### COMMITTED TO LIGHT.

Meeting Photonics Israel, 28 November 2019, Tel Aviv

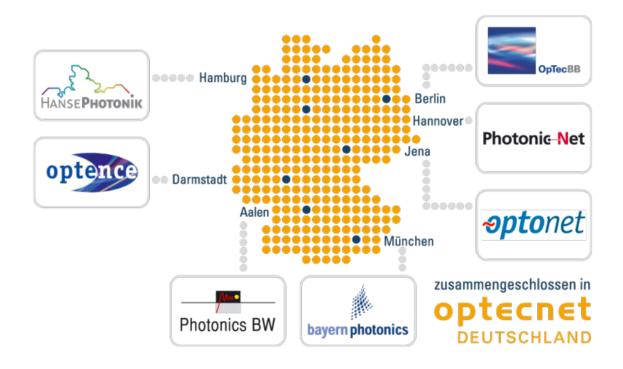
Cluster portrait > Photonics Thuringia *Israeli-German Cooperation in Photonics* 

Anke Mank, Manager International Affairs, OptoNet e.V.

**COMMITTED TO LIGHT.** 



#### The German Photonics Community - OptecNet





# The very beginning of the Thuringian photonics cluster – an interdisciplinary cooperation







Carl Zeiss (1816 – 1888)

Ernst Abbe (1840 – 1905)

Otto Schott (1851 – 1935)

Picture: CARL ZEISS Stiftung, CARL ZEISS Foundation



# Today: Germany's Photonics heart –

vivid – innovative – strong





#### OptoNet - Photonics Network Thuringia

- » Represents the interests of 100 players of Thuringia's photonics cluster
- » Provides a vivid platform for information and communication
- Supports the national and international visibility of the cluster, its players and competencies
- Promotes young talents and future experts with special career programs
- > Is involved in various activities of location marketing of the Photonics region



































































































































































































#### OptoNet – Photonics Network Thuringia

- » Founded 1999 as a **bottom-up initiative** of 13 companies
- » Founding years: supported and **funded** by the Federal Ministry of Education and Research
- » Since 2011: funding with membership fees and earnings from projects and workshops



#### **Board** members

#### Chair:

Dr. Torsten Poßner Grintech

Prof. Dr. Gunther Notni Technical University Ilmenau

Dr. Oliver Falkenstörfer Carl Zeiss Jena

Prof. Dr. Andreas Tünnermann Fraunhofer IOF Jena

Dr. Sebastian Heidrich JENOPTIK

Dr. Fred Grunert ams Sensors Germany

Peggy Bärenklau Heracle

Sabine Gottschaldt LEJ Leistungselektronik Jena



#### Photonics Region Thuringia

- » diversified Photonics industry with cutting edge technologies on international growth markets
- » outstanding research facilities with strong connections to industry
- » universities with excellent reputation in the field of Photonics
- » distinguished vocational training facilities in modern institutions
- » English member directory: <a href="https://www.optonet-jena.de/english-pages/members/">https://www.optonet-jena.de/english-pages/members/</a>



### Key Figures of Photonics in Thuringia

Unternehmen   Companies	180
Umsatz   Sales (in EUR *10°)	~3,3
Umsatzanteil für Forschung & Entwicklung   <b>R&amp;D quote</b>	12%
Exportanteil am Umsatz   Export share of sales	67%
Beschäftigte gesamt (Industrie & Forschung)   <b>Total workforce (industry &amp; research)</b>	16.200
Beschäftigte in der Industrie   Workforce in industry	14.600
Beschäftigte in Forschungseinrichtungen   Workforce in research	1.600
Durchschnittliche Betriebsgröße   Average company size	81
Auszubildende   <b>Trainees</b>	~ 520
Ausbildungsquote   Trainee percentage	3,3 %
Ausbildungsbetriebe   Companies with trainees	75



#### Gitterwerk • • asphericon • • optiX fab • • Hellma Materials **PHOTONIK** PHOTONICS B5-Optics • ORISA Software • C Feinoptik Herburg • SCHOTT Jenaer Glas Jenaer Glaswerk Feinoptische Werkstatt Trabert 🔸 🔾 Photonic Sense JenDiagnost Optikpraxis Raphael Bugiel Poly-Optik **IN THÜRINGEN** IN THURINGIA OPTECO COMMERZ • eropräzisa • OLPE Jena • Jenalens Kontaktlinsen Technologie 🌑 💮 Peter Specht Optikmaschinen 🖷 😊 IQS O O LensTec Jena • • Optics Balzers Jena • • Ilmenau Optics Solutions siOPTICA Innovent Innovent SOMAG ● ○ OptoTech Optikmaschinen ● ○ GFE ● ○ ② MICROS ● ○ ○ Leuchtstoffwerk Breitungen O Jenaer Bildungszentrum SCHOTT CARL ZEISS JENOPTIK O piezosystem jena 🔴 🔾 😂 Fraunhofer IKTS 🔾 🌑 🔾 🔾 😂 Feinmess Suhl ● ○ ② JUB Creative Product ● ○ POG Präzisionsoptik Gera 🛑 🔾 😂 Vision & Control ● ○ ○ Jena-Optronik ● ○ ○ ACM Coatings ● ○ ○ ○ Laser Imaging Systems O O O Carl Zeiss Jena 🔴 🔾 🔾 😂 Gesellschaft für Bild- und Signalverarbeitung O . Megamedica ○ ● Cross Match Technologies ○ ● ○ KoCos Optical Measurement ● HS Doms ● EnShape ○ ● ● 4H-JENA engineering ○ ● euro engineering ● ○ ○ ● j-plasma 🔾 🌑 OPTIKRON 🔾 💿 🚭 confovis O Mahr O A PI Ceramic O Prior Scientific Instruments OPTIMESS Engineering microfluidic ChipShop 🌑 🗢 Speck Sensorsysteme 🌑 Wenzel Mikroskoptechnik Jena O 🌑 Technische Universität Ilmenau 🔘 🔘 🌑 👄 TT optics 🔾 🔵 medis Medizinische Meßtechnik 🌑 🛛 JETI Technische Instrumente 🕒 Analytik Jena 🔾 🔘 CDA 🔾 🔵 😂 Friedrich-Schiller-Universität Jena 🛑 🔾 🔾 😂 MFPA an der Bauhaus Universität Weimar 🔴 MAICOM Quarz O O GRINTECH O O LEONI Fiber Optics • • HEIM Industrial Minerals & Co.KG | CO.KG | MELA Sensortechnik | SIOS Meßtechnik 🔾 🔾 🌑 🚭 Carl Zeiss Meditec ○ ○ ● ② JENOPTIK Optical Systems ● ○ ○ ○ ◎ JENETRIC • • Carl Zeiss Spectroscopy • • Faseroptik Jena 🔵 JENOPTIK Advanced Systems Cube Comment System Sys Carl Zeiss SMS 🔾 🔾 🍩 😂 ORAFOL Fresnel Optics O FBGS Technologies 🔵 🔾 😂 Leibniz-IPHT 🔾 🔾 🔵 🚭 j-fiber 🔵 Supracon UST Umweltsensortechnik Universitätsklinikum Jena 🔾 🔾 🌑 😂 HERMOS Gesellschaft für Steuer-, Meß- und Regeltechnik GÖPEL electronic 🔾 🔾 🌑 😂 Compugraphics Jena () O Alere Technologies 🔾 🔾 🌑 RUCON Enginering • • Allied Vision Technologies • Accipio • VMA Gesellschaft für visuelle Meßtechnik und Automatisierung • Jenaer Meßtechnik 🔾 🔾 🔵 💮 GESO Jena 🔾 💮 Jabil Optics Germany 🌑 🔾 🔾 😂 aura optik 🛮 🗢 OTTO Vision Technology 💿 Feinmess-Jena 🔘 Siegert Thinfilm Technology 🔾 🔾 🔵 🌑 IL Metronic Sensortechnik O O O O CE-SYS Ilmenau Micro-Sensor MEDOS System Steinbeis Transferzentrum QS+BV 🔾 🔾 🐞 Techno Team Bildverarbeitung 🔾 🐞 🚭 HILLOS O argus sensorsysteme Dyomics JenControl µ-GPS Optics ● AJZ Engineering ● UMEX ● ABS Gesellschaft für Automatisierung Bildverarbeitung und Software 🔾 🔾 🔾 🔘 JENOPTIK Automatisierungstechnik ifw optronics PWB encoders O @ O Active Fiber Systems O O ● O O ● Fibotec Fiberoptics ● O O ○ ● CiS 🔾 🌑 🔾 🚭 Numerik Jena 🔾 🜑 🔾 EPSa Elektronik & Präzisionsbau Saalfeld O O Ernst-Abbe-Hochschule Jena TETRA Gesellschaft für Sensorik, Robotik und Automation 🔾 🌑 🔾 IMMS O ADVA Optical Networking SE 🔾 🔾 🔵 🔾 0 0 0 0 0 0 PTS Jena 🔾 🌑 AIM Micro Systems 🔾 🌘 😂 Askion Gera O O O O LaCoSys Laser Control Systems O Matthias Wetzel Industriebeschriftung O ACT Laser Micro-Hybrid Electronic 🔵 🔾 biolitec • ILZ Ilmenauer Laserzentrum • Trimble Jena O LPKF SolarQuipment vm-TIM • • Class 5 Photonics • • LASOS Lasertechnik • • JENOPTIK Polymer Systems 🔾 🌑 🔾 😂 Günter-Köhler-Institut 🌑 🔾 😂 JENOPTIK Laser Caserzentrum Schorcht Smicrons ILMOTRONICS O JenCam 🔾 🖷 Lastronics • O my-Chip Production Leistungselektronik Jena 🔾 🌑 😂 nanoplus Nanosystems and Technologies • • ACD Systemtechnik VIA Laser & Systemtechnik LUCAS components 🔾 🌑 🚭 avateramedical 🌑 LCP Laser-Cut-Processing LLT Applikation O Aifotec Fiberoptics Asclepion Laser Technologies dilitronics engineering Automotive Lighting $\bigcirc$ $\bigcirc$ $\bigcirc$ EQUIcon Software Jena MUT Advanced Heating Pyramid Computer Vistec Electron Beam Output District Street Street District Street Street District Street Street District Street Street Street District Street Street District Street Street District Street Street District Street Dist Truck Lite Europe 🔾 🔾 🔵 uv-technik Speziallampen 🌑 🔾 Docter Optics 🔾 🕒 🔾 🚭 LDT Laser Display Technology 🔾 🔾 😊 😂 Heinrich-Beck-Institut O Lumundus O o o Schwerpunkt company focus weitere Arbeitsfelder O other work fields Optik & Mechanik Optics & mechanics Optische Materialien Optical materials SolarWorld Industries Thüringen 🧶 Mikro- & Faseroptik Micro & fiber optics GBneuhaus 🛑 GSS Gebäude-Solarsysteme Laser & Strahlquellen Laser & radiation sources PV Crystalox Solar 2K Moxa Lighting 👴 Lichttechnik Light engineering ANTEC solar Global LightZ O Unternehmensgröße Company size Photovoltaik Photovoltaics Beschäftigte in Thuringen No. of employees Meeting Photonics Israely STALAVIV, 28 November 2019 Optoelektronik Optoelectronics Messtechnik & Sensorik Metrology & sensors <10 A A 10-49

SCHOTT Technical Glas Solutions 🔾 🌑

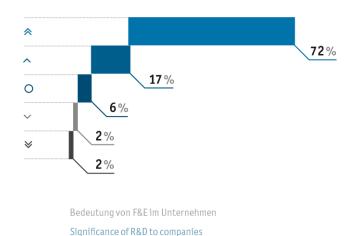
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OptoNet Mitglied OptoNet Member

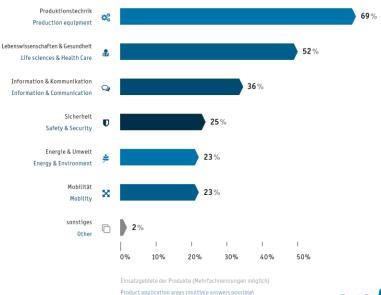
OIB Optische Interferenz Bauelemente 
Hellma Optik 
O

50-249 AA > 250

#### Significance of R&D to Companies



#### Product application areas





#### Technology

- » Optical Components and Systems, Freeform Optics
- » Ultra Precision Manufacturing (International Workshop in 2020)
- » (Ultra Short Pulse) Laser Technology
- » Optical Materials and Coating
- » Sensing and Metrology
- » Optical Fibers and Fiber Sensors
- » Biophotonics/Microfluidics/Point-of-Care-Technologies



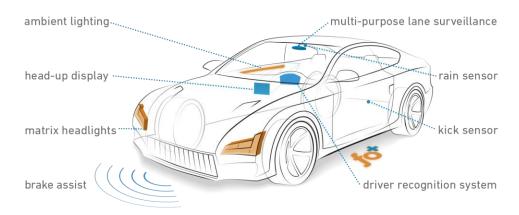
#### Strategic Technology Development





#### fo<sup>+</sup> [freeform optics plus]

Regional growth core to develop and market innovative freeform optical systems, <a href="https://fo-plus.de/en/">https://fo-plus.de/en/</a>



customizable light shapes + targeted light delivery + less straylight multispectral + less number of optical elements + reduced weight and space



#### Connecting points

- » Optical Materials (Optics Balzers, Fraunhofer IOF, Hellma Materials, SCHOTT Advanced Materials, VITRON, Fraunhofer IKTS, Docter Optics,...)
- » (Optical) measurement methods for quality purposes (mahr, OptoTech, Göpel electronic, piezosystem, SIOS, ZEISS,...)
- » High precision optical components (Precision Optics Gera, asphericon, OPTIKRON,...)
- » Coating and surface functionalization (Optics Balzers, ORAFOL, Fraunhofer IKTS, Layertec, Trionplas,...)



#### Cooperation ideas

- » Addressing the applicational side together Photonics in Life Sciences, Cosmetics, Automotive, Energy, Mechanical Engineering
- » Israeli and German sales partners
- » Joint (EU, ZIM,...) R&D projects
- » Joint workshops



#### Career Program > OptoNet MASTER+



- » promotional program with thematically focused excursions and soft skill trainings
- » company visits, specialist lectures and expert panel discussions
- » Cooperation of companies and students at an early stage

**Aim:** strenghten students bond to the industry

» <a href="https://optonet-masterplus.de/">https://optonet-masterplus.de/</a>



#### Networking



- » OptoNet part of Global Photonics Alliance
- » A club of dedicated international Photonics Cluster Managers to strengthen the bond of international photonics regions
- » Regular meetings at major events like Photonics West, LASER Munich and others



### Israel and Thuringia- committed to photonics













#### Working together with the region of Jena and OptoNet...

- » State-of-the-art photonics technology in a technology focused network
- » Enabling applications
- » Cooperative R&D, joint (international) projects
- » Information on and access to events and technology workshops with member conditions and rates
- » Access to international photonics networks and key players
- **>>** ...



## Outlook 2020 3rd International Summer School Advanced Lens Design



3rd International Summer School>Advanced Lens Design29 June -3 July 2020, Jena

Lecturer Prof. Herbert Gross, Friedrich-Schiller-University Jena, former Head of Optics Design at Carl ZEISS AG







Technologie

Technology

Workshops · Seminare workshops · seminars · Weiterbildungen further training

> Ultrakurzpulslaser

> Ultra Precision Manufacturing

Begleitung von Projekten project support

>TOF > fo\*

Beratung zu Fördermöglichkeiten public funding opportunities

Expertenvermittlung expert recruiting



Networking & Kooperation Networking & Cooperation

Plattform > Clustertreffen, platform > cluster meetings

> Mitgliederfrühstück

Statistiken und Analysen surveys and studies

> PHOTONICS REPORT

Vernetzung & networking

Kooperationsanbahnung cooperation initiatives

Social Media linkedIn



**Internationales** 

International affairs

Messen & Delegationsreisen trade shows & joint missions

USA, Israel, Niederlande USA, Israel, Netherlands

Kooperationsanbahnung partnerships

> OptoNet Summer School

> Advanced Lens Design

Clusteraustausch im Rahmen der cluster cooperation

> Global Photonics Alliance







Nachwuchsförderung

Human resources & Fachkräftesicherung & Talent promotion

Kostenfreie Stellenbörse job portal

Beratung und Austausch consulting and exchange > Expertenkreis Moderne Arbeit -> expert round Modern work

Branchenmarketing industry marketing

> OptoNet MASTER+

Nachwuchsarbeit in Schulen talent scouting

> OptoNet ExtraKlasse



Standortmarketing Site marketing

> Newsticker, news ticker

Kompetenzdatenbank expertise database

Interessenvertretung bei lobbying

politischen Entscheidern & government relations

Mitarbeit in Verbänden association work

und Gremien

Strategisches Marketing strategic marketing

# *Office*



**Thomas Bauer** CEO

**Anke Mank** International Affairs

Nora Kirsten Communication

**Peggy Lerner** Talent Promotion

**Arite Krippendorf** Financing & Back office



# Thank you for your attention.

#### **OptoNet**

Photonics Network Thuringia

Leutragraben 1 07743 Jena

T: +49 (0) 36 41 / 573 36 50

F: +49 (0) 36 41 / 573 36 59

info@optonet-jena.de

www.optonet-jena.de

