laser medicine.

Docter Optics SE

Docter Optics is the international market leader in optical glass projection lenses for automotive applications and a recognized supplier of optical components and systems to premier OEMs in various industries, including biometrics, digital projection, printing and machine vision.

GÖPEL electronic GmbH

Jena-based GÖPEL electronic GmbH is one of the world's leading providers of electrical and optical testing and inspection systems for electronic components, printed circuit assemblies and automotive electronic systems.

Jena-Optronik GmbH

Jena-Optronik is a pioneer in multispectral earth observation and optoelectronic sensors for the attitude and orbit control systems of satellites. The company has 40 years of experience and tradition to its name. For years, it has worked as a trusted partner of space agencies JAXA, ESA and NASA and international manufacturers of satellites.

Other selected companies

ADVA Optical Networking SE,
Meiningen

Allied Vision Technologies GmbH,
Stadtroda

biolitec AG, *Jena*

Carl Zeiss Microscopy GmbH,
Jena

Carl Zeiss Meditec AG, *Jena*

Cross Match Technologies GmbH,
Jena

Docter Optics SE,

Neustadt an der Orla

Fresnel Optics GmbH, *Apolda*

GÖPEL electronic GmbH, *Jena*

HELLMA Optik GmbH, *Jena*

Jena-Optronik GmbH, *Jena*

JENOPTIK AG, *Jena*

JENOPTIK Polymer Systems GmbH,
Triptis

LEONI Fiber Optics GmbH,

Neuhaus-Schierschnitz

KLA-Tencor MIE Jena GmbH, *Jena*

MAZeT GmbH, *Jena*

Photonic Sense GmbH, *Eisenach*

POG Präzisionsoptik Gera GmbH,
Gera

Vision & Control GmbH, *Suhl*

Picture credit: Carl Zeiss, JENOPTIK, Jena-Optronik

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