EPIC
European Photonics Industry Consortium

EPIC World Photonics Technology Summit

Berlin, Germany | 29–30 August 2019

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EPIC World Photonics Technology Summit

Wednesday 28 August 2019

14:00 **Departure from Hyatt Hotel**

14:30 – 16:00 **Company visit Fraunhofer HHI**

16:30 – 18:00 **Company visit Fraunhofer IZM**

18:30 – 22:00 **Networking Reception at Jamboree bar at Hyatt Hotel**

Thursday 29 August 2019

07:00 **EPIC traditional walk/run 3-6 kilometers + Networking breakfast**
Departure from Hyatt Hotel lobby

08:30 **Registration and Welcome Coffee**

09:00 – 09:15 **WELCOME**
Gerrit Roessler, Head of Unit Photonics, Berlin Partners
Jose Pozo, CTO, EPIC – European Photonics Industry Consortium

SESSION 1 – NEXT CHALLENGES IN INTEGRATED OPTICS

09:15 **Silicon Photonics: State of the Ecosystem**
Michael Hochberg, CTO, Elenion (USA)

09:35 **Integrated Microsystems: From MEMS to Photonics**
Simon Schneider, Corporate Sector Research and Advance Engineering, Bosch (GERMANY)

09:55 **Pitch Reducing Optical Fiber Array – Bridging the Gap Between Fiber Infrastructure and Dense Multichannel Optical Interfaces**
Victor Kopp, Director of R&D, Chiral Photonics (USA)

11:15 **Highly Integrated Optics and Electronics for Sensor and Communication Applications**
Tobias Lamprecht, CTO, vario-optics (SWITZERLAND)

11:35 **Enabling Optical Components and PICs for Emerging Applications**
Milan Mashanovitch, CEO, Freedom photonics (USA)

10:55 – 11:40 **Networking Coffee Break**

SESSION 2 – PHOTONICS-ENABLED SMART MANUFACTURING

11:40 **Coloured Lasers for Challenging Manufacturing Processes**
Andreas Popp, Principal Expert Strategy Laser Technology, TRUMPF (GERMANY)

12:00 **Laser Based Additive Manufacturing in South Africa**
Hencharl Strauss, Research Group Leader Novel Lasers Council for Scientific and Industrial Research (SOUTH AFRICA)

12:20 **High Power Laser Cleaning for the 21st Century**
Young Kwon, CTO, ANDRITZ Powerlase (UNITED KINGDOM)

12:40 **Highly Doped Optical Fiber Picosecond Lasers**
Tamila Zlachevskaya, CEO, Polarus (RUSSIA)

13:00 – 14:30 **Networking Lunch**

SESSION 3 – NEW FRONTIERS IN PHOTONICS TECHNOLOGIES

14:30 **Smart Additive Manufacturing Solutions for the European Photonics industry**
Michael Thiel, Co-founder, Nanoscribe (GERMANY)

14:50 **Software Framework Enabling Real-Time 3D Holographic Display**
Andrzej Kaczorowski, CTO, VividQ (UNITED KINGDOM)

15:10 **3D Printed Silicon Carbide Alloys - New Massive Polycrystalline Materials in Arbitrary Shapes**
Ruggero Schleicher-Tappeser, CBDO, PSC Technologies (GERMANY)

15:30 **Transforming Optical Structure Technology Through Innovative System Integration**
Itai Vishnia, CEO, PLX (USA)

15:50 **Astrophotonics — A New Star on the Horizon of Photonic Sensors**
Martin M. Roth, Head of innoFSPEC Section, Leibniz-Institut fuer Astrophysik Potsdam (AIP) (GERMANY)

16:10 – 17:00 **Networking Coffee Break**

SESSION 4 – LANDSCAPE AND INVESTING IN PHOTONICS

17:00 **ECOSYSTEM ISRAEL**
Dan Vilenski, Former CEO of Applied Materials in Israel (ISRAEL)

17:15 **OPEN INNOVATION AT LG – PHOTONICS**
Viktor Schütz, Technology Manager, LG Technology Center Europe (GERMANY)

17:30 **MARKET DATA**
Jean-Christophe Eloy, President and CEO, Yole Development (FRANCE)

17:45 **INVESTMENT VIEWS**
Mike Powell, Managing Partner, Renevo Capital Limited (UK)

18:00 **FUNDING/INVESTMENT**
Short pitch of EPIC members looking for investment/acquisition

18:15 **PARTNERSHIP**
Signature of collaboration agreement with the VR/AR Association

18:30 – 19:30 **Reception**

19:30 – 21:30 **Dinner**

21:30 – 23:00 **Networking continues…**

Friday 30 August 2019

08:00 – 08:30 **Networking Welcome Coffee**

SESSION 5 – IMAGING SYSTEMS FOR A CONNECTED WORLD

08:30 **Mass-Scale Automotive Optical Sensing**
Norbert Lichtenstein, R&D Director, II-VI Laser Enterprise (SWITZERLAND)

08:50 **Experience with Industrialization for Automotive of New Sensing Technologies**
Jan-Erik Källhammer, Director Visual Enhancement & Cognitive Systems, Veoneer (SWEDEN)

09:10 **Photonics in the Digitization of Electronic Manufacturing**
Avi Gross, CTO, Orbotech (ISRAEL)

09:30 **Raman Photonics in Medical Space**
Peter Cheng, CEO/CTO, Endofotonics (SINGAPORE)

09:50 **Active THz Imaging**
Andre Fougeres, Vice-President Innovation & Technology, INO (CANADA)

10:10 **Infrared Imaging Solutions and Challenges**
Patrick Abraham, Public and Private Partnership Manager, LYNRED (FRANCE)

10:30 – 11:15 **Networking Coffee Break**

SESSION 6 – SENSORS AND NETWORKS CONNECTING THE WORLD AT THE SPEED OF LIGHT

11:15 **Photonic Sensors - Applications and Challenges**
Marc Schillgalies, VP Development, First Sensor (GERMANY)

11:35 **FBG and FBG-Sensors for use in Difficult Environmental Conditions**
Alexey Zarenbin, CEO, FORC-Photonics (RUSSIA)

11:55 **Photonic Integration: MEMS+Silicon Photonics Switching and SDM Rectangular Core Fiber Devices**
Dan Marom, Head Photonic Devices Group, The Hebrew University of Jerusalem (ISRAEL)

12:15 **Cost-Effective, Ultra-High-Speed Test Solutions for the Data Center and Beyond**
Fadi Daou, CEO, MultiLane (LEBANON)

SESSION 7 – 3-MINUTES ELEVATOR-PITCH BY EPIC MEMBER COMPANIES FROM BERLIN

With the support Berlin Partner. Companies: VPI Photonics, VI Systems, Lumics, Laytec, Fraunhofer IZM, Fraunhofer HHI, art photonics, APE Angewandte Physik & Elektronik, AEMtec

13:00 – 14:30 **Lunch**

14:30 – 17:00 **Networking continues at Jamboree Bar**

CONTACTS

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HYBRID PICs – BEST OF ALL WORLDS

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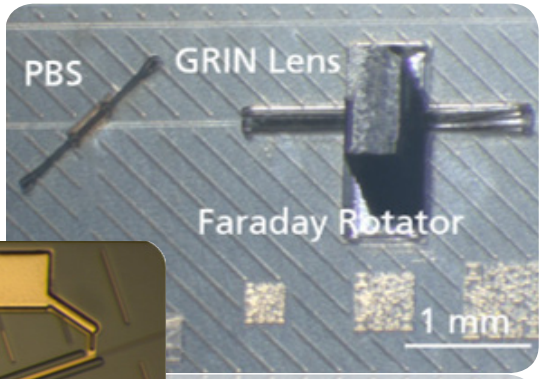
microring waveguide for sensing



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- Short iteration cycles
- Low upfront development effort

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Hybrid PICs

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Participants

Name		Job Title	Company	Country	EPIC Member
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Alain	Courteville	Vice President Innovation	Fogale Nanotech	France	EPIC Member
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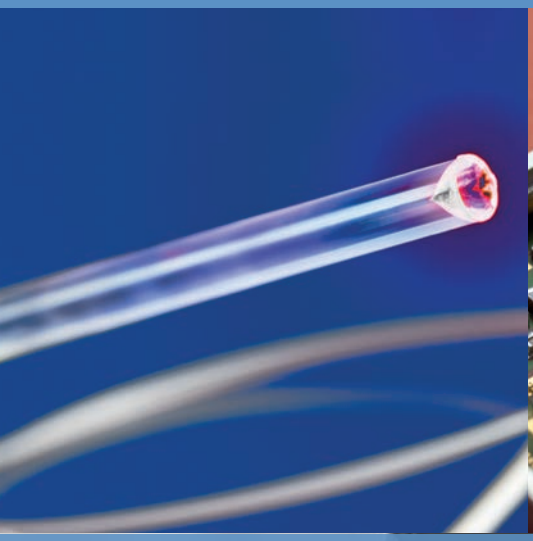

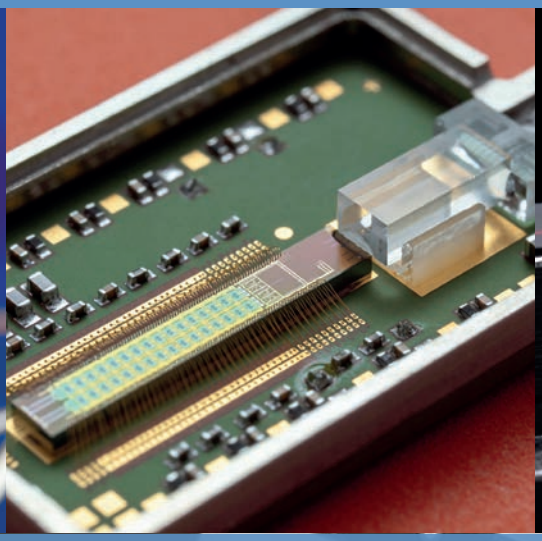

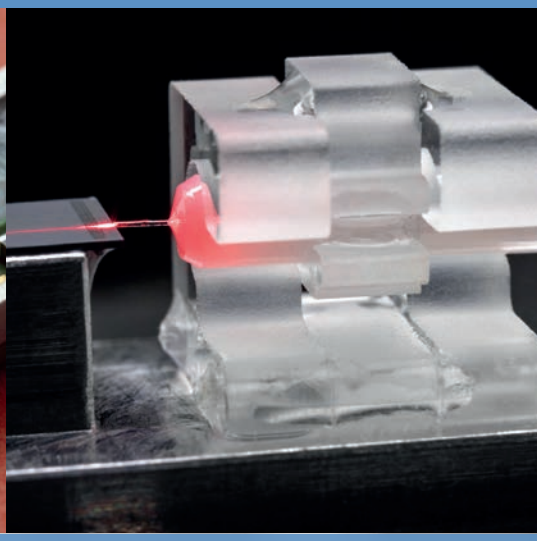

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Simon	Schneider	Research Engineer	Robert Bosch	Germany	EPIC Member
Simonas	Kicas	Co-Founder & CTO	OPTOMAN	Lithuania	EPIC Member
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Tamila	Zlachevskaya	General manager	Polarus	Russia	
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Thomas	Hessler	Board member	LIGENTEC	Switzerland	EPIC Member
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Toomas	Pruuden	CTO	Marduk Technologies	Estonia	
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Viktor	Schütz	Technology Manager	LG Technology Center Europe	Germany	EPIC Member
Volker	Sinhoff	CEO	AIXaTECH	Germany	EPIC Member
Volker	Schmidt	Vice President Technology & CTO	Berliner Glas	Germany	
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Xinbing	Liu	Director	Panasonic Boston Laboratory	USA	
Young	Kwon	CTO	Andritz Powerlase	UK	EPIC Member

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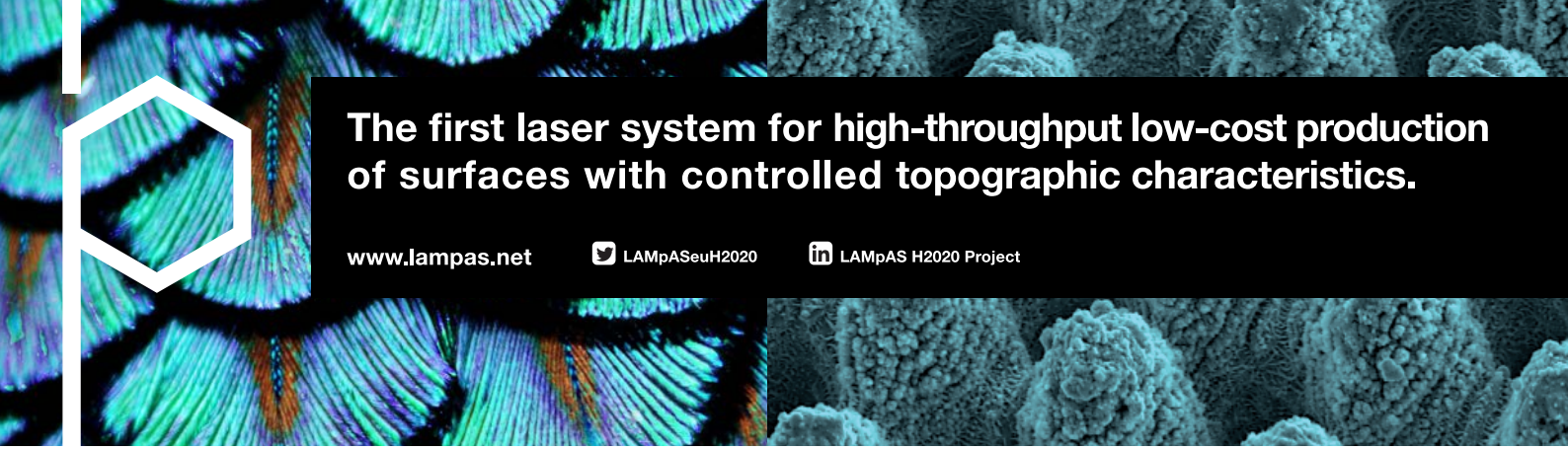

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Company descriptions and biographies

II-VI, a global leader in engineered materials and optoelectronic components, is a vertically integrated manufacturing company that develops innovative products for diversified applications in the industrial, optical communications, military, life sciences, semiconductor equipment, and consumer markets. Headquartered in Saxonburg, Pennsylvania, the Company has research and development, manufacturing, sales, service, and distribution facilities worldwide. The Company produces a wide variety of application-specific photonic and electronic materials and components, and deploys them in various forms, including integrated with advanced software to support our customers. **www.ii-vi.com**

Norbert Lichtenstein (Director Research & Development) is a Director for Research & Development at II-VI Laser Enterprise. He received his PhD in physics from University of Stuttgart for his work involving high-power semiconductor lasers. He joined Uniphase Laser Enterprise in 1998 where at the site in Zurich he held various positions in development and management within JDS Uniphase, Nortel Network, Bookham, Oclaro and II-VI including responsibility for development of 980 nm and 1480 nm telecom pump lasers, high-power laser diode products and VCSELs. In his current role he is overseeing chip development of high-volume products for consumer applications at II-VI.

Martin Benzing (Managing Director) has received his Diploma in Physics from the University of Mainz in 1994. Since then he is working for II-VI in different sales positions. In 2006, he became the Managing Director of II-VI GmbH in Weiterstadt responsible for the sales of II-VI products within Europe.

III-V Lab is an industrial Research Laboratory jointly owned by Nokia, Thales and CEA. It conducts R&D activities in the field of micro/nano-electronics and photonics semiconductor components for different applications, such as telecoms, defence, security, safety, space etc. Relying on a high level of expertise and advanced facilities in III-V materials growth and processing and their integration on Silicon, III-V lab develop a wide range of components. III-V Lab has also the capacity to produce limited quantities of epitaxial wafers, components, modules or subsystems). Such capacity is particularly adapted to address in a flexible way the rapid evolution of the market, offering to its members or partner industrial companies an early access to the components for their system development and even preliminary deployment. **www.3-5lab.fr**

Mohand Achouche (Managing Director) is the Managing Director since 2015 of III-V Lab where its main mission is to define R&D strategy with mother companies (Nokia, Thales and CEA), entity management (staff, cost structure, etc) and define valorization scheme of disruptive components and technologies. He received a PhD degree from Paris VII (Jussieu) University in 1996. His research activities started in 1993 at Orange Lab (CNET, Laboratoire de Bagneux) on the fabrication and characterization of HEMT transistors for high speed circuits applications. During 1997-2000, he was with Ferdinand Braun Institute (FBH-Berlin) working on power amplifiers based on GaAs HBTs for mobile communications. In 2000, he joined Alcatel Research and Innovation where he was first involved in 40Gb/s photodiodes. In 2004, he was in charge of a research team on photoreceivers for high speed optical communication systems, microwave photonics links and sensors. During 2011-2015, he was the head of III-V Lab's Opto-Electronic Integrated Circuit (OEIC) department, where he has the highly challenging mission to build the next generation transceivers for telecom and data communication applications, by bringing together high-speed ASICs activities with photonic integrated circuits (PICs).

4ISP is the exclusive distributor of HSG lasers for Germany, Poland, Czech Republic, and Slovakia. There are over 38 HSG laser installed since the company foundation in 2012. Our customers receive comprehensive care, from picking and testing the right machine, operational cost consultation over shipping to installation and service. Our new showroom EURAZIO Center is going to be opened in summer 2018. There will be more than 80 machines including the largest and most powerful cutting fiber lasers permanently on display. That includes milling, CO2 lasers and other CNC machinery too. Our priority is showing machines in action, so that our customers could try those out. We strive to provide a full service. **www.4isp.eu**

Petr Tůma (Managing Director) had studied economics until he had to quit in order to take over his father's company. His entrepreneurship first excelled with the StraighCore brand of wireless internet access products. In the last twenty years, Petr expanded his business activities importing technology products from China. The original company specialization in 2010 were CCTV systems when Carl Fruth bought a share in the company and the portfolio expanded to CNC machines and lasers. The company sees a quick growth in the area of industrial lasers as well as CNC machines. Recently, Autodesk partners 4ISP in its plans to enter the Chinese market with their latest technology.

ACM Coatings is the German subsidiary of Acktar Ltd. (Israel) and your production and distribution partner for Acktar products in Germany and Europe. Acktar Ltd. is the world leader in deep black, light absorbing coatings and materials. ACKTAR absorbing coatings and foils enhance the performance of an optical system, e.g. by reducing the signal-to-noise ratio and increasing the contrast. The coatings are completely inorganic, non-toxic and non-outgassing. ACKTAR coatings are applicable to a large number of substrates, have a high level of temperature stability (-269°C to +450°C) and are working in a wide spectral range (UV to IR). Applications for these deep black coatings are: Stray light absorption in optical systems, such as: portable devices, cameras for mobile phones, automotive applications, sensors and receivers, gauges, pyrometers, spectrometers as well as high-emissivity applications in the technical optics. We serve for example the industries aerospace, laser technology, technical optics, sensor technology, medical technology, biotechnology and industrial image processing. **www.acm-coatings.de**

Alexander Telle (CEO) joined Acktar/ACM in 2015 and took responsibility for the business development in the European market, especially for industrial photonic customers and aerospace business. He had previously held director and senior management positions in several photonics companies. He started his career in 2005 as an R&D engineer at JENOPTIK. Alexander holds an engineering degree (Dipl.-Ing. (FH)) from Ernst-Abbe-University Jena.

AEMtec is a global acting specialist for the development and production of customized and reliable micro- and optoelectronics. In the sector of miniaturization AEMtec provides a wide technology portfolio including Wafer Back-End Services, Chip on Board, Flip Chip, 3D Integration and Opto Packaging; all realized in cleanroom environment (ISO class 5 to 8). From concept to serial production including design and development, process management and industrialization the customers benefit from the services by a single source provider. AEMtec is certified by official organizations: ISO 9001, ISO 13485 (Medical) and ISO 14001 (Environment). **www.aemtec.com**

Robert Giertz (CTO) studied Microsystems Technology at the University of Applied Sciences in Berlin until 2004. Afterwards, he was working in the semiconductor field at Infineon/Qimonda in Dresden as process engineer in the field of electronic packaging. Since 2009, Robert is working at AEMtec in Berlin. He is a certified project manager according IPMA. Since 2012, Robert is the Head of the Engineering Department and CTO of AEMtec since 2018.

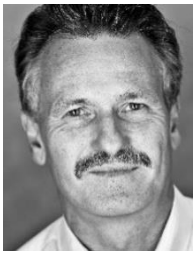
AIO Core is a spin-out company from PETRA established in April 2017 in Tokyo that provides leading-edge Silicon Photonics with the most cost-efficient solution for various scenes of optical interconnections, including: On-Board Optical Connection, High Performance Computing, and Active Optical Cables. AIO Core offers the world's fastest, smallest size, lowest power, and lowest priced Silicon-Photonics transceiver in the data center, between enclosures, between AV equipment, between boards, and within boards. Their leading-edge product, named “Optical I/O Core” is the first product from AIO Core and brings the fastest, smallest, lowest power-consumption and the most cost-effective solution to optical interconnection. **www.AIOcore.com**

Kazuhiko Kurata (CTO) is CTO and Board member of AIO core Co.,Ltd. He has over 30-years’ experience in the development and management for optical-fiber communication and optical interconnection modules and subsystem. His previous role sub-project leader of PETRA Project in Japan. He took the lead in the development of the Optical I/O core in the project and joined to AIO core in July 2017 to start business of the optical I/O core.

Leibniz-Institut für Astrophysik Potsdam

AIP belongs to the Leibniz-Gemeinschaft in Germany and is as such dedicated to fundamental research in astrophysics. With a history going back to the Berlin Observatory that was founded in 1700, the institute covers today a wide range of research topics from solar and stellar astrophysics to the formation and evolution of galaxies and the large-scale structure of the universe. The main areas of expertise are related to phenomena of cosmic magnetic fields and of gravitation on many different scales. Next to fundamental research, AIP is also actively pursuing the development of telescopes and instrumentation with access to the

largest ground-based observatories and facilities in space. AIP also hosts the headquarter of innoFSPEC Potsdam which is a BMBF-funded innovation center and a joint project between AIP and the University of Potsdam. innoFSPEC performs basic and applied research on fibre-coupled spectroscopy, astrophotonics, and chemical sensing. **www.innofspec.de**



Martin Roth (Chair of innoFSPEC Potsdam) is a Professor at the Institute for Physics and Astronomy, University of Potsdam, since 2011. Since 2009, Martin has been the Chair of innoFSPEC Potsdam. He served as Research Assistant in Universitäts-Sternwarte München from 1986 to 1991. He then became an Observer at Wendelstein Observatory in 1991. He moved to AIP in 1994 and has worked there up to now as Staff Astronomer and Head of Program.

aixatech

MEMBER of EPIC

AIXaTECH is a volume manufacturer of single crystal AlN templates. The templates serve as starting layers for subsequent growth of GaN-based layers. Compared to the conventional manufacture via MOCDV, AIXaTECH's templates allow an increased throughput and higher yield for customers active in the LED business. For customers reaching out for the next generation of power electronic devices the advantages lie in the retention of the silicon characteristics and the excellent price-performance ratio. Due to AIXaTECH's patent portfolio the customers have the utmost design freedom without paying license fees to competitors. A future activity of AIXaTECH is the manufacture of single-crystal InGaN layers with high In-content to increase the efficiency of Si tandem solar cells by a double-digit percentage. AIXaTECH was founded in 2010 as a spin-off of RWTH Aachen and is located in Baesweiler, Germany. **www.aixatech.com**

Volker Sinhoff (CEO) holds a degree in mechanical engineering of RWTH Aachen. After finishing his PhD thesis, he worked as general manager of the Fraunhofer-Institute of Production Technology IPT before starting in 2001 his own business in the field of refractive micro-optics and diode laser systems. He sold his shares of INGENERIC GmbH successfully in 2013 to the TRUMPF Group. Since then, he acts as strategic advisor and business angel for young high-tech companies. In 2015, Volker joined AIXaTECH GmbH as CEO. The company is an equipment supplier for the growth of wide band gap semiconductors. With its disruptive Low Temperature Epitaxy, AIXaTECH enables customers to reduce manufacturing costs, process complexity and environmental footprint and to exploit functional advantages.

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AIXEMTEC is a provider of high-precision assembly solutions for optical systems. We focus on the requirements of our customers. For this purpose, we offer machines and components for precision assembly as well as assembly services for optical systems. The combination of both business units is our strength. We are experts on assembly processes and know the challenges of everyday production and based on that experience we develop standardized and competitive solutions. Our core competency comprises high-end assembly technology for highest precision in optics. Based on that expertise, we offer a wide spectrum of products and services in order to design and realize competitive production solutions for our customers. AIXEMTEC was founded in 2016 as a spin-off out of the Fraunhofer Institute for Production Technology IPT. AIXEMTEC is exclusive licensee of high-end Fraunhofer assembly technology. We combine our know-how regarding the assembly of optical systems with a customer-oriented business model. This business model allows us to look for the most economic production solution for our customers. **www.aixemtec.com**

Sebastian Haag (Co-founder and CEO) received his diploma in Electrical Engineering at the RWTH Aachen University in the year 2010. Afterwards, he worked as a scientist and group manager at the Fraunhofer Institute for Production Technology IPT in Aachen in the field of automation and optical packaging until 2016. During his scientific carrier, he focused on the development of software toolchains for modelling complex optical alignment, packaging tasks and robotic control.

AKELA Laser was founded in 2003 as a consulting group serving photonics and opto-electronics industries. In 2010 Akela established its own manufacturing facilities in New Jersey, USA, and is currently a leading provider of high-power and multi-wavelength fiber-coupled and free-space laser modules, primarily for medicine, and also a supplier for emerging markets in industry and defense. Due to flexible design and manufacturing platforms, Akela offers the widest wavelength range in the industry and the highest number of combined wavelengths in more than thirty wavelengths combinations. In addition to standard product portfolio, Akela offers quick customization of the products to get specific wavelength combinations and power levels. New developments include modules for machine vision, laser cutting and welding of transparent plastics, and short-pulse Q-switched solid-state lasers for niche applications in medical diagnostics and semiconductor fabrication.
www.akelalaser.com

Mikhail Maiorov (CEO) is the CEO of Akela Laser Corporation since 2014. Before joining Akela in 2006 as the COO of the company, he held research, product design, and engineering management positions at Ford Motor Research Labs, Sensors Unlimited, Sarnoff Corporation, and Princeton Lightwave, focusing on development of high-power lasers, and design of systems on their base. He holds Ph.D. in physical electronics from St. Petersburg State Technical University, Russia (1997) and M.S. in technology management from the University of Pennsylvania, USA (2005).

Almae Technologies entered into operation on Feb 1st, 2016 and has been created as a spin-off of III-V lab, a joint lab of Nokia Bell Labs, Thales and CEA-Leti. Almae Technologies has built an industrial R&D and production platform for advanced PIC fabrication based on proven photonic integration building blocks, objective being to exploit platform for chip and wafer fabrication to support Telecom/Datacom market growth, first products launched being a portfolio of 10/25G EML products. Almae Technologies is also offering specialized foundry services to partner companies in the field of Photonic chip manufacturing and is open to discuss with interested parties whatever the application field. **www.almae-technologies.com** (under construction)

Jean-Louis Gentner (CEO and Founder) was previously Director and Administrator of III-V lab for Alcatel-Lucent (now Nokia) Bell Labs. In his career, he led research teams and many research projects in the field of Photonic Integration, being on InP or Silicon platform, and has taken active part in creating value with hardware innovation and transferring projects from R&D to production.

Altechna

MEMBER of EPIC

Altechna is a Lithuania-based custom laser optics company with worldwide customers. They develop and provide complex technological solutions and custom-tailored designs of laser optics and accessories for laser applications for the industrial, defence and academic customer. Their focus is on listening to and understanding needed requirements, selecting the best methods for producing quality laser optics, and shipping them in a timely manner. Employing more than 110 highly skilled professionals, they have accumulated all the necessary know-how to evaluate and complete every order with attention to the finest details. Altechna is best defined by its customer-oriented approach and its innovative technological solutions, expertise and reliability. **www.altechna.com**

Gintas Šlekys (Founder and Chairman of the Board) is the founder of Altechna. He graduated and gained a PhD degree in Physics from Vilnius University, Lithuania. After 6 years of research contracts in Physikalische Technische Bundesanstalt, Germany and 3 years in Lille university and France Telecom, he founded Altechna and later on Workshop of Photonics (Altechna R&D) and devoted his time to the business development of both companies, fostering businesses related to ultrashort pulse components and applications.

AMIRES

MEMBER of EPIC

AMIRES is a consulting company for research, development and innovation projects. Our main strength is the creation of new international sustainable partnerships within innovation focused value chains and EU support projects (e.g. H2020, Eurostars). Our developed projects remain the main enablers for our industrial clients and their growth and provide the important opportunities for R&D community. AMIRES activities focus on three strategic fields: Energy Efficiency, Photonics, Flexible Electronics and Regenerative Medicine and Medical Devices. AMIRES developed a search and visualization platform AMIPLEXUS – essential tool for innovation-related decisions. It allows visualization of more than 20000 projects within H2020, EUROSTARS, EUREKA and LIFE programmes. It displays most relevant project information including a list of all participants. User can search past or ongoing projects of any European organization or company. All EPIC members have free access to AMIPLEXUS – please ask EPIC secretariat for login details. **www.amires.eu**

Rudolf Fryček (CEO) has more than 14 years' experience in the European project management and consultancy. He was a consultant to several SMEs in the field of production, innovation and company development, including preparation of project for governmental incentive and for several business-oriented bank loans. In 2006, he was nominated as a Seconded National Expert to the European Commission, Directorate General for Industrial Technologies. Beside his technological expertise and daily project officer work (more than 13 projects under his responsibility) he has been active in the policy structuring for exploitation and commercialization of EU framework projects. He helped to analyze the

overall nanotechnology unit project portfolio in terms of generated IPR and also co-organized the workshop with European Patent Office and US Patent and Trade Office on IPR in nanotechnology – lessons from experiences worldwide, held in Brussels. He was a Scientific Coordinator of the EuroNanoForum 2009, the bi-annual conference financed by the European Commission. He is in member of advisory boards of EuroNanoForums and Industrial technologies since then. Recently, he was a programme coordinator of "Reindustrialization of European Union 2016" in Bratislava. Since 2011 he is an accredited coach of Innovation Platform – PLATINN, which provides hands-on coaching to SMEs. Rudolf is a cooperation coach, which helps companies to increase their innovation capacity. Rudolf is a founder of AMIRES company and within the project will be responsible especially for the conceptual setting of the selection process, pilot execution and for the business coaching activities as he has deep experience within this domain.

AMO

MEMBER of EPIC

AMO is a German nonprofit SME with >45 employees specialized in R&D for micro- and optoelectronic applications. Amongst others, AMO develops innovative technologies for nanophotonics and their implementation in novel devices architectures to a prototype level. The resultant devices and subsystems are exploited by AMO as a low volume foundry or transferred to a key player in the field. The three main research areas at AMO are nanophotonics, graphene nano- and optoelectronics and sensor technology. Being active in developing state of the art nanophotonic components since the early 2000's, AMO is offering fabrication and development of photonic integrated circuits within foundry services to research organizations as well as to industry. **www.amo.de**

Anna Lena Giesecke (Head of the Nanophotonics Group) obtained her diploma in physics from Leibniz University in Hannover, Germany and her doctoral degree in 2013 from Heinrich-Heine University in Düsseldorf, Germany. She joined AMO GmbH in 2013. Her main research areas are integrated silicon photonics and nanophotonics for optical communication technologies and biophotonic and sensor applications as well as graphene optoelectronics. Recently, a new fabrication platform based on silicon nitride for broadband photonic integrated circuits has been developed in her research group. One of the major outcomes of this was the first on-chip perovskite laser based on silicon nitride photonics. The platforms SOI and silicon nitride are accessible through AMO's foundry services. The integration of innovative materials into dielectric photonic platforms is one key field of AMO's photonic developments both for sensing and quantum photonic applications.

AMPLICONYX

Ampliconyx was founded in 2016 as spin-off company from Tampere University of Technology. The company is focused on commercialization of patented technology of active tapered double clad fibers. Ampliconyx offers wide range of all-fiber gain modules and amplifiers comprising ytterbium doped tapered large mode area active fibers. Gain modules are ideally suited for amplification of ultrashort pulses, both nanosecond and picosecond, offering customers unmatched performance for all-fiber solution. Ampliconyx mission is to enable widespread of ultrafast fiber laser/amplifiers-based technologies by providing cost-effective and highly performing gain modules, fiber amplifiers and lasers. **www.ampliconyx.com**

Valery Filippov (CTO) has received the Ph.D. degree in Radiophysics from Peter the Great St. Petersburg State Polytechnic University (St. Petersburg, Russia) in 1988. He has worked at Peter the Great St. Petersburg State Polytechnic University (1983-1998, St. Petersburg, Russia), Centro de Investigaciones en Optica (1998-2002, Leon, Mexico), University of Southampton (2002-2005, UK), Liekki Corp. (2005-2007 Lohja, Finland) and Optoelectronics Research Centre (Tampere University of Technology, 2007-2016). Dr. Filippov is founder and CTO of Ampliconyx Ltd. (Tampere, Finland). He has published more than 150 peer-reviewed journal articles and is an author of six patents. The main field of scientific interests includes optical fibers, fiber sensors and fiber lasers and amplifiers. Dr. Filippov is member of OSA.

Amplitude

MEMBER of EPIC

Amplitude Laser Group is a leading manufacturer of ultrafast lasers for scientific, medical and industrial applications. The group consists of three manufacturing locations in Bordeaux and Paris, France, and San Jose, U.S.A., and an extensive network of support offices in Europe, Asia and North America. Amplitude Laser Group offers the widest range of ultrafast laser technologies available today, from industrial fiber lasers to high energy Petawatt class Ti:Sapphire lasers. **www.amplitude-laser.com**

Clemens Hönninger (CTO) has more than 20 years of experience in the design and development of diode-pumped femtosecond lasers, most of it acquired in Photonics industry. He graduated in Physics at the University of Heidelberg in 1995 and earned his PhD from the Swiss Federal Institute of Technology (ETH Zurich) in 1998. Following a Postdoc position at the University of Bordeaux, he started transferring his research interests to industry. He joined Amplitude Systèmes in 2002.

POWERLASE
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ANDRITZ Powerlase is an innovative, high power laser company, offering powerful nanosecond and picosecond Diode Pumped Solid State lasers and Fiber lasers. ANDRITZ Powerlase has accelerated the introduction of high power lasers into a variety of industrial applications worldwide, primarily in materials processing, annealing, and cleaning applications. Customer-focused, and with an in-depth knowledge of applications, Andritz Powerlase enjoys significant expertise in developing state-of-the-art process solutions for the applications including aerospace, automotive, electronics/display manufacturing, conservation, infrastructure/bridge maintenance, nuclear waste management, shipbuilding and oil/gas industries. Andritz Powerlase has successfully combined high power, high repetition rates, and high energy pulses; a combination not previously available together and offers the laser systems in IR and Green wavelengths. Its unique utilization of these product features introduces laser processing into new and innovative applications**.** **www.powerlase-photonics.com**

Young Kwon (CTO) joined Powerlase Photonics Ltd. in Crawley, UK as Managing Director in 2011 from Northrop Grumman in Orlando FL USA. He has been President/CEO and now CTO of Andritz Powerlase Ltd. He has been working in the laser industry over 35 years for commercial, medical, defense and industrial applications. He received a Ph.D. in Electrical Engineering from the University of Colorado in Boulder, USA. He has wide ranging responsibilities for the current and future laser technology and applications platform for the Andritz Powerlase, and an extensive involvement in the business development with the customers.

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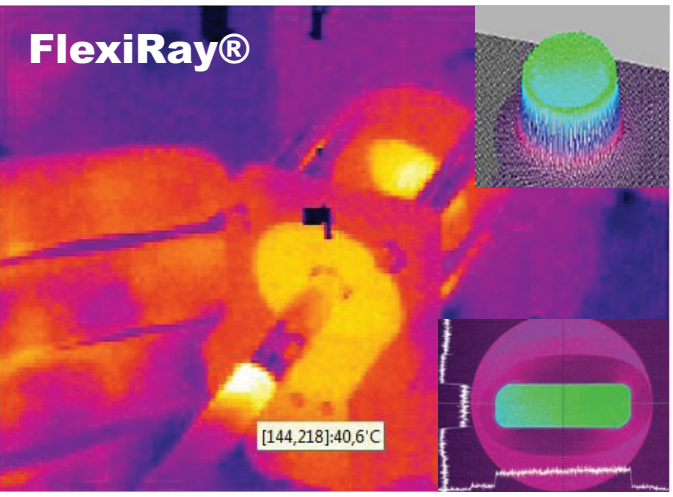

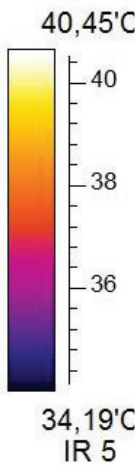

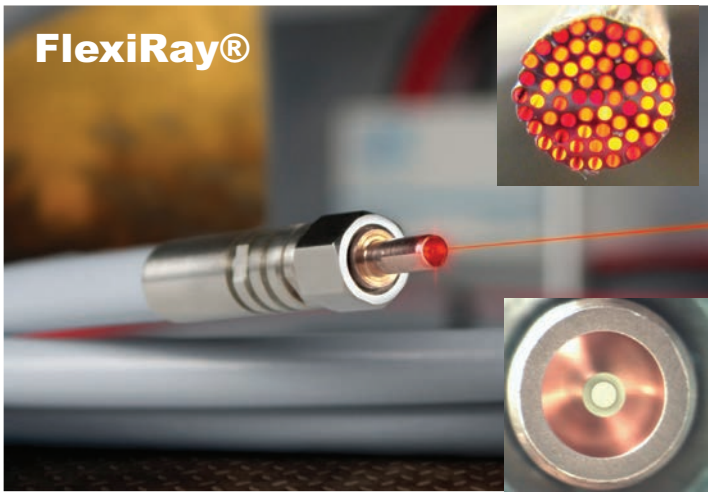

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APE is a worldwide trusted supplier of laser diagnostics and wavelength conversion for the ultrashort pulse (USP) laser industry. The diagnostics business covers autocorrelators for pulse width measurements, spectrometers, calibration light sources for cytometry, and other equipment for measuring and manipulating laser pulses. The business segment wavelength conversion includes optical parametric oscillators and amplifiers (OPO, OPA), frequency multiplication, as well as laser-sources for nonlinear Raman spectroscopy and label-free microscopy. APE is headquartered in Berlin, Germany, and was founded 1992. **www.ape-berlin.de**

Bodo Richter (CEO) finished his degree studies with a diploma in physical chemistry from the University of Bielefeld in 1997. After that, Bodo went to Berlin to continue his studies at the Fritz-Haber-Institute. He received a doctor´s degree from the Humboldt University with a thesis about surface science. This subject led him to a manufacturer of devices for surface analysis where he started his professional career in 2002. There, he worked in different functions, the last position being a production manager. Bodo took over the same position when he joined APE in 2010. Together with Cornelia Gläser, he was appointed chief executive officer in January 2015.

Konrad von Volkmann (Director of Research and Development) is responsible for managing the development department at APE. He studied physics at the FU in Berlin and in Bordeaux and finished his PhD in 2009 on ultrafast relaxation processes in condensed matter using ultrafast vibrational spectroscopy and time-resolved broadband THz spectroscopy. From 2010 onward, he worked at APE as product expert, project manager, team leader of the software development team and became Director of R&D in 2015.

art photonics was launched in Berlin in September 1998 to develop and produce specialty fiber products for a broad spectral range from 200nm to 16µm. Various fiber cables, bundles and spectroscopy probes are produced with unique parameters for different applications: from high laser power delivery in technology & medicine to process-spectroscopy and medical diagnostics. **www.artphotonics.de**

Slava Artyushenko (President & CEO) was born in Russia. His PhD in physics was done at General Physics Institute, Moscow in 1981 - focused on his pioneering development of polycrystalline fibers for Mid IR-range: 3-18µm. His multiple publications and patents were devoted to fiber optic technologies and applications in laser medicine, process-spectroscopy, optical sensing and diagnostic. In 1998, he founded art photonics GmbH in Berlin – one of worldwide leaders now in the production of specialty fiber products for a broad spectra 0.2-16µm. Dr. V. Artyushenko and art photonics are members of EPIC, CPACT, IBioIC, SPIE, OSA, SAS, SPECTARIS, Optec-BB, Photonics-BB, GDCh-DECHEMA & CLIRSPEC.

ASE Optics Europe provides optical engineering talent for world-class optical systems. Do you need help with challenging optical applications? ASE Optics Europe creates applied engineering solutions for a wide range of applications. Based in Barcelona, our team has the expertise to tackle the most complex of challenges. As an RPO Company, ASE Optics Europe helps customers move from lens and assembly design to prototype to full production if needed. Rochester Precision Optics offers expanded access to technology, facilities and testing to speed our customers' time to market. **www.aseoptics.eu**

Marta de la Fuente (CTO) holds an MS in Physics from the University of Valladolid (Spain). In 1987, she joined Indra where she worked as optical engineer and then became responsible of the Optics Group. In 2017, she joined ASE Optics Europe as CTO, leading design and development projects. Her expertise is optical design but she has a good background in image processing and the Defense and Security market. Marta is author of 22 papers and 1 patent. She has been technical program chair of multiple conferences and in 2011 she was recognized as SPIE Senior member for her achievements in optical design. She has been jury of Prism Award for the period 2010 – 2012. She was co-founder of SECPhO in 2009 and member of its Executive Committee until 2013. Marta is currently in her second term as Elected Director at SPIE BoD.

ASM AMICRA Microtechnologies is a worldwide leading supplier of ultra high precision Die Attach Equipment specializing in submicron placement accuracy (±0.3µm @3 sigma). Equipment supports Die Attach and Flip Chip bonding processes, including: in-situ eutectic laser bonding, dynamic alignment, active bond force with the largest bonding area. Additional capabilities include Wafer Inking, LED/LD Automated Test & Sort and Custom Systems. **www.amicra.asmpt.com**

Johann Weinhändler (Managing Director) is responsible for Customer Operations, Sales, Marketing, Business Development and Quality Management at ASM AMICRA Microtechnologies GmbH. He has a degree in Electrical Engineering, an MBA from the Open University Business School (UK), and holds a doctoral degree in Marketing from Trinity College in Dublin. He has been working in the semiconductor industry for over 25 years. Previously, he worked on Lam Research, Datacon/BESI and Oerlikon Systems in different management roles. His main responsibilities are the development of international offices and the internationalization of AMICRA's facilities. Moreover, he has accomplished demonstrable success in attracting internationally renowned clients. He serves the role of the "visionary" and the "internationaliser".

Astrum LT

Astrum, founded in 2017 and based in Lithuania, and Czech Republic, is an international supplier of high-power OEM laser systems and components for industrial and medical applications. Astrum LT focuses on the semiconductor technology as an efficient, most advanced and reliable source of innovation and features both EEL and VCSEL arrays' applications. The company has grown through extensive academic and industrial partnerships offering customized but competitively priced solutions for a wide variety of laser types such as Nd:Yag, diode, green and yellow, Erbium, Holmium, Thulium, Q-switched and picosecond lasers that are widely used in aesthetic medicine, dermatology, gynecology, surgery, and therapy. The product range includes laser amplifiers, laser heads, optical modules, laser diode drivers to be soon extended with laser components for 3D sensing, ToF, LiDAR and gas sensing. A new 6,000m2 laser chip epi foundry and fabrication facility in the vicinity of Prague, Czech Republic is scheduled to be up and running in Q3 2020. **www.astrum-lasers.com**

Sergei Tsarev (CEO) is the founder of Astrum LT. He originally came from Russia and has over 10 years' experience in international business development in industrial and laser applications. Strong project management and liaison skills allowed him to name a few successful development and delivery of 120W CW Tm laser head for surgery, 5J QCW green laser for vascular treatment and ongoing yellow laser project. Customers include Israel, South Korea, US and EU-based energy device manufacturers.

Avantes is a world leader in the field of spectroscopy. They develop and manufacture spectrometers, light sources, software, fiber-optic cables and accessories. Avantes' products are highly customizable, adaptable to any specific application, and integrated into even the smallest housings. These products therefore find usage in many OEM applications and markets, as well as in the scientific and industrial world. With 25 years of experience, Avantes continues to produce innovative applications in diverse fields including chemical, solar energy, agriculture, gemology, (bio)medical, semiconductor, light measurement and food processing technology. **www.avantes.com**

Benno Oderkerk (CEO) has a background in electronics and medical technology. He studied at the University of Twente, Netherlands and did his master's thesis at Technion, Israel Institute of Technology in Haifa in 1988. Since then, he worked for 5 years in a small sensor company in Munich and, in 1994, he started TOP Sensor Systems, which was renamed to Avantes in 2000. As a CEO, Benno is responsible for 100 employees worldwide as well as the strategic development of Avantes and its affiliated companies in China, USA and UK. Benno Oderkerk is President of the EPIC Board of Directors.

Danny Wilms Floet (Manager R&D) holds a Ph.D. in Applied Physics (Delft University of Technology) with a degree in the field of ultra-sensitive superconducting detectors for the Herschel Space Telescope. He is a multi-disciplinary professional with almost 20 years of international experience in high-tech materials and products. Before joining Avantes as a manager R&D in December 2018, he worked in various roles in the field of innovation, new business development, and marketing and sales. Moreover, he was responsible for setting-up a customer support laboratory in Shanghai (China) and has built extensive experience in developing cooperation between startup companies and multinationals. Danny is an open-minded team player with a strong focus on improving the products of today and creating the ones of tomorrow through a thorough understanding of customer needs.

BERLINER GLAS GROUP is one of the world's leading providers of optical key components, assemblies and systems, high-quality refined technical glass as well as glass touch assemblies. With more than 1,500 employees, the BERLINER GLAS GROUP develops, produces and integrates optics, mechanics and electronics into innovative system solutions for its customers. As OEM partners from concept to volume production, the BERLINER GLAS GROUP companies serve innovative customers in various market segments – semiconductor industry, laser and space technology, metrology, medical technology and the display industry. **www.berlinerglas.com**

Volker Schmidt (VP Technology & CTO) holds a degree in Physics from Friedrich-Schiller University Jena (Germany). His diploma-thesis focused on the quantum-theory of the interaction of light and matter. He worked as a Test & Measurement specialist on infrared cameras between 1988 and 1990 at the "Factory for TV-Electronics" in Berlin. From 1990 to 2002, he served as Vice President Engineering at the European headquarters of Raytek, a company specialized on non-contact temperature measurement before he joined Berliner Glas KGaA in 2002, leading the research & development department. Being a member of the Management Board since 2006, he has been appointed as CTO in 2009. His main working areas are optical design and opto-mechanical components for lithography-tools.

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 photonics and microsystems technology. The management of the Berlin Brandenburg Photonics Cluster lies with Berlin Partner for Business and Technology, as well as OpTec-Berlin-Brandenburg and ZAB Brandenburg Economic Development Board. The Photonics Cluster in Berlin and Brandenburg is especially distinguished by the strong scientific basis and the high amount of specialized small and medium-sized companies with widely ranged know-how – a perfect basis for a mutual transfer between science and industry, and innovation driver for other branches. **www.berlin-partner.de**

Gerrit Rössler (Head of Unit Photonics) is head of the photonics unit at the Berlin regional economic development agency Berlin Partner and he is in charge for the management of the Berlin-Brandenburg photonics cluster in cooperation with the branch network OpTecBB e.V. and the ZukunftsAgentur Brandenburg. He has more than 10 years working experience in economic development support for optics and photonics industry and research. Gerrit has an MBA in network management, b2b-marketing and economic development from the Free University Berlin.

Besi (BE Semiconductor Industries N.V.) is a leading supplier of semiconductor assembly equipment for the global semiconductor and electronics industries offering high levels of accuracy, productivity and reliability at a low cost of ownership. Besi develops leading edge assembly processes and equipment for leadframe, substrate and wafer level packaging applications in a wide range of end-user markets including electronics, mobile internet, cloud server, computing, automotive, industrial, LED and solar energy. Customers are primarily leading semiconductor manufacturers, assembly subcontractors and electronics and industrial companies. **www.besi.com**

Ruurd Boomsma (CTO) is the Chief Technology Officer of Besi, covering all aspects of technology roadmaps and developments plans for all equipment developed at Besi . He is also responsible for strategic supply chain management and overall Quality. He received a master's degree in Technical Physics focusing on Semiconductor Physics and High Vacuum Technology from the State University of Groningen the Netherlands. Ruurd started working in the Semiconductor Industry in 1984, initially in front end equipment at ASM followed by MRC and later Unaxis.He is now over 10 years active at Besi. His tasks include work on supply chain Asia, reorganizing the Plating activities, and held responsible for all the Die Attach activities worldwide. Ruurd is now CTO of Besi.

bmbg consult is an International Management Consultant with a long experience in semiconductor industry R&D, mask making, EUV ecosystems and infrastructure, product management, product strategy, business development with more than 25 years of management in different industries from group to division level, management of national and international funding projects, organization of workshops and conferences, writing and reviewing of scientific articles, implementation and assessment of excellence systems. The owner is an excellence assessor for the European Excellence Award, EFQM Ambassador and has an MBA in International Management, International Marketing and Business Communication. Funding Experience in Germany on state, federal and European level, e.g. MEDEA+ EXTUMASK – Extreme UV Lithography Mask. **www.bmbg-consult.de**

Jan Hendrik Peters (Owner) has a background in physics and business administration. He holds degrees in physics from the University of Washington, Seattle (M.S.) and University of Hamburg, Germany (PhD) and an MBA from the Nordakademie in Elmshorn, Germany. Based on his management experience in the academic world (particle physics lab DESY) and the semiconductor business sector (AMTC and Carl Zeiss SMT), he started his management consultancy firm in 2017 to support SMEs in strategy development and balanced business management. His work as an excellence assessor allows him to acquire a deep insight into management methods from organizations all over Europe, the Near East and China which he transfers to the realm of small and medium enterprises.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 410,000 associates worldwide (as of December 31, 2018). The company generated sales of 78.5 billion euros in 2018. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The basis for the company's future growth is its innovative strength. At nearly 130 locations across the globe, Bosch employs some 68,700 associates in research and development. **www.bosch.com**

Simon Schneider (Research Engineer) studied electrical and information engineering with focus on optical communications at Karlsruhe Institute of Technology (KIT), Germany, and at Universitat Politècnica de Catalunya, Barcelona, Spain. From 2010 on, he was scientific assistant at KIT, working on the development of optical coherence tomography systems, on silicon photonics and on nanomaterial characterization. In 2016, he joined the corporate research division of Robert Bosch GmbH. In the domain of microsensors for automotive and consumer applications, he concentrates on integrated optical ranging systems.

Chiral Photonics (CPI), founded in 1999 and located in Pine Brook, New Jersey, USA, designs, develops and produces fiber-based components and assemblies. CPI's products and related services include multicore fiber fanouts, high density fiber arrays, pump-signal combiners, high temperature sensors, optical probing and packaging of photonic integrated circuits. CPI continues to innovate, through its research and development programs and with industry and government partners, in a broad array of technological areas, including, fiber lasers and high-power laser components, space division multiplexing, shape sensing and harsh environment sensing. **www.chiralphotonics.com**

Victor Kopp (Director of Research and Development) received his MS degree in physics from St. Petersburg University and his Ph.D. degree in laser physics from the Vavilov Optical Institute, Russia. Dr. Kopp was a Research Associate at Queens College of City University of New York from 1997 to 2000. In 1998, he co-founded Chiral Photonics where he is Director of Research and Development. At Chiral Photonics, he has led the technological development, authored and co-authored 39 patents and more than 60 articles and opened business opportunities with a new optical fiber photonic platform for space division-multiplexing in multicore optical fibers, coupling photonic integrated circuits to optical fibers and optical fiber-based temperature and 3D shape sensors.

CGS Management, headquartered in Pfäffikon SZ, Switzerland, is an independent, experienced industry partner specialized in building medium-sized companies into international groups and expanding their businesses. Since 1999, CGS private equity funds have been investing in platform companies in Europe's German-speaking countries and making add-on acquisitions worldwide. To date, CGS has invested in more than 30 individual companies and formed more than a dozen of industrial groups. **www.cgs-management.com**

Antonio Cives (Managing Partner) joined CGS in 2006 and has been a Managing Partner since 2017. During this career, he has built multiple industrial groups. Before CGS, Antonio was on the transaction advisory services team at Ernst & Young in Switzerland and accompanied multiple M&A transactions in industrial business areas. He has a deep understanding of the needs of medium-sized companies in the German-speaking region and their strategic potential. Antonio's profile is rounded off by his many years of experience in the areas of M&A, integration, and group-building and his expertise in operational value enhancement. His industrial experience lies in plastics, tool-building, machinery, equipment, and accessories. He holds a Master of Business Administration from the University of Basel and completed the Program for Executive Development at IMD business school in Lausanne.

COMPOUND SEMICONDUCTOR TECHNOLOGIES

MEMBER of EPIC

CST Global is an independent, volume-producer of III-V compound semiconductors for the fabrication of photonics products. We provide custom foundry services and standard, high-volume, laser products for the optical communications markets. We are a partner in the UK and European Technology Consortium Programme and we supply leading companies around the world in the Telecommunications, GPON, Industrial, Defense and Healthcare markets. **www.cstglobal.uk**

Neil Martin (Founder and CEO) is CEO of CST Global, a Glasgow-based, volume producer of III-V compound semiconductors for photonics applications. Neil was one of the founders of CST Global in 2001. As CEO, he has grown CST Global from a private ownership company, through two funding rounds, to its acquisition by Sivers IMA Holding AB, a quoted, Swedish technology company, in 2017. Neil brings extensive leadership, technical and commercial experience to the company, gained through international project management and marketing roles at Digital Equipment Co (DEC), Motorola and as a consultant with Scottish Enterprise Microelectronics. Neil has an Electronics Degree from the University of Strathclyde and has been involved in the global electronics industry since 1984. CST Global now provides custom foundry services, custom designed photonics chips and standard, high-volume, lasers for the rapidly growing, worldwide telecoms, sensing, defence, industrial and healthcare markets. It is also a partner in the UK and European Technology Consortium Programmes. CST Global now employs 70 staff and exports over 90% of its output.

CORNING

MEMBER of EPIC

Corning is one of the world's leading innovators in materials science, with a 167-year track record of life-changing inventions. Corning applies its unparalleled expertise in glass science, ceramics science, and optical physics, along with its deep manufacturing and engineering capabilities, to develop category-defining products that transform industries and enhance people's lives. Corning succeeds through sustained investment in RD&E, a unique combination of material and process innovation, and deep, trust-based relationships with customers who are global leaders in their industries. Corning transforms the way the world connects: Since ushering in the telecommunications revolution with the invention of low-loss optical fiber in 1970, Corning has been continually innovating to increase the speed and capacity of optical networks, while reducing installation costs. Today, we are delivering solutions for growing segments like fiber to the home,

wireless technology, and hyperscale data centers. Innovating the next generations of thin, tough glass for mobile devices: By pioneering glass that is thin, lightweight, damage resistant, and responsive to touch, Corning helped transform the way people use their smartphones. Today, Corning(r) Gorilla(r) Glass is featured on billions of mobile devices worldwide. We continue innovating to enhance performance, deliver new features, enable new designs, and support new capabilities such as augmented reality. Creating richer entertainment experiences through display glass innovation: Corning helped create the LCD industry by inventing a process for making thin, flat glass with exceptional stability and unparalleled surface quality. Today, we are leveraging our expertise and assets to drive the next round of display innovations - better images, ubiquitous touch, flexible displays, and new form factors. Delivering solutions that enable life-changing, life-saving medicine: Corning has been a trusted supplier to the healthcare and pharmaceutical industries since we introduced PYREX(r) glass in 1915<x-apple-data-detectors://3>. Today, we are a leader in lab products, cell culture solutions, bioprocess vessels, and specialty surfaces. We are also helping to provide more reliable access to medicine with our revolutionary new glass packaging for drug storage and delivery. **www.corning.com**

Waguih Ishak (Division Vice President & Chief Technologist) received a B.Sc.E.E. in 1971, a B.Sc.Math. in 1973, an M.Sc.E.E. in 1975 and a Ph.D.E.E. in 1978. He received an Honorary D.Sc. from McMaster University in 2018. Dr. Ishak joined HP Labs in 1978, Agilent Labs in 1999, Avago Technologies in 2005. He joined Corning Incorporated in 2007 to establish the Corning West Technology Center in Silicon Valley. He is a VP and Chief Technologist with Corning R&D Corporation in Silicon Valley. His research interest includes novel displays, embedded sensors and machine learning.

csem

MEMBER of EPIC

CSEM: Swiss Center for Electronics and Microtechnology, founded in 1984, is a private applied R&D center. Our 400-strong workforce specializes in micro- and nanotechnologies, systems and surface engineering, low-power information and communications technologies, and photonics. The main focus of CSEM's photonics program is the development of optoelectronics components and their optimal integration into innovative products. Our technologies are able to address the needs of a very wide range of fields, from healthcare, watchmaking, aerospace, security and medical, to consumer electronics and cleantech. **www.csem.ch**

Christian Bosshard (Head of Center Muttenz / Vice-President) is managing developments in the fields of MicroNano Optics & Photonics, Sensing & Security, Large Area & Flexible Systems and associated integration technologies for applications including lighting, space and aeronautics, pharma and bio, health and medical. Christian received his degree in Physics (1986) and his doctorate (1991, Silver medal award) from ETH. After a postdoctoral stay at the Center for Research and Education in Optics and Lasers (CREOL) in Orlando, Florida, he was Senior Scientist and Lecturer ('venia legendi') at ETH before joining CSEM in 2001. Christian is a Fellow of the Optical Society of America (OSA), managing director of the Swissphotonics technology network, board member of EPIC, and member of the Board of Stakeholders of Photonics21.

The Council for Scientific and Industrial Research (CSIR) is a leading scientific and technology research organisation that researches, develops, localises and diffuses technologies to accelerate socioeconomic prosperity in South Africa. The organisation's work contributes to industrial development and supports a capable state. The organisation aims to conduct research, development and innovation, localise transformative technologies and accelerate their diffusion in order to collaboratively improve the competitiveness of high-impact industries to support South Africa's re-industrialisation. **www.csir.co.za**

Hencharl Strauss (Research Group Leader) joined the CSIR in 2008 and was appointed research group leader in 2014. His group's most notable achievement was the development of the laser and optical subsystems of a South African built, large powder-bed, 3D printer. They are currently using this machine as a platform to develop high power laser and process monitoring technologies. The group's core capabilities lie in developing high average power and high energy laser delivery and laser beam shaping solutions for industry.

Delta Optical Thin Film is a world-leading manufacturer of optical thin film filters with more than fifty years of experience. Through continuous development of new design and production technology Delta Optical Thin Film helps the world's leading manufacturers of diagnostic and analytical instruments in setting new standards. With its unique and advanced optimisation software to match customers' particular optical specifications, Delta Optical Thin Film ensures a fast and efficient design process. Delta Optical Thin Film fluorescence filters and Continuously Variable Filters are used in challenging applications such as fluorescence microscopy, spectroscopy, flow cytometry, wavelength selectors, high-performance monochromators, biomedical laser systems, Point of Care (PoC) instruments, image transferring systems, hyperspectral imaging and optical coherence tomography. **www.deltaopticalthinfilm.com**

Henrik Fabricius (CTO) earned an MSc EE with focus on optics and optoelectronics in 1986 with the Danish Technical University (DTU). Henrik also has a Diploma as Industrial Researcher (1988) with the Physics Lab3 at the Danish Technical University (DTU). He is the Head of R&D Optical Thin Film in DELTA from 2001 to 2014. Prior to that, Henrik also served as Senior Technology Specialist for DELTA from 2007 to 2014. CTO. He is a co-founder and board member of Delta Optical Thin Film A/S (2014). Henrik is responsible for the development of Delta's advanced design techniques and proprietary design software, as well as the optical monitoring techniques and the OMS software used on their coating machines; including the techniques for designing and producing Delta's continuously variable filters and beam-splitters. Henrik has more than 28 years of experience in negotiating specifications and designing advanced coatings serving as key components in high quality instruments across a wide range of industries, from medical and biochemical devices to space and aerospace applications and semiconductor industry.

Easics is a System-on-Chip design services company, targeting ASICs / ASSPs and FPGAs. Easics also offers embedded artificial intelligence solutions based on deep neural networks for real-time pattern recognition close to novel image sensors: visual, thermal infrared, time-of-flight, LiDAR, ultrasound, X-ray, spectroscopy, ... Applications include in-line quality control in factories, medical image analysis and self-driving vehicles. Easics is active in imaging / image sensors, industry 4.0, healthcare, smart mobility, consumer electronics and space markets. Easics is based in Leuven, Belgium and was founded in 1991. **www.easics.com**

Ramses Valvekens (Managing Director) is managing director at easics, since the management buy-out in 2004. In 1994, he co-invented, at imec, the first soft microprocessor on FPGA for image processing, for which he received the Barco/VIK-prize. He holds two masters' degrees in electronics engineering from KU Leuven. He performed research at INP Grenoble (France) and at Lawrence Livermore National Laboratory (California). He is an avid microscopy hobbyist.

EFFECT Photonics develops highly integrated optical communications products based on its DWDM optical System-on-Chip technology. The key enabling technology for cost effective DWDM systems is full monolithic integration of all photonic components within a single chip, also known as Photonic Integrated Circuits (PICs). This technology combined with EFFECT Photonics' low-cost packaging capability, addresses the soaring demand for low cost DWDM solutions in high bandwidth connections between Datacenters (Inter-Datacenter), mobile cell towers for Fronthaul, Backhaul, and Passive Optical Networking (PON) applications such as NGPON2. **www.effectphotonics.nl**

Boudewijn Docter (CTO) started working in Photonic Integrated Circuits in 1998. He first worked as software developer and later as Photonic IC designer at start-up BBV, then Kymata and Alcatel Optronics, where he returned to research. He served six months at the photonics labs of NTT in Japan and then at TU/e to work extensively on the InP PIC technology using the generic fabrication model which has become the basis of EFFECT Photonics' capability.

Elenion Technologies is a vertically integrated semiconductor company driving innovation in silicon photonics-based chip design and development. With its SiPh technology platform and design for services lineage, Elenion's System-on-Chip solutions are tailored for a broad range of telecom, hyperscale communication and networking applications. **www.elenion.com**

Michael Hochberg (CTO) founded a number of integrated photonics companies, including Elenion, Simulant and Luxtera. He's held faculty positions at UW, UD, and NUS and he directed the OpSiS initiative, which pioneered silicon photonic multi-project wafer runs and PDK's. His work has received over 10,000 citations in the academic literature, and he's won a number of awards for his work, including a Presidential Early Career Award (PECASE), an NRF Fellowship, and an AFOSR Young Investigators Program award. His book, "Silicon Photonics Design: From Devices to Systems," was published in 2015 by Cambridge University Press and has been widely adopted as a textbook in the field.

Endofotonics is a medtech startup from Singapore developing the world's first diagnostic biopsy device to assist clinicians on selecting the best-informed biopsy during endoscopy. This medical device, called IMDx system, is utilizing state-of-art fiber-optic Raman optic technology and machine learning algorithm in detecting specific precancerous and cancerous tissue in vivo. Endofotonics is currently ran by a lean team of highly skilled and specialized engineers and PhD executives, with knowledge ranging from optics to biomedical, and skills from academic research to industrial product development. Overseeing Endofotonics as a business, the company is supported by board of directors and engineering scientific board that comprises of founders and thought leaders in their own field. Endofotonics is currently at the product development phase of the IMDx system. The system is a Raman spectroscopy with an extension of a confocal fiberoptic probe; with machine learning capabilities. The whole console system will be used by clinicians in surgical theater. **www.endofotonics.com**

Peter Cheng (CEO) currently serves as Zig Ventures' CTO as well as Senior Adviser for Biobot Surgical and CEO for Endofotonics. Peter has more than 30 years of experience in the Technology Management and R&D field spanning across industries, such as, Computer & Printer & Computer peripherals , Medical Devices, Magnetic & Optical Storage & Multimedia Solutions , Consumer Lifestyle & Domestic Appliances , Renewable Energy, and Desalination & Waste Water Treatment Peter had served in the management, technology and operation space for companies like Vestas, Hyflux, Unisys & Philips.

EPIC
European Photonics Industry Consortium

EPIC is the European industry association that promotes the sustainable development of organisations working in the field of photonics. Our members encompass the entire value chain from LED lighting, PV solar energy, Silicon photonics, Optical components, Lasers, Sensors, Displays, Projectors, Optic fiber, and other photonic related technologies. We foster a vibrant photonics ecosystem by maintaining a strong network and acting as a catalyst and facilitator for technological and commercial advancement. EPIC works closely with related industries, universities, and public authorities to build a more competitive photonics industrial sector, capable of both economic and technological growth in a highly competitive world-wide marketplace. **www.epic-assoc.com**

Carlos Lee (Director General) brings with him a background in microelectronics which was acquired through several management positions held at the international association SEMI. He has been responsible in Europe for the SEMI International Standards program, managed technical and executive programs, and together with the advisory board advocated for a more competitive semiconductor and photovoltaic manufacturing industry. Carlos has a BBA in Finance and an MBA in Leadership & Change Management from United Business Institutes. He lives with his spouse and three children in Belgium.

Jose Pozo (Director of Technology) is a Senior Photonics specialist with extensive background in technology, market knowledge and an eye for business opportunities, with 14+ years of professional background. Experienced at building consortia and supply chains for the development of innovative solutions towards improving the state of the art of the Photonics Industry. Highly regarded scientist as well as an award-winning conference speaker with over 70 publications (including a Nature paper in 2015). Member of the board of IEEE Photonics Society – Benelux.

Ana Belén González (R&D Manager) has as main role to understand the technology developed by EPIC members and to identify potential collaboration between them. She also participates in different EC initiatives such as Pulse and the Pilot Lines in Photonics in which she is involved in business development and marketing strategy. Her expertise lies in the development of optical systems and the investigation of applications such as Sensing and Datacom. She received her Bachelor's degree in Chemistry from the University Autonomous of Barcelona (UAB) and her PhD degree from the Catalan Institute of Nanoscience and Nanotechnology (ICN2).

Auri Ripoll (Marketing Manager) received a bachelor's degree in Biology from the University of Barcelona and a Masters in Marketing Management from EAE Business School. She started her career as a scientific professional working for over nine years in several companies. She has worked as a marketing manager in a chemical company where she was responsible for the marketing strategy, including branding and digital marketing actions, where she developed online advertisement and social networks campaigns. Auri has also organised the participation of companies in international exhibitions.

Helena Jelínková (Events Manager) studied Business Administration and Management at Thomas Bata University in Zlin, Czech Republic. Her passion for travelling brought her into the hospitality and tourism industry. She worked for several international hotel brands in Prague at various positions both in the operations and sales department. She dedicated most of her professional life to events. Projects she worked on range from corporate conferences and meetings to sport tournaments or weddings. In June 2019 she has joined the EPIC team as their second Events manager.

Ishani Dave (Marketing Manager) has a background in Public Relations and Marketing and an extensive experience of the exhibition industry. Originally from India, Ishani has worked in various Indian cities on manufacturing and technology trade fairs. She has also worked with various industrial sectors, networking with businesses and understanding the eco system and supply chain of various industry. She previously worked with Deutsche Messe, which also happens to be recent EPIC member. She has joined EPIC as a Marketing Manager and is based in Berlin.

Jasmine Vlietinck (Events Support) has a bachelor's degree in business administration acquired at United Business Institutes in Brussels, Belgium. She has over 15 years' experience in training and coaching on numerous topics: communication and presentations skills, self and team-leadership management, and other topics to enhance a company's performance. Her clients include large multinationals, as well as the European Commission and Parliament. Jasmine is a freelancer, currently supporting the EPIC team with some of their events.

Femto Easy is a company specialized in ultrafast metrology. We have a strong expertise in the production and characterization of high energy ultrashort pulses. We provide robust and reliable measurement devices for ultrafast lasers, already used in some state-of-the-art laboratories. Our current product-line includes all the useful instruments to characterize and manage ultrafast lasers. We provide innovative devices for temporal measurement (ROC, FROG and BOAR), spectral measurements (MISS spectrometer) and spatial measurements (BeamPro). They are suitable for a broad wavelength range (from UV to mid-IR) and a large pulse duration range, from 5 fs to 80 ps. Beside their intrinsic technical performances, our products are very easy to use, compact, portable and versatile, which make them the ideal tools for customer services. The products are associated with a high-quality user-friendly software which contributes to make them easy and pleasant to use. We also make custom products upon request and we provide our expertise on ultrafast metrology. `www.femtoeasy.eu`

Antoine Dubrouil (CEO) is a laser physicist specialized in ultrafast laser and attosecond science. He received his PhD from the University of Bordeaux in 2011. During his PhD at CELIA laboratory, he developed the first Terawatt sub-10 fs laser source and used those high intensity pulses to generate intense attosecond pulses. He acquired during his PhD a strong expertise in the production and characterization of femtosecond and attosecond pulses. After his PhD, he went to Australia for a post doc position in Swinburne University in Melbourne. As a laser technology expert, he was in charge to upgrade their laboratory infrastructure to latest laser technology. His next stint was in Milan, Italy where he spent his time in fundamental research with the Politecnico di Milano, one of the world's best laser research institute. After his period in Milan, he decided to come back to Bordeaux at CELIA in 2014 with the motivation to create a company related to laser technology. After one year and a half of maturation, the project finally results in the creation of Femto Easy. Antoine founded the company in February 2016 with an associate Stephane Lecorné who is talented software developer. After almost three years of existence, the company is showing a promising development.

finetech

MEMBER of EPIC

Finetech, since its foundation in 1992, has evolved into a leading global supplier of micro assembly and SMD rework equipment for customers involved in microelectronics. Finetech's sub-micron bonding equipment supports the most precise and complex applications. Facilitating innovation and boosting new product developments have always been driving forces at Finetech. In order to support customers at the development stage, and help them transition their processes into production, Finetech has been focusing on efforts to expand its portfolio of automated bonders. Along with its development machines, the company offers semi- and fully automated production systems combining process flexibility, high precision and speed. Finetech works in close partnership with customers - many have grown in parallel with us, forming countless productive relationships over the years. The company serves a broad range of industries, including Datacom & Telecom, Industrial Semiconductor, Consumer Electronics, Medical Technologies & Life Sciences, Aerospace & Avionics, Automotive, Defense & Security, Energy, as well as universities and research facilities. With subsidiaries on three continents and an extensive global network of representatives, Finetech ensures quick response times, fast on-site service and personal consultation at all times. **www.finetech.de**

Hermann Moos (Head of Technology Scouting & Product Manager) has over 25 years of experience in the global semiconductor capital equipment industry and joined Finetech in June 2014. Before that, he was Management Consultant, Vice President at Geringer Halbleitertechnik, Sales & Marketing Manager at Sillner Maschinen as well as President and Technical General Manager of two companies in Taiwan, where he worked closely with leading semiconductor capital equipment manufacturers such as F&K Delvotec and Siemens A&D in the fields of business development and sales engineering as well as companies engaged in optoelectronics. Hermann has a strong background in semiconductor back-end equipment and materials for optoelectronic applications and holds a diploma in electrical engineering from the University of Applied Sciences Wuerzburg-Schweinfurt as well as a mechanical engineering degree.

Firecomms™

Firecomms is a global provider of fibre optic solutions and optical transceivers for use in industrial, power & energy, rail transportation and medical markets supplying major power electronics and medical technology health companies. The Company designs and manufactures CMOS ICs, optical semiconductor devices and entire module-assemblies used primarily for command & control applications over plastic optic fibre. Firecomms' design and product development is undertaken in Cork, Ireland while its transceiver products are manufactured in the Company's China facility in Zhejiang province. **www.firecomms.com**

John Lambkin (Managing Director) is a Physics graduate of the University of Surrey, UK and where in 1989 he also completed his PhD in the optical and high pressure characterisation of compound semiconductors. In 1990, he moved to what is now the Tyndall National Institute in Cork, Ireland where he managed the semiconductor characterisation in what was the Institute's new semiconductor growth laboratory. After instigating and co-ordinating several EU framework programmes, John then co-founded Firecomms in 2001 and held the position of Chief Technology Officer. Following the acquisition of the Company in 2012, John was subsequently appointed Managing Director, the position that he currently holds.

First Sensor

MEMBER of EPIC

First Sensor is one of the world's leading suppliers in the field of sensors and sensor systems. In the growth market of sensor systems, First Sensor develops and produces customer-specific solutions for the ever-increasing number of applications in the industrial, medical, mobility and aerospace and defence target markets. Our goal here is to identify, meet and solve the challenges of the future with our innovative sensor solutions early on. **www.first-sensor.com**

Marc Schillgalies (VP Development) is currently Vice President of Development at the German detector company First Sensor in Berlin. At First Sensor, he has worked in different development and product management roles since 2010. Prior to First Sensor, he was developing semiconductor laser diodes at Osram Opto Semiconductors in Regensburg, Germany. He received a Doctorate degree and M. Sc. degree in physics from the University of Leipzig, Germany and an M. Sc. degree in Optical Sciences from the University of Arizona in Tucson. In Tucson and Leipzig, his academic work focused on the field of optical semiconductor devices. Furthermore, he received a M.B.A. degree in General Management from Steinbeis University in Berlin with attention to innovation management.

Fluence

Fluence is laser manufacturer based in Warsaw (Poland) that is focused on environmentally stable femtosecond fiber laser technology. The mission of the company is to deliver maintenance-free femtosecond lasers with an exceptionally long lifetime. Long years of research have led Fluence to create shock and temperature immune femtosecond lasers which can be used in various fields: from science to industrial micromachining. Fluence expertise and products extend to optical parametric amplifiers and laser pulse diagnostics equipment with a revision to the standard approach. **www.** `fluence.pl`

Michał Nejbauer (Co-founder and CEO) graduated in Physics (field of optics) from Warsaw University by making his first Ti:sapphire CPA system. He then completed his PhD in Laser Center at the Institute of Physical Chemistry of Polish Academy of Sciences by developing laser sources for femtosecond stimulated Raman spectroscopy. Michał has more than 10 years of hands-on experience in building ultrafast lasers from scratch in various technologies with an emphasis on nonlinear light conversion techniques. Together with other laser experts he founded Fluence as he believes that femtosecond lasers can perform better.

FOGALE nanotech

MEMBER of EPIC

FOGALE nanotech, an engineering company founded in 1983, is known worldwide as the reference for high accuracy dimensional metrology. FOGALE nanotech provides notably process control and characterization solutions for optics manufacturing industry, allowing thickness, position and shape measurements of lenses, micro-lenses, lens assemblies, wafer-level optics … in lab and high volume manufacturing environments. Headquartered in NÎMES, France, Fogale has offices and subsidiaries based around the world. **www.fogale.com**

Alain Courteville (Vice President Innovation) holds an Electrical Engineering degree from the Polytechnic Federal School of Lausanne (Switzerland) and a PhD in Optics and Biomedical Engineering from the University of Franche Comté (France). He also graduated from the Centre for International Intellectual Property Studies (CEIPI, France), and qualified as French and European Patent Attorney. He joined Fogale Nanotech in 2000 as R&D Engineer and later Optics Business Unit Manager, in charge of high-accuracy optical metrology products for the industry. His research activity included development of interferometers for scientific and industrial applications. He is now in charge of the innovation and technology development strategy.

FORC PHOTONICS®

FORC-Photonics was founded in Moscow in 2005 to develop and manufacture fiber Bragg gratings, high temperature optical sensors ans monitoring systems, broadband ligh sources and high-power amplifiers. Various type FBG's and high temperature sensors are highly customizable and produced with unique parameters for different application.FORC-Photonics performs R&D and delivery for various applications including energy industry, medicine, laser technologies, telecommunications and etc. **www.forc-photonics.com**

Alexey Zarenbin (CEO) is founder of FORC-Photonics. He graduated from Bauman Moscow High Technical School in 1991.Since 2001, he had been working in the Fiber Optics Research center of the Russian Academy of Science where he was Vice Director. In 2005 he created an innovative company (FORC-Photonics) that uses the results of FORC R&D of specialty fibers area for developing various optics equipments. Dr. Zarenbin and FORC-Photonics are members SPIE, Russian Laser Association and Technological Platform “Innovative laser, optical and optoelectronic technologies – Photonics” Russia.

Fraunhofer
Heinrich Hertz Institute

MEMBER of EPIC

Fraunhofer Heinrich Hertz Institute does research on communications since more than 90 years. Nowadays, about every second bit transported in the internet touches HHI InP technology on its way to the receiver. With a strong focus on InP, we also develop polymer waveguide based hybrid integration and silicon photonics. While our expertise is strongest in high performance (100GBit/sec and above) data- and telecom, we have strongly increasing activities in sensor systems, e.g. based on terahertz technology. We regularly offer multiproject wafers in InP. Our partners have the choice to do the design themselves and just use us as a foundry or to get both design and chips from a single source. **www.hhi.fraunhofer.de**

Martin Schell (Executive Director) studied physics at the RWTH Aachen University and took his Ph.D. in 1993 at the Technical University of Berlin. Following a one-year research post at the University of Tokyo, Martin Schell worked from 1995 to 2000 as a management consultant for high tech and energy at the Boston Consulting Group. Before he joined Fraunhofer HHI as head of the Photonic Components department in 2005, he was head of production at Infineon Fiber Optic Technologies. Since 2012, he is professor for optical and optoelectronic Integration at Technical University Berlin. Since 2014, Martin Schell leads Fraunhofer HHI together with Thomas Wiegand. He is head of the board of OpTecBB, a network of companies and institutions in Berlin and Brandenburg. **Martin Schell is member of the EPIC Board of Directors.**

Fraunhofer Institute for Laser Technology develops new laser processes, tailor-made laser beam sources and special laser systems. We can provide you with customer-specific solutions for contract research and development in the field of solid state lasers, diode lasers, laser optics, laser cutting, laser welding, surface treatment, micro technology, laser measurement and testing technology, plasma technology, modelling and simulation as well as system technology for your innovations. **www.ilt.fraunhofer.de**

Rolf Wester (Group Leader Freeform Optics) is a scientist at the Fraunhofer Institute for Laser Technology (ILT). He received his M.Sc. in physics in 1983 from the Technical University of Darmstadt and his Ph.D. in 1987 from the RWTH Aachen University. In the same year, he transferred from the RWTH Aachen University to the Fraunhofer ILT, where he gained a broad range of expertise in the fields of laser excitation, plasma physics, and thermomechanics, among others. The main focus of his work during the last 20 years was on the field of optics including wave optics and nonlinear optics. Since more than ten years, he is working in the field of freeform optics.

Fraunhofer Institute for Applied Optics and Precision Engineering develops innovative solutions with light for the future fields of energy, environment, information, communication, health, production, security, and mobility. Applied research and development are linked with excellent fundamental research for the control of light - from creation and manipulation to application. We cover the entire process chain, from system design to manufacturing of prototypes within our five research units: optical components and systems, precision engineering components and systems, functional surfaces and coatings, photonic sensors and measuring systems, and laser technology. Due to the close interaction of these research units, we provide customized and optimized solutions for our partners. **www.iof.fraunhofer.de**

Kevin Füchsel (Head of Department Strategy & Marketing) is responsible for Strategy, Marketing and Communication at the Fraunhofer Institute for Applied Optics and Precision Engineering in Jena. He studied physics at the Friedrich Schiller University Jena and worked in the field of thin film optics and semiconductor physics during his doctorate. Before joining Fraunhofer IOF, he led a junior research group at the Friedrich Schiller University Jena in the field of nanostructured surfaces and transparent conductive oxides. He was co-founder of a start-up and was awarded as “German High Tech Champion” in the field of Green Buildings. At the moment his team coordinates strategic projects of the institute, e.g. innovation alliance »3Dsensation« and »Max Planck School of Photonics« founded by the Federal Ministry of Education and Research or the »Center of Excellence in Photonics« and the »Fraunhofer Project Hub for Microelectronics and Optical Systems for Biomedicine«.

The **Fraunhofer-Institute for Production Technology IPT** in Aachen was founded in 1980 with the mission of conducting application-oriented research and development. Fraunhofer IPT has a strong background on optical technologies starting from optics manufacturing, over optical metrology until the assembly of optical systems. The structure of the Fraunhofer IPT offers solutions to highly specific problems as well as problems that require integrated system-wide solutions. This is done by combining interdisciplinary contributions from

the fields of process technology, machine and control components, metrology, quality management, technology planning and organisation. **www.ipt.fraunhofer.de**

Jan Staasmeyer (Group Manager Optics) started his academic career with a bachelor's degree in mechanical engineering at RWTH Aachen University. After receiving his M.Sc. in Production Engineering with focus on Optical Technologies at RWTH Aachen, he became a research fellow at Fraunhofer IPT in 2015 responsible for the precision glass molding technology. In this function, he managed several industrial and public funded projects related to production of visible and infrared optics. His research interest is molding of chalcogenide glass for infrared optics, a field in which he pursues a PhD. Since February 2019, he is managing the group "Optics", which comprises all glass molding related technologies at Fraunhofer IPT.

Fraunhofer IWS

MEMBER of EPIC

The Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS Dresden stands for innovations in laser and surface technology. As an institute of the Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., IWS offers one stop solutions ranging from the development of new processes to implementation into production up to application-oriented support. The fields of systems technology and process simulation complement the core competencies. The business fields of Fraunhofer IWS include PVD and nanotechnology, chemical surface and reaction technology, thermal surface technology, generation and printing, joining, laser ablation and separation as well as microtechnology. **www.iws.fraunhofer.de/en**

Udo Klotzbach (Business Unit Manager) graduated from TU Dresden (Electrical Engineering and Information Technology) and received a PhD in Laser micro processing from TU Wien. He worked early in his career with University of Northumberland/Newcastle, Fraunhofer IIS-EAS/Dresden, State Chancellery of Thuringia/Erfurt, TU Dresden/Dresden, State Ministry of Economic Affairs, Labour and Transport/Dresden. From 2001 onward, he is responsible for micro technology (Micro materials processing, Micro- and biosystems engineering, Surface functionalization) at Fraunhofer IWS Dresden, Germany. These activities led to a large number of technical publications, patents and new products. As an employee of the Fraunhofer IWS, he has experience in managing and coordinating various projects at German and European level. He is collaborating in advisory boards, scientific congress and Editor of scientific journals like: SPIE/Photonics West, LPM 2020, Photonics 21, EPIC, Silicon Saxony, Bio Saxony etc. In 2012, he got the Dorothy Hegarty Award and 2018 he was awarded 3rd place in the EARTO Innovation Award in the Impact Expected category.

Fraunhofer IZM

MEMBER of EPIC

Fraunhofer Institute for Reliability and Micro-integration specializes in applied and industrial contract research on packaging technology and the integration of multifunctional electronics and photonics into systems. Fraunhofer IZM is one of the leading institutes in the field of microelectronics and microsystem packaging worldwide. The institute covers all the competencies needed for advanced photonic packaging such as process development and qualification and reliability and failure analysis with specific links to 3D Wafer level packaging and 3D heterogeneous integration. Optical interconnection technologies such as fiber optics, photonic substrate integration, electrical-optical Circuit boards (EOCB) and LED are fields of excellence. The institute has a staff of more than 300 and earn 80% of the turnover through contract research. **www.izm.fraunhofer.de**

Henning Schröder (Group Manager) received his M.Sc. degree in applied physics from the University of Magdeburg, Germany in 1994 and his Ph.D. degree at the Technical University of Berlin in 2000. Currently, he is with Fraunhofer Institute for Reliability and Microintegration (IZM), Berlin, heading the Optical Interconnection Technologies Group. His main fields are R&D of photonic packaging and optical interconnection technologies for printed circuit boards and photonic modules. The research focus lies on the design, fabrication and performance enhancement of optical glass waveguides and micro optics for PCB and optical sensors, their characterization, and on reliable micro-optical assembling and packaging technologies for photonic modules, including optical fiber attachment. He holds a lot of patents in photonic packaging technologies. Henning Schröder is member of the German Physical Society, German Society of Applied Optics, and European Optical Society.

Tolga Tekin (PPS Manager) has received the Ph.D. degree in electrical engineering and computer science from the Technical University of Berlin, Berlin, Germany, in 2004. He was a Research Scientist with the Optical Signal Processing Department, Fraunhofer HHI, where he was engaged in advanced research on optical signal processing, 3R-regeneration, all-optical switching, clock recovery, and integrated optics. He was a Postdoctoral Researcher on components for O-CDMA and terabit routers with the University of California. He worked at Teles AG on phased-array antennas and their components for skyDSL. At the Fraunhofer Institute for Reliability and Microintegration (IZM), he then led projects on optical interconnects and silicon photonics packaging. At the Technical University of Berlin, he then engaged in microsystems, photonic integrated system-in-package, photonic interconnects, and 3-D heterogeneous integration research activities. He is manager of Photonics and Plasmonics Systems Group at Fraunhofer IZM and coordinator of 'PhoxLab - European Photonics Innovation Hub for Optical Interconnects at Fraunhofer IZM. He coordinated European Flagship project on optical interconnects 'FP7-PhoxTroT', and is currently coordinating 'H2020-L3MATRIX' and 'H2020-MASSTART'.

FREEDOM PHOTONICS is a manufacturer of unique and innovative photonic components, modules and subsystems, based in Santa Barbara, California, USA. Our advanced semiconductor and dielectric photonic integration technology platforms are enabling new, high-performance fiber and free-space optical communication and sensing systems aimed at applications in diverse markets. A standard range of products offered are a family of (fast-sweeping) tunable lasers in the 1280 nm-1650 nm range, high-power, high-efficiency single and multi mode laser sources, and high-performance photodetectors (up to 115GHz, and 27dBm RF power). For customers where our standard solutions do not work, and that have a need that can be met through customizing our core photonic technology in the 750nm to 1900nm wavelength range, we provide private or white label production services. **www.freedomphotonics.com**

Milan Mashanovitch (CEO) co-founded Freedom Photonics in 2005 and has served as Director of Business Development from 2005-2010, General Manager from 2010-2016, and as CEO since 2016. In these different roles, he has helped grow the company to become a leader in innovative photonic components, with ~45 employees, and ~10 products, manufactured in Santa Barbara, California. Dr. Mashanovitch has ~20 years of experience working in the field of integrated photonics, combined with 10 years of management experience. Prior to Freedom Photonics, Dr. Mashanovitch has worked at the University of California Santa Barbara as a Scientist on photonic integrated circuits in Indium Phosphide, as well as an Adjunct Professor teaching graduate level classes on semiconductor lasers and photonic ICs.

GEHT International is a leading channel partner for high power semiconductor lasers, optical fibers, fiber laser components and LiDAR systems. It represents industry leaders such as CorActive High-Tech Inc., Han's TCS, Optizone, Amonics, Raysung, LightComm and Leishen Intelligent System. GEHT International Ltd also provides and administrates website features and services when you visit or shop at www.gehtmarketplace.com ("GEHT Marketplace"). GEHT Marketplace is a digital transformation to your sales operations and it is fundamentally changing the way how your business can interact with potential customers. GEHT Marketplace is "always connected" and customers can find and buy relevant laser products anywhere and anytime. GEHT International Ltd is headquartered in Hong Kong while European Union, Turkey, Israel, Norway and Switzerland sales operations are run from Helsinki, Finland. We focus on technologies that improve our customers' product performance, quality and help them to reduce the cost of their BoM. **www.gehtinternational.com**

Heikki Timonen (Director) is Director and Co-owner at Hong Kong based GEHT International Ltd. Prior to joining GEHT, Heikki has served in key management, sales and marketing positions in international Tier 1 OEM laser and semiconductor companies like Coherent Inc., nLIGHT Inc. and Murata Electronics. In these companies, he drove gains in revenue, market share and profit performance in European, Asian and American laser and sensor markets.

האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem presents a switching concept based on total internal reflection (TIR) and frustrated-TIR (F-TIR) using a MEMS movable waveguide fully compatible with silicon photonics technology. Switching is accomplished via sub-micron electro-static actuation, even though we employ 3 μm silicon photonics technology. The switching element allows implementing large-scale photonic switches. **www.new.huji.ac.il**

Dan Marom (Professor) is a Professor in the Applied Physics Department at the Hebrew University in Jerusalem, Israel, heading the Photonic Devices Group. After receiving the PhD degree from UC San Diego in Electrical Engineering in 2000, he joined the Advanced Photonics Research Department of Bell Laboratories, Lucent Technologies, and since 2005 he has been affiliated with the Hebrew University. During his 20+ year research career in optical communications, he has been involved in the development of various optical switches for telecommunications applications, utilizing free-space and guided-wave optics and different switching mechanisms. Prof. Marom is a Senior Member of the IEEE Photonics Society, and a Fellow of the Optical Society of America. He was awarded the IEEE Photonics Society Distinguished Lecturer Award for 2014 and 2015 and is currently serving on the Society's Board of Governors.

heracle

Heracle is a Germany-based company that helps its customers to explore, successfully source and navigate the many opportunities arising in the global specialty optical fiber industry. The Heracle team is breaking new ground by partnering with customers and leveraging its wealth of experience and personal connections to develop new products. The company is located in Jena, Germany, the center of leading-edge research and

development (R&D) in optical fiber. Heracle provides customers with a personal bridge to the innovation and breakthroughs taking place in Jena's "optical valley," as well as other important R&D facilities across the globe. Heracle designs, develops and produces optical fiber for targeted markets and customers worldwide. **www.heracle.de**

Peggy Bärenklau (CEO and Founder) joined Jenoptik, after her studies of International Business at the Zeppelin University in Bad Waldsee/Friedrichshafen, to work in Marketing for Semiconductor automation industry. In 1999, she started with Optical Fiber and was responsible for Sales and Marketing of telecommunication fiber and preforms at Fibercore Jena /j-fiber. From 2003 through 2009, she actively supported the FTTH council architecture comitee. At j-fiber/Leoni, she was responsible for Specialty Fiber Applications and Business Development for Fused silica used in the Optics industry. After being head of Sales of the business Unit Fiber Optics at Leoni, she left 2014 to start company heracle as a dedicated custom specialty optical fiber manufacturer She is member of the Board of the Optonet Thüringen e.V. as well as the Advisory Board of the Fraunhofer IOF in Jena.

HUAWEI

MEMBER of EPIC

Founded in 1987, **Huawei** is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. We have nearly 188,000 employees, and we operate in more than 170 countries and regions, serving more than three billion people around the world. Huawei's end-to-end portfolio of products, solutions and services are both competitive and secure. At Huawei, innovation focuses on customer needs. We invest heavily in basic research, concentrating on technological breakthroughs that drive the world forward**. www.huawei.com**

Christopher Cobbold (Executive Director, Corporate Development) has over 20 years of operational, strategy and corporate development experience in the technology sector. He has led venture capital investments, supported M&A transactions and served as a board director or board observer at European technology start-ups. He joined Huawei's Corporate Development team in 2016. Chris studied electrical engineering at Queen's University and the University of British Columbia and received the MBA degree from INSEAD.

Ibsen photonics

Ibsen Photonics is a global provider of transmission gratings and customised grating-based spectrometer modules for OEM applications. Our transmission gratings cover the UV, VIS and NIR ranges and are used in diverse industries such as telecom, sensing, lasers and spectroscopy. Our high performance, compact spectrometer modules are used by international customers in sensor systems and spectroscopy applications such as absorption and flourescence spectroscopy, Optical Coherence Tomography, Raman Spectroscopy and Laser Induced Breakdown Spectroscopy. Ibsen Photonics is a privately held company, majority owned by Foss A/S, with headquarters in Farum, Denmark. **www.ibsen.com**

Henrik Skov Andersen (CEO) joined Ibsen Photonics in February 2011, bringing international experience from senior management positions at Coloplast A/S, Scandinavian Mobility and Timken, and several years as a consultant at McKinsey & Co. At Ibsen, Henrik is responsible for securing strong and profitable growth through long term partnerships with industrial customers and has grown the business 30% per year since 2014. Henrik Skov Andersen holds a M.Sc. E.E. from the Technical University of Denmark and an MBA from INSEAD.

ICN2 Institut Català de Nanociència i Nanotecnologia — EXCELENCIA SEVERO OCHOA

MEMBER of EPIC

The Catalan Institute of Nanoscience and Nanotechnology (ICN2) is a research organisation focusing in the science and technology of nano devices for energy, life sciences and information technology. The Institute promotes collaboration among different disciplines to carry out basic and applied research, working within the Barcelona Nanocluster and with local and global industry. In the context of EPIC, research and development activities include biophotonics and biosensors, lab-on-a-chip, organic solar energy cells, thermal transport in the micro- and nano-scale and opto-mechanics. Its Flexible Nanofabrication Platform develops solutions for cost-efficient and scalable processes suitable for photonics devices. The institute participates in active in several national and international research initiatives, such as the graphene flagship (graphene-based biosensors) and nanophononics. **www.icn2.cat**

Nikos Kehagias (Research Manager) is leading the flexible nanofabrication platform of ICN2 since 2010. He obtained his PhD in 2007 from the National University of Ireland. In May 2008, he joined the Phononic and Photonic Nanostructures group in the Catalan Institute of Nanotechnology (ICN-CIN2). His research work focuses on the study and developed of novel nano-manufacturing methods based on imprint lithography techniques. In the last years, his research efforts have been focused on developing nano-enabled plastic components and devices based on bio-mimicking properties. Dr. Kehagias had been working in the past on polymer optical and photonic devices with an emphasis on photonic crystal applications for light extraction purposes.

imagine optic™

MEMBER of EPIC

Imagine Optic is a provider of Shack-Hartmann wavefront sensing hardware and software, adaptive optics technologies and professional services in applied optics. We work with scientists and industrials in domains including pure science, industrial quality control, space and defense, semiconductors and many others. From X-EUV to SWIR and MWIR, through the visible light spectrum, we develop, manufacture, distribute and support a very large range of wavefront measurement and correction technologies. From augmenting resolution in bioimaging applications to improving beam shape and propagation, we have the hardware and software to meet customer needs. **www.imagine-optic.com**

Samuel Bucourt (CEO) graduated from Institut d'Optique Graduate School and from HEC. He founded Imagine Optic in 1996 and Imagine Eyes in 2003. Both companies are offering instrumentation based on wavefront sensing and adaptive optics for academic, industrial and medical purposes. He is the co-author of a few patents and scientific articles. He is an expert in metrology as he started his career by developing a 3D probe based on conoscopi holography (Le Conoscope). Samuel is also the VP of Photonics France and member of the board of Directors of EPIC.

INO is the largest centre of expertise in optics and photonics in Canada and is among the best technological research centres in the world. For the past 30 years, it has created and developed innovative and valuable solutions to meet the needs of businesses in Quebec and throughout Canada. A world leader in high technology, INO has implemented more than 6,500 solutions, carried out 74 technology transfers, and contributed to the creation of 35 new companies, which provide jobs to more than 2,000 people. Through multiple light applications, from laser and fibre optics technologies to imaging systems, INO controls light to capture, identify, predict, decide or transform the real world. Its innovative solutions support Canadian businesses in several key industries through five business units: biomedtech; advanced manufacturing; energy, resources and environment; security, defence and aerospace; and city, infrastructure and mobility. **www.ino.ca**

André Fougères (VP Innovation) received his Bachelor of Physics from the Université de Montréal in 1988 and his master's and Doctorate from Rochester University (New York State) in 1990 and 1994, respectively. His post-graduate studies, funded by the Natural Sciences and Engineering Research Council of Canada "Génie '67" scholarship, focused on quantum and nonlinear optics. In the summer of 1994, he joined the laser system technology group at INO as a post-doctoral scholar. He left his management position in active sensing technology in 1999 to join EXFO as Senior Product Manager for the Scientific Division at the head office in Quebec City, then in Geneva, Switzerland, at the Gap Optique SA subsidiary. Returning to INO in January 2005, Mr. Fougères' activities as program manager focused on business and technology development. In March 2008, he was appointed Director of Program management. In September 2011, André joined INO's senior management team as Vice-President, Operations and in September 2013 as Vice-President Business Development and Operations. In July 2018, André has transitioned to Vice-president Innovation & technology.

Institute for Photonic Integration
Materials • Devices • Systems
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

MEMBER of EPIC

The **TU/e Institute for Photonic Integration (IPI)** was established on April 25th 2016. It integrates all research areas crucial to photonics - materials and devices, components, circuits, systems ¬- and cooperates with initiatives that bring photonic research results to a higher Technology Readiness Level. The Institute for Photonic Integration is a leading R&D center in the field of photonics. The work of the institute ranges from fundamental scientific research to the development of prototypes that are taken on to the product stage by industry. The Institute for Photonic Integration continues the research of the TU/e research school COBRA, and therefore possesses an extensive staff of researchers along with a large cleanroom(800 m2) optimized for photonics R&D. The research school has been one of the world's leading proponents of photonics research for many years. Furthermore, there is intensive collaboration on photonics with the research groups of the University of Twente and Delft University of Technology. The institute covers three fields: photonics materials (III-V semiconductors), integrated circuits (photonic integrated circuits, PICs) and photonic systems. **www.tue.nl/en/research/research-areas/integrated-photonics**

Ton Backx (CEO) has worked the past 40 years both in industry and at the university. He was appointed part-time professor at Eindhoven University of Technology in 1990 in the field of modelling and model-based control of industrial processes. He joint Eindhoven University of Technology full-time in 2006 as Dean of the Electrical Engineering Department (2006-2016). He was appointed Vice-Rector of Eindhoven University of Technology with special responsibility for strengthening the collaboration between the university and industry (2010-2016). In 2016, he became Vice-President International Relations. Since January 2016, he is responsible for research and development of Photonic Integrated Circuits and Systems at Eindhoven University of Technology. He started the Institute for Photonic Integration in April 2016. He also is co-initiator of Photon Delta –an eco-system for exploitation and strengthening of Photonic materials, photonic integrated circuits and photonic-electronic systems related companies and R&D institutes.

IX-CAD

IX-CAD was founded in 2001 and offers engineering services and consultancy for high-speed digital design in optical data communication. IX-CAD brings RF and Fiber Optics expertise to small and midsize companies which don't have the competency or the resources. We are specialized on Multi-Gigabit optoelectronic package design and bring the RF performance from the chip through the package to the board. We use Keysight's Advance Design System (ADS) - the world's leading electronic design software for RF, microwave and high-speed digital applications -, Ansoft's HFSS for 3D-EM simulation and Allegro for board design. The latest chip packages and boards are made for PAM-4 100 Gbit Ethernet application. Our expert knowledge in combination with the powerful design tools enable first past success. **www.ix-cad.de**

Karsten Droegemueller (CEO) has received his Dipl. Ing. degree from the University Braunschweig in Microwave and Fiber Optics Technology in 1984. After twelve years in the Central Corporate Research of the SIEMENS AG in Munich, he was Project Manager at Fiber Optics Infineon Technologies for the first parallel optical link (PAROLI) in the world. He was co-founder and is now owner of the company IX-CAD GmbH. As a specialist in high-speed package design for Fiber Optics, Karsten is author and co-author of 20 publications, has given presentations on international conferences and holds over 15 patents. In Keysight's EEsof EDA community, he is designated member of the technically advanced group of users.

Joltcapital

MEMBER of EPIC

Jolt Capital is a fully independent Private Equity firm that specializes in Growth Capital Technology Investing and is authorized & regulated by the AMF (Autorité des Marchés Financiers). Jolt Capital generates returns for its investors by enabling mid-sized technology-rich companies with strong fundamentals to execute their growth strategies, in sectors that offer good exit potential across software, mobility, cloud and Internet of Things (IoT). In providing growth capital to our portfolio companies, we support their scaling in new markets, new capacities and new acquisitions, while mitigating the risks towards solid value creation. **www.jolt-capital.com**

Antoine Trannoy (Partner) was most recently the Managing Director for Hoist Group France prior to joining, and subsequently becoming a Partner, at Jolt Capital. Before this, Antoine had been serving as CTO & Director for Locatel whereupon it ultimately merged with Hoist in 2014. Antoine has also had various other top executive roles including; VP Operations for Completel, CIO for AVIP/Dresdner Group, CTO for Mentum (acquired by InfoVista), and CTO for Fileas (acquired by Telespazio). An engineer by training – a graduate of Telecom Sud Paris – Antoine's career initially began with nearly a decade of research working in top-tier research labs including CERN (CH), IBM (USA), CRS4 (IT) working on

networking and grid computing projects. He was part of the SHIFT project at CERN which was awarded the "2001 Computer World Honors" (best scientific application of the decade). In addition, Antoine is the joint inventor of 3 patents, filed while he was CTO of Locatel. Antoine is currently on the Board at both 4JET & Interel.

LAMBDA-X
MASTERS IN INNOVATION

MEMBER of EPIC

Lambda-X designs, develops and manufactures optical & metrology systems as well as sub-systems for Space, Defense & Industry. Active since 1996 and recognized as a key player in the space sector, Lambda-X has developed and manufactured more than 30 instruments, which have been deployed in Space. In addition, Lambda-X has developed a proprietary range of instruments capable of quantifying the optical properties of ophthalmic corrective elements (such as spectacles, contact and intraocular lenses), as well as reflective surfaces such as mirrors. Those robust and fast instruments are typically used for quality control in both R&D and production environments. **www.lambda-x.com**

Olivier Dupont (CEO) has received his PhD in Science from Université Libre de Bruxelles (ULB) in 1992. The first part of his career, 1985-2002, was academic. During that period, he worked in the Microgravity Research Center, a laboratory of the polytechnic school of the Université Libre de Bruxelles where he was involved in the development of various fluid science experiments in microgravity onboard sounding rockets and the Spacelab D2 Mission. In parallel with the scientific research, he develops as project manager, optical equipment for fluid and material science in microgravity conditions. In 1996 he founded Lambda-X with two partners. From 2002, Olivier is the CEO of the company.

Philippe Antoine (CTO-Research) received its Ph.D degree in physics in 1994, from University of Louvain (Belgium). From 1998 to 2005, he worked in telecommunications successively at Alcatel and Broadcom. Then, he was assistant professor at University of Louvain (Belgium) in the physics department. He joined Lambda-X in 2002 as project manager and then as research program manager. Since 2016 is CTO in charge of the research activity at Lambda-X.

lasea
PRECISION LASER **SOLUTIONS**

MEMBER of EPIC

LASEA develops and manufactures high-precision laser machines and production lines for medtech, pharmaceutical, semiconductor and watch industries. With more than 300 laser machines installed worldwide, Lasea serves world-class companies and widely known research centres. Equipped with fs lasers since 2003, Lasea has acquired a special expertise in micromachining applications (zero-tapper cutting, drilling, texturing, marking, internal engraving…). Moreover, Lasea provides OEM components as reliable 3-axis laser beam deflection systems and precession subsystems. The facilities are located in Liège (Belgium), Bordeaux (France), Biel (Switzerland), and San Diego (USA). **www.lasea.com**

Paul-Etienne Martin (Vice President & Head of Advanced Optical Systems Division) received his Master in 2004 from the School for Advanced Processes in Electronics and Optics (ESPEO-Polytech'Orleans) in France with a major in Lasers. He has been working with LASEA for 14 years, holding positions in R&D, production, and business development. After 7 years, he created LASEA's first subsidiary in Bordeaux. Now managing a team of 8 co-workers, he is driving the development and the production of a whole range of products dedicated to laser micromachining systems. Since 2014, Paul-Etienne Martin is also a board member of the French association CLP dedicated to the development and promotion of the laser industry.

LAYTEC Knowledge is key

MEMBER of EPIC

LayTec is a major provider of in-situ and in-line optical metrology for thin-film processes. These metrology tools are used in a broad range of thin-film applications such as LED & LASER production, thin-film photovoltaics, oxide and organic deposition as well as other large area deposition processes. LayTec's integrated metrology provides access to all key thin-film parameters in real-time – either in-situ, during the deposition process, or in-line. The implementation of LayTec metrology systems in production processes significantly shortens development cycles and enables an efficient quality control that helps to considerably reduce production and development costs. **www.laytec.de**

Kolja Haberland (CTO) is Chief Technology Officer (CTO) at LayTec, a leading manufacturer of integrated metrology for various markets. He studied physics at the Technical University of Berlin with special focus on semiconductor physics and optical spectroscopy. In 1998, he finished his diploma thesis on 'multi-channel spectroscopy of dynamic processes on semiconductor surfaces'. In 2002, he got his PhD for his work on 'optical in-situ monitoring during epitaxial growth'. In 2004, for his contributions he was awarded the Carl-Ramsauer-Prize of the Berlin Physical Society. Since 1999, when LayTec was founded with Dr. Haberland being one of the co-founders, he worked in several responsible positions at LayTec and contributed significantly to the rapid growth of this technology company, providing both industry and academia with integrated metrology solutions for epitaxy of LEDs, lasers, transistors and solar cells.

LEJ LIGHTING & ELECTRONICS JENA

MEMBER of EPIC

LEJ || Lighting & Electronics Jena is a provider of high-performance Illumination as well as Power Electronic solutions in the fields of Microscopy, Analytics, Medical Technology, Semiconductor and Industry. Besides its comprehensive portfolio of brand products LEJ offers the highest degree of flexibility and speed to bring customer-/application-specific products to the market. World-known OEMs count on LEJ as their system provider for e.g. laser and system power supplies, LED high performance controller as well as their partner for contract assembly of complex opto-mechanical and opto-electronical sub-assemblies and systems. LEJ supports OEM customers with in-depth know-how in dimensioning Lamp-, LED- and Laser-powered Illumination Systems. The company is fully integrated with a strong focus on core technology competencies, all manufacturing facilities are DIN ISO 9001 certified to ensure an invariably high standard of quality and reliability of our products. **www.lej.de**

Simon Schwinger (Managing Director/CEO) joined LEJ in 2015 and focuses on Technology & Sales. Simon provides in-depth know-how along the entire photonic chain. Having started his career in Digital Imaging (digital camera modules and systems for scientific, industrial and consumer applications), he extended his professional background in optics (classical, polymer optics, hybrid systems and now provides professional Illumination as well as Power Electronic solutions to the market. He graduated from the University of Applied Sciences in Jena and holds a degree (MBE®) from Steinbeis University Berlin. Prior to his current role, he filled several cross-company management positions, e.g. at JENOPTIK AG. As a member of the board of OptoNet e.V., he actively shapes and drives the prosperous future of Photonics.

LG

MEMBER of EPIC

LG is a global leader and technology innovator in consumer electronics, mobile communications, chemical, displays, home appliances and innovative solutions on the components base, employing more than 220,000 people working around the world. With 2018 global sales of USD 150 billion, LG Corp unifies 70+ LG companies under its umbrella, with companies like LG Electronics, LG Display, LG Chem, LG Innotek, LG CNS and many more. In an exemplary case LG Electronics comprises four business units, Home Appliance & Air Solutions, Mobile Communications, Home Entertainment and Vehicle Components—and is one of the world's leading producers of TVs, mobile devices, air conditioners, washing machines and refrigerators. **www.lgtce.de**

Viktor Schütz (Technology Manager) studied Photonics at the University of Applied Sciences in Emden. While he was working as a scientific employee at the Laser Zentrum Hannover (2008-2016), he has been awarded with a PhD degree in engineering in 2015 from the Leibniz University of Hanover. In 2019 he has been also awarded with a MBA degree from the Private University of Applied Sciences Göttingen. He is an author of various scientific publications and a patent. Since September 2016, Dr. Viktor Schütz is active for LG in Europe. In the Düsseldorf office "LG Technology Center Europe" (LG TCE), he is responsible as a "Technology Manager" for the fields: optics, photonics, laser, thin-film and semiconductor technology.

LIGENTEC

MEMBER of EPIC

LIGENTEC is a Swiss based manufacturing partner, offering low loss SiN Photonic Integrated Circuits (PICs) for industries such as quantum technologies, LiDAR, communications, space and sensors. Due to its high confinement, the thick nitride waveguides and resonators have low bending losses and excel even in high power applications from the visible to the mid-IR. The main application areas for this advanced silicon photonics low loss technology include coherent telecommunication, metrology, supercontinuum generation, spectroscopy, sensing and microwave photonics. Ligentec's All Nitride Core Technology platform is fully CMOS compatible, thus allowing us to offer ramping up to high volumes benefiting from the scale of the semiconductor industry. **www.ligentec.com**

Thomas Hessler (Board Member) studied at the University of Constance (Germany) and Imperial College London (UK). He received his Diploma in Physics in 1994 and his PhD in Applied Optics from the University Neuchâtel (Switzerland) in 1997. In 1998, he joined Swiss niche market leader Leister to diversify their activities into micro technology leading to the foundation of today's Axetris AG which he grew to 130 people and market leadership and led as general manager for 21 years. Recently, he joined the Board of Directors at Ligentec SA. Besides his general management experience to navigate in a complex, multi-disciplinary, multi-market, high investment, high-tech OEM business environment, he has profound experience in a variety of photonics and non-photonics technologies (sensors, infrared gas detection, MEMS, micro-optics and micro-fluidics) and markets (automotive, medical, telecom, analytical, industrial).

Light Conversion, UAB is the world leading manufacturer of femtosecond lasers PHAROS and CARBIDE as well as wavelength tunable ultrafast light sources based on TOPAS and ORPHEUS series of optical parametric amplifiers (OPA). Light Conversion is a privately-owned company with >250 employees. Company has its roots in Laser Research Center of Vilnius University. Femtosecond lasers from Light Conversion are broadly used for scientific and industrial applications with more than 10 years history of their usage in 24/7 manufacturing. With over 4000 various systems installed worldwide, Light Conversion has established itself as a reliable and innovative producer of ultrafast optical devices. **www.lightcon.com**

Martynas Barkauskas (CEO) is recently appointed CEO of Light Conversion, a leading femtosecond laser manufacturer located in Vilnius, Lithuania. Previously, Martynas held different positions within the company working at femtosecond laser development, managing world-wide service actives, and serving as head of sales. He holds a degree in laser physics from Vrije Universiteit Amsterdam, the Netherlands, and PhD in ultrafast spectroscopy from Vilnius University, Lithuania.

Lithoglas is a specialist in advanced opto-electronic packaging components. We enable miniaturized, hermetic SMD packages with a focus on Laser Diode, UV LED and opto sensor packaging. Employing wafer-level processing techniques we can offer highly customized solutions at cost-efficient scalability. Certified according to ISO 9001:2015 quality is a fundamental element of our company's philosophy. Lithoglas is located in Germany with production lines in Dresden and Berlin. **www.lithoglas.de**

Ulli Hansen (CEO) is a co-founder MSG Lithoglas based in Dresden, Germany. He received his Ph.D. in 2004 from the Techn. University of Braunschweig in the field of MEMS prior to engaging in the development and commerzialization of the proprietary Lithoglas glass deposition technology. He has been responsible for the business development and product strategy at Lithoglas since the founding of the company in 2006. Prior to Lithoglas , Ulli has worked at Schott Electronic Packaging on the development and production transfer of WLCSP-Opto-Packaging.

Lumics, founded in 2000 and headquartered in Berlin, is a global key player for design and manufacturing of high-power diode lasers. Own in-house capabilities range from chip level up to fiber-coupled diode laser modules and complete system solutions based on single emitter technology. The product range comprises multi & single mode diode lasers from 670nm up to 1940nm. The LuOcean™ series features an unmatched choice of both single and multiple wavelengths modules, sensors and accessories, offering fiber-coupled output powers from 1W up to >600W. Proprietary driver boards and heat management solutions complement the offering. Other industry standard solutions include 2-pin TO packages up to 10W and single mode 14-pin BTF packages up to 1.2W (peak power). All lasers are field proven and 100% individually tested. Additional features allow for perfect adaptation to numerous applications in Medical & Life Sciences, Material Processing, Analytics, Sensing, Metrology, Seeding, Pumping, Illumination, and many more. **www.lumics.com**

Nils Kirstaedter (CEO/CTO) has more than 20 years of experience in design and manufacturing of diode lasers. He published 20 papers and several patents. Nils has initiated and managed many public research projects in the field of laser diode and packaging technology and was engaged in fund raising to finance cutting edge technologies. He studied physics at the TU-Berlin. For his distinguished achievements on laser technology, during his PhD thesis, he was awarded a Research & Development prize from Daimler Benz AG. In 1997, he joined the SAP AG and was one of the inventors and developers of the SAP US patent for a general testing technology of SAP systems.

LYNRED and its subsidiary US-based Lynred USA are global leaders in designing and manufacturing high quality infrared technologies for aerospace, defense and commercial markets. Their vast portfolio of infrared detectors covers the entire electromagnetic spectrum from near to very far infrared. The Group's products are at the center of multiple military programs and applications. Its IR detectors are the key component of many top brands in commercial thermal imaging equipment sold across Europe, Asia and North America. The organization is the leading European manufacturer for IR detectors deployed in space. **www.lynred.com**

Patrick Abraham (Public and Private Partnership Manager) is in charge of Public and Private Partnership (PPP) development at LYNRED since 2014. He joined Sofradir in 2007 as head of the Front End R&D Department. Patrick holds a PhD in Materials Science with a research focus on III-V semiconductor processes. Patrick spent the first eight years of his career as an Associate Scientist at the National Center for Scientific Research (CNRS) in France. He then joined the University of California Santa Barbara (UCSB) where he worked for four years on epitaxy process development of fiber optics communication components. He then joined Agility Communications (acquired by JDSU, in 2005, now separated in Lumentum and VIAVI) in Santa Barbara (CA-USA) to develop and produce wavelength tunable lasers. Patrick Abraham authored and co-authored more than 60 papers. He holds a Certificate in Innovation Management from Grenoble Graduate School of Business and is a Senior IEEE member since 1999.

microfluidic ChipShop, founded in 2002 and based in Jena, Germany, is one of the leading microfluidic service providers and is an established OEM partner in microfluidic cartridge/system development and manufacturing for the diagnostic, pharma and the life science industry. Part of this service is the precision molding of optical components and the integration of sensors such as silicon photonic sensors into microfluidic devices (for this task, microfluidic ChipShop is a member of the PIXAPP pilot line consortium). A unique service of the company is its catalogue with off-the-shelf microfluidic components and systems, allowing a low-cost rapid access to lab-on-a-chip technologies. The company offers complete system (cartridge, instrument and assay) development and manufacturing in an ISO 13485 environment. **www.microfluidic-chipshop.com**

Holger Becker (Co-founder and CSO) is co-founder and CSO of microfluidic ChipShop. He obtained physics degrees from the University of Western Australia/Perth (1990) and the University of Heidelberg (1991). He started to work on miniaturized systems for chemical analysis during his PhD thesis at Heidelberg University, where he obtained his PhD in Applied Physics in 1995. Between 1995 and 1997, he was a Research Associate at Imperial College with Prof. Andreas Manz. In 1998, he joined Jenoptik Mikrotechnik GmbH. Since then, he founded and led several companies in the field of microsystem technologies in medicine and the life sciences, for which he received various awards, most notably a nomination for the "Deutscher Gründerpreis" in 2004. He led the Industry Group of the German Physical Society between 2004 and 2009 and is the current chair of the SPIE ''Microfluidics, BioMEMS and Medical Microsystems'' conference. He serves on the Advisory Boards of the "Next Generation Diagnostics" and "Molecular Diagnostics Europe" conferences and of "Lab-on-a-Chip", the Editorial Boards of "Microelectronic Engineering" and "Micro and Nanosystems" as well as on the Board of Trustees of the "Physik Journal". In 2014, he was appointed a Fellow of The Royal Society of Chemistry (London). He has published more than 160 journal and conference papers with currently >6.000 citations.

Marduk

Marduk Technologies is developing long range automated identification, tracking and targeting models and implementations using AI augmented and improved electro-optics. Previous generations of unmanned systems have relied on radio communications and have been relatively easy to counter with RF-jamming. Next generations will be able to work in complete radio silence and are immune to RF-based counters, using inertial and optical navigation - main focus for Marduk Technologies is on finding ways to disable this capability. **www.**`marduk.ee`

Toomas Pruuden (CTO) has always been fascinated by optical phenomenons and the combination of optical systems with electronics and seems still to be great way to have fun after 20 years of experience. Optronics and computationally augmented vision systems have turned out to be great success for him professionally and he has had a chance to be involved in several different areas involving optics implementations - from photometers for analytical bio-chemistry, Shack-Hartmann cameras for astronomy to sensor systems for defense related projects. Today, he is seeking for new AI models and novel optical configurations for long range automated tracking and targeting with Marduk Technologies. When he is not busy chasing Newton's rings, he enjoys bullets in chess and getting off the train at peaceful places.

MedLumics
Enlightening Healthcare

MedLumics is a pre-commercial Madrid-based medical device company developing a unique optically guided radiofrequency ablation catheter AblaView® which merges photonics with miniaturized silicon-based optics to guide cardiac ablation therapy for the treatment of Atrial Fibrillation. The combination of optics and photonics guides Electrophysiologist's and enables direct lesion assessment in real-time. Medlumics is supported by a team of EU based venture capital firms and is the recipient of a €2.4M Horizon 2020 grant. **www.medlumics.com**

Jim Greene (CEO) serves as Chief Executive Officer for MedLumics, bringing 30 years of extensive operational experience in medical device design, development, and commercialization. Before joining MedLumics, Jim served as a Partner in Seroba Lifesciences Limited, a Dublin based venture capital firm, where he is still serving as a Medtech advisor to the firm. Jim is a serial entrepreneur founding multiple medical device start-ups and serving as CEO for Verso technologies, Inc., Apica Cardiovascular Ltd., Advanced Medical Technologies, Inc. (APK), and MitralSolutions, Inc. Additionally, he has served as Board Chairman for Novate Medical Ltd. and is a Founder and Board member for Bionet-Sonar, Inc. Earlier in his career, Jim held Director level positions at global medical device companies such as Medtronic, AVE, and Guidant. Jim holds a B.A. degree from Furman University, Greenville, S.C. and served in the United States Military following graduation for 7 years.

modulight

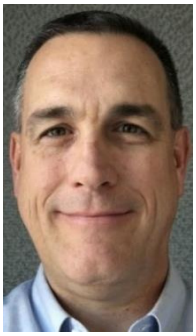
MEMBER of EPIC

Modulight is an ISO9001, ISO14001 and ISO13485 certified company focusing on design, development and manufacturing of laser diodes and laser systems. Modulight lasers are deployed mainly in medical, industrial, security/defence and display/projection markets. The company provides components and turnkey laser systems with wavelengths range between 405 nm and 1650 nm and power levels up to 100 W along with design and implementation of sub-system level laser integration including cooling, drivers and mechanical design. The products are offered from bare and mounted laser chips to packaged and fibre-coupled lasers and complete turnkey laser systems. The Company has in-house laser diode production facilities and headquarters in Tampere, Finland and a fully owned subsidiary Modulight USA, Inc., based in San Jose CA. **www.modulight.com**

Seppo Orsila (Executive Chairman) is leading Modulight's board as Executive Chairman and defines the strategy. He has been for 8 years with Nokia in Sales and Finance roles, most recently as CFO of accessories business. Since 2014, he shares Modulight's operational responsibilities with his business partner and co-founder Petteri Uusimaa. His turf is to lead marketing, sales and product management.

Juha Lemmetti (R&D Director) is responsible for the system level research and development at Modulight, Inc. The application areas include development of medical devices, biomedical applications, and various industrial applications. He is also responsible for the value-adding services such as Modulight cloud solutions. He has an MSc on Computer Science and has been involved in R&D activities in the field of medical devices, heavy industry, automotive, and mobile technology for more than 20 years. He has also been establishing start-up company presence in Silicon Valley and in China.

Moxtek is a global leading supplier of advanced nano-optical and X-ray components used in display electronics, imaging, and analytical instrumentation. Moxtek wire grid polarizers and beam splitters are available for UV, Visible, and IR applications and can be configured into various footprints, including pixelated arrays. Moxtek X-ray products enable compact handheld and benchtop elemental analysis for positive material identification, especially for low-Z elements, and are used in various types of EDXRF systems. Founded in 1986, Moxtek is a wholly owned subsidiary of Polatechno, Co., Ltd. (Japan) since 2004. **www.moxtek.com**



Brian Bowers (Director, Corporate Development) is currently leading global M&A efforts for Moxtek/Polatechno. Previously at Moxtek, he served as Director of Optics R&D, implementing a high volume 200mm wafer NIL process. His career began with GaAs MOSFET & MBE material research (Motorola) and he has over 24 years of technical & leadership roles primarily in the semiconductor field; including Low Power MOSFET development (Fairchild Semiconductor), High Purity Pumps/Chemical Heaters and Ultra Hard Diamond materials. Brian has over 14 patents and hold MSE Material Science & BS Physics degrees from Arizona State University, USA.

MPSI Technologies is a provider of innovative embedded software development solutions. MPSI's Whiznium developer tools cover the full range of (industrial) embedded system software, from lowest hardware level (FPGA's & MCU's), via multi-core Embedded Linux computers to state-of-the-art connectivity (HTTPS/Web-UI/OPC UA/DDS). Model-based automated source code generation gives Whiznium users a competitive advantage in terms of time-savings, source code maintainability and latest software technology. Owing to the roots of Whiznium in European photonics research projects, MPSI also offers system integration services, combining dedicated mixed-signal hardware with state-of-the-art embedded software. **www.mpsitechnologies.com**

Alexander Wirthmüller (Founder & Director) started his high-tech journey as a high-school student with first commercial projects in database software and microcontroller-based embedded systems. During his studies, he specialized in power electronics first, before descending all the way to the nanoscale in device simulation and hands-on optoelectronics. In his last research position at the University of Neuchâtel (CH), he was in charge of managing the interdisciplinary €1.1m sensing work package of the FP7 robotics project ICARUS with six partners, resulting in an integrated 8x8 pixel QCD + LWIR/stereo VIS detection system. In 2016, he founded MPSI Technologies, with the mission to alleviate embedded systems programmers from repetitive coding tasks. Alex holds a MSc in Electrical Engineering from ETH Zurich.

MultiLane, a leading provider of T&M equipment for production testing, is enabling at-speed wafer-scale and final package testing of 112 Gbps. MultiLane develops instruments and interconnects for 10 to 400 Gb/s data rates. Products include BERTs, TDR, optical and electrical oscilloscopes, optical switch boxes, and a host of MSA-compliant development tools for QSFP28, QSFP-DD, OSFP, and other standards. The company also offers compliance test services and fully automated test solutions. In addition, MultiLane develops high speed ATE modules that fit in wafer-scale automated test systems such as Advantest's V93K platform. MultiLane's products are used to test semiconductors, DACs, transceivers, and system blades. **www.multilaneinc.com**

Fadi Daou (CEO) is a serial entrepreneur with 30 years of experience founding high-tech startups and developing state of the art technology products and solutions in the semiconductor industry. Fadi's entrepreneurial journey started in 2000 with his co-founding of Telephonics, a developer of passive optical components. FiberGrade, Fadi's next venture, was a developer of optical monitoring equipment. Shortly after this, Fadi moved on to founding PXIT, a developer of high-performance instruments for the electro-optical transceiver market. After repatriating to Lebanon, Fadi founded MultiLane, a manufacturer of high-speed test instruments and interconnects as a key player in the support backbone of the data center, cloud-computing industry. Today, Fadi operates MultiLane out of his ancestral hometown of Houmal, Mount Lebanon. He is currently developing Houmal Technology Park (HTP) with the goal of incubating and hosting more technology companies in the area. HTP is a 20,000 square meter campus, that can host up to 1,000 individuals and includes state-of-the-art facilities, research and development labs, a training academy, an incubator, coworking spaces, guest houses, as well as other amenities.

Multiphoton Optics supplies 3D lithography equipment (high-precision 3D printing) for manufacturing of optical packages, photonic components, or biomedical and life science products, prototyping and engineering support. The 3D lithography process allows the integration of optical wire bonds at the locations required by the components, with the required precision and repeatability. We supply a process that automates high-precision optoelectronics assembly and allows interconnecting optical components, Silicon or III/V Photonic chips, and the creation of novel optical component packages. The technology allows scaling optical packaging operations to large volumes as it is compatible with standard assembly processes known from electronics manufacturing, ideally fitting into standard processing lines. Target markets include hardware for Big Data computing and storage systems as well as optical transport infrastructure. **www.multiphoton.net**

Ruth Houbertz (CEO and Managing Director) is co-founder of Multiphoton Optics (MPO), which was founded in September 2013 as spin-off of the Fraunhofer ISC in Würzburg, Germany, and has been CEO and Managing Director since August 2014. She was CTO of MPO from 2013 to July 2014. From 2000 to 2012, she held different technical and management positions at Fraunhofer ISC, the latest were Head of the Optics & Electronics Unit and Senior Manager Photonics where she focused on material, process, and technology development, including equipment for photonic and biomedical applications. From 1999 to 2000, she worked at Sandia Nat.'l Labs, Livermore, CA (USA). She has invented more than 80 patents and has received many awards and nominations, amongst which are the following: Finalist in the Prism Award (2015), Cowin Award for Entrepreneurship (2014), Green Photonics Award 2013 (Optical Communication), Joseph von Fraunhofer Award 2007 (Optical data transfer in Printed-Circuit Boards), and the Stifterverbandspreis for Industrial Applications in 2002.

Nanoscribe is a pioneer and market leader in high-precision additive manufacturing. The supplier of 3D printers and maskless lithography systems for microfabrication also develops tailor-made print materials as well as smart process solutions inspiring and enabling customers to materialize ground-breaking ideas. The wide range of applications in research, prototyping and industrial production processes especially addresses EPIC's needs for photonics technologies such as PIC, microoptics, diffractive optics as well as waver-level optics. The vibrant, award-winning company is supported by ZEISS and headquartered in Karlsruhe. Today, the medium-sized company with over 70 highly qualified employees provides complete solutions from its locations in Germany, China and the USA. More than 25% of our 2-digit million annual revenues are invested in the future of microfabrication. Thus, we deliver smart solutions for more than 1,500 active system operators that enable them to materialize ground-breaking ideas. **www.nanoscribe.de**

Michael Thiel (Chief Science Officer & Co-Founder) is responsible for research and technical development. After studying physics and visiting the National Institute of Standards and Technology in the U.S., he earned his doctorate at the Karlsruhe Institute of Technology (KIT) in the field of 3D laser manufacturing of photonic nanostructures. At the age of 25, he became the youngest co-founder of Nanoscribe GmbH, a German SME that was founded in 2007. For his work, he received the Otto-Haxel-Preis 2007, KIT Doctoral Award 2010 and the Cyber Champion Award in 2011. In 2015, he was among the finalists of "Deutscher Gründerpreis", the most important entrepreneur prize in Germany. He was chosen as one of 10 "Innovators under 35" by MIT Technology Review in 2016. The same year he has been receiving the European CTO of the year 2016 award. Michael published more than 30 scientific publications and several key patents which have been transferred into commercial products by Nanoscribe. Michael visited INSEAD in Fontainebleau in France for executive business education.

New Imaging Technologies (NIT) is a leader in SWIR and high dynamic range CMOS imaging devices, based on an innovative solar-cell logarithmic pixel technology. NIT was founded in 2007 by Prof. Yang NI as a spin-off from Institut-Telecom Sud-Paris after 17 years of research activity on CMOS smart imaging devices. Presently NIT develops, manufactures and sells InGaAs materials for short wave infrared band imaging and High Dynamic Range CMOS sensors for high-end visible band. NIT addresses various markets with a focus on industry, scientific, aeronautics, surveillance & defense. NIT employs 20 people and is located at Verrieres le Buisson, close to Paris. **www.new-imaging-technologies.com**

François Coursaget (General Manager) achieved an Engineering Degree at ENSAM Arts&Metiers school in Paris followed by a master's degree in Material Science at Georgia Tech in Atlanta. François started his career at SAFRAN Electronics & Defense where he occupied several Project Leader functions before leading a team of 40 Engineers and PhDs for the electro-optical advanced studies programs and the development of portable electro-optic equipment product range. François then had the opportunity to Manage a growing SME at NIT. First as COO, François is now General Manager at New Imaging Technologies. These experiences have given François a solid experience in managing innovation in the electro-optics field.

NIL TECHNOLOGY

MEMBER of EPIC

NIL Technology (NILT) is specialized in replication of micro- and nanostructures. We develop solutions for advanced high-tech components, focusing on optical applications for sensors, imaging and displays. NILT is offering optical designs, mastering, prototyping and mass production, and we assist our clients in all aspects from idea, to proof of concept, prototyping and mass production. We enable future optical solutions for Smartphones, Augmented Reality, IoT, Automotive, and in addition we serve the biotech and space industries among others. **www.nilt.com**

Theodor Nielsen (CEO & Co-founder) holds an engineering master's degree from The Technical University of Denmark (DTU) where he has specialized in nanotechnology. Theodor has worked with nanoimprint lithography since 2003 where he, as part of his studies, took part in pioneering the nanoimprint activities in Denmark. He is one of the founders of NIL Technology where he has held the position as CEO since 2006. NIL Technology began from an idea developed during his studies at DTU. Before starting the company, the idea was awarded at the Danish national business plan contest Venture Cup. Since start-up of NIL Technology, Theodor has been responsible for attracting investments to NIL Technology and leading the growth of the company to include more than 300 customers worldwide. He has also been a driving force in NIL Technology's engagement in National and EC funded research projects. NIL Technology has 29 full time employees.

NKT Photonics

MEMBER of EPIC

NKT Photonics is the leading supplier of high-performance fiber lasers, fiber optic sensing systems, and photonic crystal fibers. Our main markets are within imaging, sensing and material processing. Our products include ultrafast lasers, supercontinuum white light lasers, low noise fiber lasers, distributed temperature sensing systems and a wide range of specialty fibers. We have lasers in space and deep under the oceans and our products run in both clean rooms and on oil rigs at sea. We seed the world's largest laser fusion experiment and power hundreds of the most advanced microscopes on the globe. We aim to make a difference in the world and we are involved in projects that will transform the way we live through life-science, renewable energy and the basic understanding of the Universe. With over fifteen years of expertise, IP and experience, NKT Photonics strives to continually be the market leader in everything we do. NKT Photonics has its headquarters in Denmark with sales and service worldwide. NKT Photonics is wholly owned by NKT A/S. **www.nktphotonics.com**

Christian Vestergaard Poulsen (CTO) joined NKT Photonics in 2001 from IONAS where he had focused on single frequency fiber laser and silica on silicon planar waveguides. Christian received his PhD degree from the Technical University of Denmark and has been a Research Fellow at the University of Southampton. He further holds an MBA degree focusing on Technology Companies from Copenhagen Business School.

NorthLab Photonics is a competence center for advanced fiber preparation, splicing, glass/fiber processing and FBG manufacturing solutions. The products and services are designed for a wide area of applications; from manufacturing of Fiber Bragg Gratings, Mode Field Adapters, combiners/bundles to preparation and splicing of polyimide, exotic and large diameter fibers. NorthLab customers are found in all industries and research areas where optical fibers are used. Examples are companies and universities working with high power lasers, sensors, medical probes, telecom and defense applications. The product portfolio includes the NORIA for "plug & play" manufacturing of Fiber Bragg Gratings, the ProCleave and ProCoater series for cleaving and recoating of standard and large diameter fibers and the ProView interferometer for end-face inspection. We are also long-term partners with 3SAE Technologies in the US and Furukawa in Japan as well as several other suppliers, distributors and research institutes around the world. **www.northlabphotonics.com**

Jan Brandels (CTO) is the R&D manager of NorthLab Photonics. He is an Electrical Engineer from the KTH Royal Institute of Technology (1992). He started his career working with software and hardware design at a small firm primarily contracted by Ericsson Fiber Optics to develop and manufacture the high-speed video acquisition systems inside their FSU 9XX-series of fusion splicers. In the mid-1990s, he was responsible for the system architecture, PCB design and software coding of a series of highly complex production-line equipment used to align and pigtail fibers in Fiber Optic Gyro manufacturing. From 2003 he has exclusively worked with product development in the field of fiber optics and in 2015 he joined the NorthLab Photonics team to boost their in-house product development capability.

Nynomic AG is an internationally leading manufacturer of products for permanent, non-contact and non-destructive optical measurement technology. The smart photonic solutions are built on a technology platform based on spectral sensor technology. Thanks to the good adaptability to customer's processes, they can be scaled into different applications, unfolding a large increase in efficiency and thus give an edge to the customer. With its miniaturization-based technology, Nynomic has a strong basis for its medium-term growth, which is well above average compared to market levels. As a full-line supplier, Nynomic AG has a clear marketing concept, from component to solution. It has a global presence, with independent brands, subsidiaries and approximately 400 employees. **www.nynomic.com**

Maik Müller (CEO) is CEO of Nynomic AG as well as the tec5 AG. He has a background in electronics and more than 25 years' experience in different positions within the photonics and life science industry. He studied at the University of Applied Sciences Mannheim, Germany and started to work for tec5 in 1995 in development, project management and management positions. In 2005, he joined a company in the life science business as Director R&D and in 2009 he moved to a Swiss-based consulting company to build up a new business unit in Germany for system engineering. Since the end of 2010, he is back at tec5 as CEO and in 2015 additionally joined the board at Nynomic. As CEO, Maik is responsible for approximately 400 employees worldwide, the strategic and technology development of the Nynomic and tec5 group and is appointed to several board of directors in Europe, the US and China.

Oplatek is the leading North-European solution provider in the field of photonics with over 30 years of experience. We are specialized in manufacturing specialty optical fibers and capillaries, molded glass components, thin film coatings, precision mechanics, and optical assemblies for various industries. By combining our fields of expertise, we can offer our customers a full chain of service from design to serial production. We can solve your photonics challenges! **www.oplatek.com**

Jyrki Huttunen (CEO) has a Master of Science (Tech) degree from Technical University of Helsinki (1986) and an eMBA degree from University of Kuopio (2002). He has worked in various managing positions for SME's mainly in Finland, and briefly in the USA. He has also co-founded two companies. Since 2008, he has been co-owner and CEO of Oplatek Group Oy.

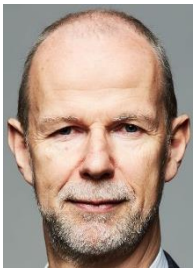
Optics11 has developed a range of sensing systems based on optical fiber interferometry, that are best in class and easy and flexible in use. We believe that optical fiber sensing provides a unique solution for many applications that involve precise measurements in challenging environments. Because light can travel unperturbed inside the fiber, and requires no sensitive electronics at the sensing location, any environmental challenge can be championed: low or high temperature, liquids, electrical or magnetic fields, remote locations, small spaces. Optics11 combines unique fiber interferometry interrogation concepts with many miniaturized all-optical sensors. Typical applications are: acoustic emission sensing in structural health monitoring, underwater acoustic sensing, perimeter sensing, acceleration and acoustic emission sensing in condition monitoring. In addition, we have developed a range of measurement instruments that perform micromechanical measurements on biological samples in life science applications. **www.optics11.com**

Grzegorz Gruca (CTO) holds an MSc degree in Microsystems Electronics from Wroclaw University of Technology and a PhD in Physics from VU University Amsterdam. Through his career he worked as electronic circuit designer, mechanical designer and senior researcher. Since a smooth transition to industry in 2011, he is driving and actively supporting R&D activities within OPTICS11. His main interest focuses on novel fiber optic sensors, interferometry, signal processing, MEMS and electronics.

Optimax is America's largest optics manufacturing company. On the cutting edge of future applications, Optimax implements an engineered solutions approach to help our customers achieve breakthroughs in the aerospace, defense, semiconductor, research, and medical industries. Optimax has a wide range of capabilities to support your programs, including advanced freeform manufacturing and metrology. **www.optimaxsi.com**

Jessica DeGroote Nelson (Director of Technology & Strategy) joined Optimax in 2007 after graduating from The Institute of Optics at the University of Rochester with a bachelors, masters and Ph.D. in Optics. She is also currently an adjunct faculty at The Institute of Optics teaching an undergraduate and graduate course on Optical Fabrication Materials and Testing. Jessica also holds an Executive MBA degree from the Simon School at the University of Rochester. Jessica is an active member and presenter with the Optical Society (OSA), SPIE, American Ceramic Society (ACerS), the American Society of Precision Engineers (ASPE), and Optics and Electro Optics Standard Council (OEOSC). She is also active in the local section of the Optical Society of America (OSA) - Rochester Section where she served as president and currently leads educational outreach activities. Currently, Jessica is serving as an associate editor for SPIE's Optical Engineering journal and an editor of SPIE's Tutorial Text series.

Optiross specializes in Optical Design and Consulting. We work on site with our clients to develop optical systems, to debug and improve existing designs. We work off-site on a design by commission basis and undertake technology assessment reviews. Recently we have been working on virtual reality and augmented reality systems, tracking solar concentrators, biometric systems, and optical sensors. Our clients include, Intel Corp, Creal3D, Insolight and MagicLeap. **www.**optiross.com



Ross Stanley (Director) joined the EPFL, Lausanne, Switzerland in 1992. His main work includes: Design, simulation and characterization of multilayer optical filters, microcavities and photonic band gap crystals and their integration into novel light emitting diodes and lasers. In 2001, he was appointed section head of the Optical MEMS group at CSEM, Neuchatel, Switzerland where he was responsible for plasmonics, optical MEMS and IR development projects at the CSEM SA. In 2016, Ross founded Optiross Sàrl, an optics design and consulting company.

OPTOMAN - with great laser power comes great responsibility for coaters! OPTOMAN manufactures custom dielectric thin films and high power laser optics, where we aim for the highest possible accuracy, repeatability and quality. This is possible with innovative ion-beam sputtering technology. Progressive control and automated processes allow the deposition of complex structures of several hundred thin film layers. The advantages of spectral control include sharper features, higher contrasts, repeatable performance and tighter tolerances. We are ready to design, develop and manufacture cost effective yet advanced, high accuracy and repeatability thin film coatings and laser optics for universities, laser and laser systems manufacturers worldwide. **www.optoman.eu**

Simonas Kičas (CTO and Co-founder) holds a PhD in material engineering from Vilnius University, Lithuania. Since 2008, Simonas has gathered more than 11 years of work experience in both thin film related industry and research. His specialty is in thin film coating design, Ion beam sputtering technology, ultrafast coatings, high power optics and laser induced damage related topics. During his research career at Center for Physical Science and Technology, he authored more than 20 scientific papers in thin film coating related topics. As CTO, Simonas leads a team of more than 10 engineers responsible for technological process improvement and product innovations.

OptoSigma offers a variety of products to address the demand of high-quality photonics components. OptoSigma Europe, a subsidiary of SIGMAKOKI, was established in Europe in early 2014 to provide support to our distributors and get closer to the European customers. Our group possesses more than 40 years of experience in manufacturing high quality optics. Thanks to the rich Japanese know-how we have cultivated over the years, high quality products at an affordable price are available for any customer. Our optics portfolio includes all kind of optics such as mirrors, beamsplitters, lenses, polarizers, filters among others. Our portfolio also includes a wide variety of opto-mechanics products to hold all kind of optics, as well as motorized and manual stages, optical tables and most of the building blocks for photonics applications. **www.europe.optosigma.com**

Guy Ear (President and CEO) has 10 years of several sales and marketing management positions in the airlines, tourism and luxury hospitalities in France, UK and the United-States prior to deciding in 2005 to take a new challenge in the photonics industry by taking a Sales & Marketing Director for Asia Pacific position at a UV light-source manufacturer for Lithography, Mask Aligner equipment in Japan. With his strong self-taught abilities and ability to speak 5 languages in the Asian region, Guy has built up an extensive experience and a human network. He founded in 2006 Etendue Mejiro KK (Japan), a company specialized in designing and manufacturing high performance scan lens for semi-conductor and digital displays industry and which was sold in 2009. Guy joined SIGMAKOKI Group as the Head of the International Sales Division to expand the international presence of the SIGMAKOKI Group in Asia and recently by establishing a new subsidiary in Europe in 2014.

Orbotech, a KLA company, is a leading provider of process innovation technologies, solutions and equipment serving the global electronics manufacturing industry. With over 37 years of proven experience, Orbotech specializes in providing highly-accurate, performance-driven yield enhancement, production solutions and tools. Our customers are manufacturers of printed circuit boards, flat and flexible panel displays, advanced packaging, MEMS and other electronic components. Virtually every electronic device in the world use components produced by Orbotech systems. Orbotech's mission is to enable smart, digital production in the electronic world of micromanufacturing. This is done through continuous technology innovations in fields such as Electro-Optics, image processing, mechatronics, physics and material processing. With sales exceeding $1B (2018) and close to 3000 employees worldwide, Orbotech strives to take part in creating a better tomorrow. **www.orbotech.com**

Abraham Gross (Executive VP and CTO) manages and promotes Orbotech's worldwide technological leadership, innovation and creativity. Dr. Gross supports internal innovation initiatives that will bring value to customers and will create growth opportunities to the company and its associates. Before that, he held several key positions in Orbotech R&D organization in Israel. In addition, during this time, he served two years sabbatical at the Office of the Chief Scientist in the Ministry of Economy, Israel, and three years as the chief engineer of Microvision, Inc. USA. Dr. Gross holds 34 granted patents. His bachelor's and master's degrees in physics are from the Technion Haifa, Israel, and his PhD is in Physics and Atmospheric Sciences from Drexel University, Philadelphia USA.

orion engineering

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Orion Engineering is the project sourcing agency of choice for engineering and technical assignments. Our professionals have a solid technical background and we do have different options to strengthen teams; from filling temporary assignments to recruiting employees. We always deliver solutions tailored to our clients' needs and search for the best solution. Orion Engineering offers an infallible assessment of the professional atmosphere and wishes at a client ensures a prompt and perfect match. Our driving forces are technical professionals of intermediate, higher or academic level. People who are flexible and want to be challenged by interesting projects at a(n) (inter)national level. The success formula of Orion Engineering was rewarded in 2018 with 2 prizes, for being one of the fastest growing companies in the Netherlands. **www.orionengineering.nl**

René Louwers (Director) is an authentic, enthusiastic, driven, engaging, proactive leader with a strong entrepreneurial spirit and result oriented, who delivers revenue and margin growth. His major fields of expertise are (team) leadership, recruitment, commercial management and performance management.

Djordi van Beek (Partner in Technology Recruitment) is responsible for managing a team of Consultants, Business Managers and Recruiters at Orion Engineering. His team specializes in technical (project) staffing and is responsible for the entire recruitment and selection process of (inter-)national candidates with a focus on the High-Tech and Semiconductor industry. While making a difference on personal level, his team is always searching for technical talent in and outside our network (with a specific focus on interesting backgrounds like Applied Physics, Mechatronics, Electromechanics, Aerospace etc.)

OXFORD INSTRUMENTS

The Business of Science®

Oxford Instruments (OI) is a leading provider of high technology tools and systems for industry and research. The company designs and manufactures equipment that can fabricate, analyze and manipulate matter at the atomic scale for wide variety of applications ranging from photonics to life sciences, astronomy, quantum

technologies and graphene .Oxford Instruments Plasma Technology (OIPT) is a business unit of Oxford Instruments nanotechnology Tools Ltd (OINT), based near Bristol in the UK. OINT is wholly owned by Oxford Instruments plc (OI). OIPT develops and manufactures surface treatment processing equipment based primarily on vacuum plasma processes, including plasma etching and plasma enhanced chemical vapour deposition. OIPT employs about 300 people, and contributes 10-15% of the total revenue of OI. **www.oxinst.com**

Ravi Sundaram (Market Manager: Emerging Technologies) is the market manager for research and emerging technologies at Oxford Instruments Plasma Technology. He has been involved in materials research in several institutions such as EPFL Switzerland, Max Planck Institute Stuttgart, Germany, IBM T.J Watson Research Labs, NY and Cambridge University where he worked on several aspects of nanotechnology based research from synthesis, fundamental science to prototype applications in sensors, optoelectronics and electronics. He joined Oxford Instruments to lead and coordinate R&D efforts towards 2D materials products. Currently, he is responsible for technology and market strategy for Oxford Instruments Plasma Technology with a focus on emerging technologies such as 2Dmaterials, biomedical devices, integrated photonics devices, Quantum Technologies among others.

Panasonic

Panasonic is a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, and B2B businesses. Celebrating its 100th anniversary in 2018, the company has expanded globally and now operates 591 subsidiaries and 88 associated companies worldwide, recording consolidated net sales of 7.982 trillion yen for the year ended March 31, 2018. Committed to pursuing new value through innovation across divisional lines, the company uses its technologies to create a better life and a better world for its customers. **www.panasonic.com**

Xinbing Liu (Director) received his PhD in Applied Physics from the Center for Ultrafast Optical Science (CUOS), the University of Michigan in 1994. He joined Panasonic Boston Laboratory in 1998 as a project manager and managed PBL's program for the Japanese government's NEDO project on femtosecond laser applications for telecommunications. At the same time, he also initiated a program for industrial applications of picosecond lasers, including the key picosecond laser source and the ultra-precise parallel processing technology using diffractive optics. He became the director of Panasonic Boston Laboratory in 2006. Besides managing the lab, he still focuses much of his time developing technologies in picosecond lasers, laser manufacturing technologies, and micro-optics for Panasonic's various products. Dr. Liu is a Fellow of SPIE, and a Fellow of the Laser Institute of America.

PBF
SFC ENERGY GROUP

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PBF Group – The specialist for power supply solutions, coils & linear drives. The PBF Group develops, manufactures and markets highly reliable standard and semi-standard high-power-platform solutions for demanding requirements in laser and semiconductor manufacturing equipment and analytical applications. The PBF Group also co-develops and manufactures highly complex and reliable coils & linear drives for semiconductor manufacturing equipment and analytical applications. PBF operates from its R&D and manufacturing locations in Almelo, the Netherlands, and Cluj-Napoca, Romania. Since 1999 PBF have been helping customers with their mission critical objectives by designing and manufacturing power supplies, coil & linear drive solutions for laser, analytical and semiconductor applications. PBF Group B.V. was created from Philips Electronics NV through a management buy-out in 1999 and since 2009 has also been represented in Romania with PBF Power SRL. **www.pbfgroup.nl**

Michael Sauer (Business Development Power Supply Solutions) has over 18 years' experience in segment of power supply systems. He joined PBF Group in 2012 after working in positions in the R&D department and project management for optical communication systems, division manager and head of sales for power supply solutions. Mr. Sauer is presently in the business development for power supply solutions with focus in the segments of laser applications and semi-conductor manufacturing equipment. In addition, he is taking care of the key account management of PBFs customers in central Europe.

René Dingshoff (Business Development Power Supply Solutions) has over 16 years' experience in segment of power supply systems. He joined PBF Group in 2003 as senior design engineer, designing power supplies and systems. In 2007, he became R&D manager of PBF group (The Netherlands and Romania). Mr. Dingshoff is presently in business development for power supply solutions with focus in the segments laser applications, analytical and semi-conductor manufacturing equipment. He is responsible for the product and technology road map within the PBF group.

phix PHOTONICS ASSEMBLY

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PHIX Photonics Assembly was founded in 2017 by Lionix International. PHIX is offering a cost-effective manufacturing service for Photonic Integrated Circuit (PIC)-based modules in large volumes. PHIX is located at the High-Tech Factory in Enschede, the Netherlands. PHIX offers assembly services for all three major PIC technology platforms (InP, Si and TriPleX) and is specialized in hybrid integration of multiple PICs in one module both with optical fiber interfaces as well as free space optical interfaces through micro optical components**. www.phix.com**

Joost van Kerkhof (COO) was the CEO of XiO Photonics and is the COO of LioniX International since the merger of XiO Photonics, LioniX and SatraX into LioniX International in 2016. He has more than 20 years of experience in the micro-nano technology industry. Before joining XiO Photonics, Joost worked with Sensata Technologies as Director Business Integration where he was responsible for business due diligence of acquisition candidates, followed by integration of the business in the Sensata organization. In this role, he built a significant experience in business case analysis and development. Before his role in business management, he has held positions within Texas Instruments (which became Sensata Technologies in 2006) as Director R&D and Director Operations. In these positions, he has brought several products in high volume production. Joost also worked for 6 years as R&D manager at HortiMax. Joost holds a master's and Ph.D. degree in electrical engineering specialized in micro-nano technology and (bio)sensors.

Photonics HUB

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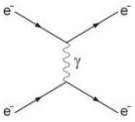
The regional networks Optence and bayern photonics are shareholders of the **Photonics Hub**. Photonics Hub connects 200 members of both networks as a platform for the cross-regional exchange of its members and a service provider for the photonics industry. We offer working groups, grant projects, joint projects, events, training courses, networking days, newsletter and last but not least: motivation, industry knowledge,

professional way of working, always an open ear for your wishes. Our aim: Achieving more together! **www.photonics-hub.de**

Daniela Reuter (Managing Director) has a degree in Biology (University of Tübingen). She works for Optence for 18 years since 2011 as the managing director. Since 2018, she is also the managing director of the Photonics Hub.



Photonic Insights - technology service provider for photonics and AI applications, offering applied research & development as well as evaluation/due diligence. Photonic Insights de-risks high tech innovation to minimize the risks of complex research and development for partner organizations via the following collaboration formats: Success-based compensation for research and development. Support or sole acquisition of government subsidies to support joint research and development. **www.photonicinsights.com**

Mike Richardson (Managing Director) is a technical due diligence expert, Mentor, Researcher and Public Speaker. He focuses on delivering technical solutions in challenging environments. Mike recently presented “Industry 4.0 the integration of Hardware and Software” at King Mongkut University of Technology in Bangkok, Thailand.

PLX is a major innovator and leader in monolithic optics, providing countless solutions to fit the demands of a new generation of optical requirements for the Defense, Aerospace and Commercial industries. From a fabricator of conventional system optics to a system integrator, PLX provides high-quality optics that maintain their integrity and accuracy over time, as well as withstanding harsh operating conditions. PLX clients include some of the world’s leading space and defense contractors as well as laboratories around the world. PLX’s proprietary, Monolithic Optical Structure Technology (M.O.S.T.TM), integrates complex optical elements into compact monolithic structures, achieving exceptional accuracy and stability under severe environmental conditions. PLX Inc. is located at 40 W. Jefryn Blvd. Deer Park, NY 11729 USA. **www.plxinc.com**

Itai Vishnia (CEO) is a 25-year veteran of PLX. Itai has been responsible for the introduction of such PLX innovations as upgrading Telescope Alignment in space, modernized Boresighting military technology, state-of-the-art interferometers and the Monolithic Optical Structure Technology (M.O.S.T.TM). A prolific inventor, Itai holds 27 optical patents and has authored numerous technical papers. Itai's modernizing PLX’s production and quality control departments has resulted in supplier awards from several of the world’s leading defense contractors as well as the U.S. Small Business Administration Region II Small Business of the Year award. Itai holds an opto-mechanical engineering degree from Technion I.I.T. in Israel where he also worked for a high-tech company, directing the design and development of highly accurate laser technologies. He is a veteran of the Israeli Defense Force, where he commanded and supervised a team involved in Optoelectronics repair both in the lab and in the field.

Polarus is an advanced picosecond laser manufacturer from Russia. Polarus, one of Technospark's laser cluster companies, is located in Troitsk, city, which is known as a "Russian laser capital". We have been producing picosecond lasers since 2013. Since then, we have gone from the R&D stage to small-scale production. Polarus provides customers with picosecond, high-power, fiber laser, produced with highly doped optical fiber, making it possible to process even particularly brittle materials. Due to special technology and mastership of engineers, Polarus laser is 40% cheaper than its analogues and the operational costs are two times lower in comparison with other picosecond lasers in a laser market. We have now started the stage of planning large-scale production of PL70 in China. **www.polaruslaser.ru**

Tamila Zlachevskaya (General Manager) graduated from Computational Mathematics and Cybernetics faculty of Lomonosov Moscow State University in 1999 with a degree of specialist in math and further worked as systematic programmer. In 2007, Tamila acquired an education of MBA degree in RANEPA, Moscow. She has more than 18 years of management experience, including crisis management, and experience in different types of businesses, ranging from construction companies and small manufacturers to the world's largest retail and Government Corporations. In 2016, Tamila became head of Polarus, and since then Polarus LLC appeared in the international market.

PowerPhotonic is a global leader in the design and manufacture of precision freeform fused silica micro-optics. Our business was founded with the objective of providing unsurpassed excellence in all aspects of micro-optics product realization for laser applications. Our world-class design skills are supported by an innovative and flexible manufacturing process that allows the company to design both a broad range of state-of-the art industry standard laser micro-optics products and, uniquely, to offer a low-cost rapid fabrication service for creating completely freeform optical surfaces. **www.powerphotonic.com**

Natalia Trela-McDonald (Head of Product Development at PowerPhotonic) is the Head of Product Development at PowerPhotonic responsible for new product development from R&D through to full production release. Her team specialises in optical product design, simulation, realisation and validation. Prior to joining PowerPhotonic, Natalia was a Research Associate at Heriot-Watt University. In this role, she worked on high power diode lasers and micro-optics for beam combining and fibre coupling, including projects with high profile industrial partners. Natalia's work has led to a number of published papers and patent applications.

PSC Technologies, a start-up specialising in silicon carbide based in Berlin, has developed processes for direct 3D-printing of silicon carbide alloys. PSC-SiC is massive, non-porous material with customisable properties in arbitrary forms produced from proprietary precursors. PSC was founded in 2015 for translating decades of basic research by Prof. Greulich-Weber into widespread industrial application. PSC-SiC overcomes the hurdles that until now limited the use of the well-known outstanding mechanical, thermal and semiconductor properties of SiC. Photonics is one of many sectors where it may find widespread application. PSC is essentially a service company developing processes and materials, offering small series production and later leasing of specialised 3D-printing machines. **www.psc-tec.com**

Ruggero Schleicher-Tappeser (Managing Director Business Development) holds a degree in physics from the University of Bern. Prior to founding PSC together with Prof. Greulich-Weber, he coordinated the xGWp project, the last attempt to establish a Gigawatt solar cell production in Europe by a German-French-Swiss cooperation. After starting his career as science and technology journalist, for decades he served as policy advisor focusing on renewable energies, innovation, sustainability and transport, among other functions as founder and director of the EURES Institute for Regional Studies in Europe. With a multicultural and multidisciplinary background, he is motivated by the opportunities that PSC's inventions offer for more sustainable energy and transport systems.

Radiall™

RADIALL, founded in 1952, is a French family-owned company and an interconnect component specialist focused on three core technologies: Radio Frequency; Multi-pin Packaging and Fiber Optic. In 2018, the sales were 373M€ with 30% in Europe, 30% in Asia and 40% in America. The market mix serving is balanced between Aerospace, Defense and Space, Telecom and Industrial. The manufacturing footprint is spread in 11 plants with over 3000 employees on three continents. Radiall is investing 8% of revenue per year in Research and technology to prepare for the future. The Optical Interconnect System business unit provides customers end to end solutions from optical transceiver with electronic solutions, optical cable assemblies and connectors suitable for harsh environments. Our extended range of high performance optical interconnect solutions includes Active Optics by D-Lightsys, connectors and optical assemblies. **www.radiall.com**

Victor Licchesi (Optic Expert) graduated from Institut d'Optique Graduate School in France in 1986. Victor was Project Manager on M1cell M3 tower ESO VLT Project at Giat Industries, on LMJ amplifier slab at Optsys, on LMJ M1 mirror at CILAS. In Radiall, he was R&D manager for fiber optic BU and started the fiber optic team in Connecticut (US). Now, Victor is part of Radiall's Research and Technology division where he is the Photonic Expert driving the technology road map.

Richmond Park Partners
Independent Corporate Finance Advisor

Richmond Park Partners is an international advisory firm which works across several industries and is headquartered in London. The company provides strategic advice in capital-raising and M & A. Recent mandates have included infrastructure, industrial manufacturing, food and beverages, fintech software, and a sovereign Ex-Im Bank. **www.richmondparkpartners.com**

Christopher Kirby (Managing Director) has over 30 years experience as both a technology analyst and banker in New York, Silicon Valley, China, and London. He has taken over 70 technology companies public (IPOs) in both US and European markets and managed M and A transaction processes for well over a dozen companies, and divides his time between London and the U.S. Past firms include Sanford Bernstein, Rothschild Inc, Cowen & Co, DLJ, Lehman Brothers and Silicon Valley Bank.

SABIC is a global leader in diversified chemicals headquartered in Riyadh, Saudi Arabia. It manufactures on a global scale in the Americas, Europe, Middle East and Asia Pacific, making distinctly different kinds of products: chemicals, commodity and high-performance plastics, agri-nutrients and metals. The company has more than 34,000 employees worldwide, an annual revenue of 39.9 bn US$ and operates in more than 50 countries, with innovation hubs in five key geographies – USA, Europe, Middle East, South East Asia and North East Asia. **www.sabic.com**

Bernd Grammer (Senior Manager, New Business Development) studied Mechanical Engineering with focus on plastics and graduated from the "Institut für Kunststoffverarbeitung" (IKV) at RWTH Aachen, Germany. He began his career in ROBERT BOSCH GmbH, Power Tool division. Following to that he was 4 years in the Automotive Lighting divison. In 2003, he joined GE Plastics (General Electric) focusing on thermoplastic resins on Automotive headlamp applications. SABIC acquired the GE Plastics segment in 2007. SABIC is offering wide portfolio of thermoplatic resins. The high performance, High Heat segment (PEI and TPI) allows use temperatures in applications up to 260°C. One of his focus segments are photonic sensors: Amorphous, IR transparent and dimensional stable optical components can be injection molded. The ULTEM™ and EXTEM™ resins are used in e.g. proximity/gesture control sensors, gas sensors or in Automotive applications, radar systems, LiDAR, etc. These thermoplastic grades are showing dimensional stability, chemical resistance, inherent flame resistance, low smoke toxicity, very low CTE (thermal expansion) and EXTEM can be used even in lead-free-reflow soldering process.

Sanmina makes some of the most complex and innovative optical, electronic and mechanical products in the world. Recognized as a technology leader, Sanmina provides end-to-end design, manufacturing and logistics solutions, delivering superior quality and support to Original Equipment Manufacturers (OEMs) primarily in the communications networks, computing and storage, medical, defense and aerospace, industrial and semiconductor, multimedia, automotive and clean technology sectors. **www. sanmina.com**

Robert Newberry (Senior Director of Engineering) holds a B.S. degree in Electrical and Computer Engineering from the University of Alabama in Huntsville. He worked early in his career with Chrysler Group (USA) in various engineering positions over 10 years and also served as R&D manager with Daimler (Stuttgart Germany) for almost 5 years. Later, he held the position of Managing Director of Si-Gate GmbH for 7 years. Most recently, he has been with Sanmina past several years leading their innovation team supporting medical and automotive technology development areas globally. He has authored more than 25+ patents and is a recognized innovation leader in medical sensing technologies.

SENORICS is a start-up originating from the University of Technology Dresden commercializing an optical sensor solution for near-infrared (NIR) spectroscopy based on organic electronics. This proprietary technology allows small, robust, wavelength selective and fully customizable detectors enabling NIR-spectroscopy on a chip level. Thus, SENORICS can deliver unique solutions for a multitude of measurement

and detection problems in industrial applications. Examples are determining ingredients or compositions of raw materials, consumables or end products in the food, chemistry, packaging or automotive industry and many other branches. Moreover, SENORICS technology is enabling the design of new small and mobile mass market devices for consumers including NIR-spectroscopy chips for smartphones. **www.senorics.com**

Ronny Timmreck (CEO) received his diploma degree in physics from the University of Technology Dresden, Germany and his PhD for a work on organic solar cells in the group of Prof. Karl Leo renowned for the organic electronics start-ups Novaled and Heliatek. Ronny founded his first start-up at the age of 23 and developed this company to a leader in its branch. In 2016, he took the lead in the start-up project SENORICS. He has been CEO of SENORICS since the company's foundation in 2017.

SPECTRAL ENGINES
MEMBER OF THE NYNOMIC GROUP

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Spectral Engines develops and produces ground-breaking smart material sensing technology, which can measure the very make-up of materials. Our solutions improve industrial processes, enable advanced pocket-size analyzers and make material sensing possible in consumer applications. The team and technology platforms enable new measurement applications and business opportunities. Spectral Engines' novel technology originates from years of research done at VTT Technical Research Centre of Finland, now developed to a full industrial-grade sensor. **www.spectralengines.com**

Uula Kantojärvi (CTO and Co-founder) received his M.Sc.(tech.) from Helsinki University of Technology in 2006. He has been responsible for the technology and product development at Spectral Engines Oy since the founding of the company in 2014. Prior to Spectral Engines, Uula has worked at VTT Technical Research Centre of Finland for 10 year as researcher, senior scientist and team leader.

son x

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son-x is a leading-edge technology and component supplier in the field of ultra-precision machining. The technology developed and commercialized by son-x enables direct ultra-precision machining of steel, which is conventionally not possible. Our products are high precision custom metal mirrors with up to 1 m in size with not only symmetric, but also off-axis or freeform surfaces. Furthermore, we manufacture optical mould inserts for injection moulding of lenses for a variety of applications, such as automotive lighting, camera lenses, sensors, AR/VR, etc. son-x also supplies high precision plastic lenses. **www.son-x.de**

Olaf Dambon (CEO/CTO) studied Mechanical Engineering at Aachen Technical University (RWTH) with a special focus on Production Engineering. He successfully completed a research stay at the Massachusetts Institute of Technology (MIT) in Cambridge, USA where he finished his study with a Master thesis on Three Dimensional Printing ("3DPrinting"), a precursor technology of today's innovative Additive Manufacturing Techniques. He obtained a master's degree ("Diplom-Ingenieur") from Aachen Technical University. In 2000, Olaf Dambon started his career as a Research fellow at the Fraunhofer Institute for Production Technology IPT, working in the field of precision machining. In 2006, he became Chief Engineer of the Department Fine Machining and Optic. He was involved in more than 20 projects, both

publicly and industrially funded, published Journal papers, and held a teaching position at Aachen Technical University in the field of precision optics machining. In 2011, he founded together with Benjamin Bulla the spinoff-company son-x GmbH, a specialist in ultra-precision manufacturing. Olaf has a PhD-degree ("Dr.-Ing.") with his dissertation on polishing of steel.

STENSBORG

Stensborg is a privately held company located in Roskilde, Denmark 30 minutes from Copenhagen Airport. We have served our clients for nearly 20 years producing holographic optical element masters and NIL imprinting templates for security purposes as well as numerous light controlling applications for technical processes. The patented Holoprint® technology is owned by Stensborg and was developed in cooperation with industry and research partners as the former Danish National Research laboratory Risoe, now part of the Technical University of Denmark. Our skilled team excels in the full production cycle of nano and micro surface relief creations as well as imprinting production. We have our own range of proven machines, prepress materials and resin chemistry. **www.stensborg.com**

Jan Stensborg (CEO) studied at the Holographic Laboratory, DTU (Technical University of Denmark) and went on to establish Stensborg A/S in 1997. He has more than 20 years' experience of working with the industrial mass production of functional surface structures, holograms and optical verification devices. Jan is inventor of several patented NIL related technologies. He is experienced in all phases of product development and delivery to large companies, as well as using a variety of staffing options, process frameworks and technology stacks. His specialties include: Performance management, technology evaluation, financial planning and analysis, project management, large volume production of nano-and micro structures, holographic technologies, clean room construction and management.

SÜSS MicroOptics

MEMBER of EPIC

SUSS MicroOptics is a manufacturer for high-quality refractive and diffractive micro-optics in 200mm: 8'' wafer technology, based in Neuchâtel, Switzerland. SUSS MicroOptics meets highest demands as required for applications in photolithography, optical networking, laser, medical and metrology. In 2013 SUSS MicroOptics moved to a new cleanroom facility: class 100/1000. SUSS MicroOptics is ISO9001:2008 qualified and SGS attested. **www.suss.ch**

Wilfried Noell (Chief Scientist) is responsible for R&D projects, optical designs and advanced client requests. He supports sales and production with his team of nine scientists and engineers. For the preceding two years, he was an R&D scientist and process engineer in the industrial x-ray business unit of the COMET AG, Switzerland, where he focused on process development, material characterisation and analyses of high-voltage components and x-ray sources. From 1998 through 2012, he worked as Senior Scientist and Team Leader in the IMT-SAMLAB (Sensors, Actuators and Microsystems Laboratory) of the University of Neuchâtel and later at the EPFL, Neuchâtel, Switzerland in the group of Prof. Nico de Rooij. He was responsible for the Optical MEMS activities and microtechnology developments. During his master and PhD studies, he worked on InP-based integrated photonic circuits (PLC) and silicon photonics (SiPh) for ring resonators and optical AFM-microprobes, respectively, at the TU Darmstadt and later at the IMM in Mainz, Germany.

Technobis group is a developer and supplier of high-tech instruments and modules for OEM companies around the world. Technobis tft-fos is specialized in the development and supply of fibre optic sensing systems and applications. All developments are spectrometry and or interferometry based. Starting with free-space optics 17 years ago, nowadays all new developments are based on integrated photonics. Application Specific Photonic Integrated Circuits: ASPICs allow custom and highly dedicated system designs for a versatile range of improved performance requirements. Technobis ipps is a specialized solution provider for ASPIC packaging by supplying dedicated and mid-range volume packaging services. As ASPIC packaging requires complex dedication, our key values are thermal: and mechanical stability, high performance, low-noise, low power consumption, easy but versatile integration, reliable and repeatable quality. Technobis mechatronics is specialized in carrying out complete product development projects, going from an idea to a successful turnkey product, prototype or series product. **www.technobis.nl**

Pim Kat (CTO) started his career at Sun Electric systems in 1982, developing automotive testing equipment. In 1987, he moved to Hoogovens Research where he worked as researcher for 9 years. In 1996, he co-founded the company BIHCA Systems as part of the HIT group. In 2003, this company became Technobis and eventually Technobis group in 2006. After developing the state-of-the-art Fibre Bragg Grating interrogator on a free space optics basis, Technobis joined the Jeppix-Paradigm program and started to experiment with ASPIC designs for FBG sensing solutions. This resulted in diverse ASPICS for various fields of use mostly based on InP but also making use of SOI and TriPlex technology. At this moment, developments on ASPICS are executed in the field of nano-strain sensing, impact detection, damage detection in composites, shape reconstruction, Eigen mode monitoring. As packagers for industrial series of ASPICS are hard to find, Technobis started to develop and produce their own packaging solutions for the ASPICS and is setting up a packaging facility.

THOSS Media GmbH specializes in two fields: content marketing and scientific publishing. For content marketing THOSS Media has established a network of specialized writers and editors to create high quality content distribute it wordwide. In the field of scientific publishing THOSS Media has established the scientific journal Advanced Optical Technologies. Based on 16 years of publishing experience THOSS Media offers workshops for both, publishing companies and research scientists. **www.thoss-media.de**

Andreas Thoss (Founder and CEO) is an expert in physics and publishing. He started his career as a development engineer for medical laser systems with Aesculap-Meditec in 1996. In 2003, he completed a physics doctorate at the Max-Born-Institute Berlin and joined the publishing house John Wiley & Sons. There, he edited and published books, journals and magazines. Among others, he co-founded the journals Laser Technik Journal (2004), Laser & Photonics Reviews (2007), and the Journal of Biophotonics (2008). In 2010, he started his own venture THOSS Media GmbH. Beside his engagement with THOSS Media, Andreas Thoss acts as Contributing Editor Germany for the leading American magazine Laser Focus World.

TMC is a consultancy and outsourcing company that characterizes itself by helping both its clients in the high-tech industry and its 'employeneurs'. We do this by temporarily assigning them one or more of our highly educated consultants. With their background and skills, our consultants will work closely together with the employees of the client for a pre-determined period or specific project. We have over 10 offices throughout the world, with a strong presence in Europe and in the Netherlands (where our headquarters are located).

All levels of experience are also present at TMC, from junior to senior. Our experts usually have a B.Sc, M.Sc. or Ph.D in a relevant (technical) discipline and their expertise covers a wide range of technical backgrounds such as: Physics, Photonics, Nanotechnology, Data Science, Chemical, Mechanical, Mechatronics, Software, etc. **www.tmc-employeneurship.com**

Robert van Tankeren (Director) has a background in Physics from the University of Twente. After working for several years for high tech companies, Robert joined TMC where he's now the director of TMC Physics and TMC Nanotechnology. He is responsible for the strategic development of the Physics and Nanotechnology competence and the long-term roadmap for these fields. Currently there are over 70 experts (all with B.Sc./M.Sc./Ph.D.) working for these units. Robert's experience lies in recruitment of highly skilled professionals and in strategic business development and key account management in the high-tech industry. As a member of EPIC, he looks forward to collaborating on a strategic level with other members of EPIC to help them achieve their long-term goals.

TNO innovation for life

MEMBER of EPIC

TNO is an independent Dutch organisation for applied scientific research with approximately 5400 employees. Research themes include: Healthy Living, Industrial Innovation, Defence/Safety/Security, Energy, Transport and Mobility, Built Environment, Information Society. **www.tno.nl**

Erik Ham (Business Director) studied mechanical engineering at the University of Technology in Delft and Master of Business Innovation at Tilburg University. In 1999, he joined the research institute TNO and was part of the R&D team developing EUV lithography tools for ASML. In 2016, he co-founded the Dutch Optics Centre, a cooperation between the technical university of Delft and TNO, to support high-tech industry by joint innovation for next generation optical instruments.

TOPTICA PHOTONICS

MEMBER of EPIC

TOPTICA Photonics develops and manufactures high-end laser systems for scientific and industrial applications. The portfolio includes diode lasers, ultrafast fiber lasers, terahertz systems and frequency combs. These systems are widely used in quantum optics and spectroscopy, biophotonics and microscopy, as well as test and measurement. **www.toptica.com**

Patrick Leisching (Senior Vice President R&D) is currently working as Senior Vice President R&D at TOPTICAs headquarter in Munich (Germany) managing an R&D team of more than 80 highly qualified engineers and researchers developing TOPTICA's advanced laser systems. He joined TOPTICA in 2010 after a long career in both industry and scientific environment. For more than 10 years, Patrick worked in the telecommunication division of Siemens and later at Nokia Siemens Network in various positions as researcher, head of R&D department, head of portfolio and product management for hard- and software of optical transmission equipment. Patrick began his scientific career at the Technical University in Munich (Germany) in the field of ultrashort pulse physics. After that, he received his PhD from the RWTH Aachen (Germany) working at the electrical engineering department on pulsed terahertz sources and their applications. His first postdoc position took him to Paris to the Ecole Polytechnique (France) investigating semi magnetic semiconductors, after which he went to work on fiber laser system development at the Max Born Institute in Berlin. He currently holds more than 20 patents and is author or co-author of more than 100 publications.

TRUMPF is a family business. We think and act with a long-term perspective. Our core business is manufacturing solutions in the fields of machine tools and laser technology. These are used in the manufacture of the most diverse products, from vehicles, building technology and mobile devices to state-of-the-art power and data storage. Our consistent internationalization is one of our success factors. We are active with own subsidiaries in those markets, where our customers are. Our creative will fosters our promise for constant innovative power. **www.trumpf.com**

Andreas Popp (Principal Expert Strategy Laser Technology) is responsible for the technology strategy of the business unit laser technology. Before, he was responsible for the technology scouting of the TRUMPF Group. Andreas Popp serves in different leading roles related to TRUMPF´s venture strategy, including venture capital and mergers & acquisitions. Having a passion for inventing, he holds various patents in different technology fields. He studied physics at the Technical University of Munich and subsequently worked as a research assistant on the development of new lasers at the Institut für Strahlwerkzeuge (IFSW) at the University of Stuttgart. From 2011 onward, he worked at TRUMPF Machine Tools as project manager for advanced development and expert for solid-state lasers.

Tyndall National Institute is a leading European research centre in integrated ICT (Information and Communications Technology) hardware and systems. As Ireland's national institute for photonics and micro/nanoelectronics, the institute employs 580 researchers, engineers and support staff, including 120 full-time graduate students. Central to our mission is delivering economic impact through research excellence. We work with a network of over 200 industry partners and customers worldwide to transform our research into products in our core market areas of electronics, communications, energy, health, agri-food and the environment. We generate approximately €30m in income each year, with over 85% coming from competitively won contracts. Our institute hosts the only full Silicon CMOS, Micro-Electro Mechanical Systems (MEMS) and III-V Semiconductor Wafer fabrication facilities and services in Ireland. We are experts at designing, miniaturising and prototyping products to drive connectivity. We are the lead institute for the Irish Photonics Integration Centre (IPIC) and European Space Agency (ESA) Space Solutions Centre Ireland. We host industry aligned research centres; Microelectronic Circuits Centre Ireland (MCCI); International Energy Research Centre (IERC); the Centre for Future Networks and Communications (CONNECT) and the recently launched CONFIRM Centre for Smart Manufacturing. **www.tyndall.ie**

Eamonn Hawe (Programme Manager for the ICT for Health) was awarded his PhD in 2007 and worked in industry for eleven years before joining Tyndall National Institute in early 2018. Research within the ICT for Health Programme in Tyndall is focused on exploiting the extensive design, fabrication and characterisation tools available in Tyndall, together with expertise in modeling, embedded software and systems integration for applications related to health. Dr Hawe's role involves working closely with academic partners, global leaders in medtech and pharma industries, and clinical experts, to ensure that Tyndall research delivers significant impact in terms of clinical utility and commercial opportunity.

UnitySC is a leader in advanced process control and delivers semiconductor metrology and inspection solutions that support the advancement of the semiconductor industry's heterogeneous integration roadmap. Specifically, our integrated systems target the semiconductor advanced packaging, power semiconductor and MEMS markets, focusing on applications, such as through silicon via (TSV) fabrication, fan-out wafer-level packaging, substrate control, hybrid bonding and chemical mechanical planarization (CMP) processes. We work in collaboration with our customers to develop and implement disruptive semiconductor metrology and inspection systems that provide industrialized solutions to process control problems, enabling them to better understand their processes, manage and improve their yields, and grow their businesses. Our customers include the largest foundries, integrated device manufacturers, outsourced semiconductor assembly and test service providers, and R&D centers. **www.unity-sc.com**

Kamel Ait-Mahiout (CEO) is the CEO of Unity Semiconductor since April 2018 and is in charge of positioning Unity as a leader in advance packaging and power in metrology and inspections tools, with key differentiations in the marketplace offering a bench of different solutions applications using disruptive approach. His professional career started in 1989 with Tekelec in Paris in different senior management roles, from R&D project management to manufacturing and operations managing large portfolio on RF and microwave products. In 1998, Kamel joined Kyocera microelectronics in Marketing Sales leading the RF & Microwave Department in Europe and positioning the company to lead the telecom European market. He was involved from saw filter for first mobile phone in the industry to telecom satellites. He joined Amkor Technology in France and became General Manager for Europe, developing and building a strong organization team and positioning the company strategically partnering with key customers with strategic market share growth.

Philippe Gastaldo (CTO) joined Unity Semiconductor in 2006. Until 2016, he has held the position of Director of the NanoVision product line. Then, he managed R&D and Engineering as Technical director. Since early 2018, he is leading Unity Business unit. After a successful position at GEEO R&D centre (Schneider Electric), Philippe joined Teem Photonics at its foundation in 1999, where he became Engineering Senior Manager. Philippe studied Optic and Optoelectronic at INPG and earned his doctoral degree in Integrated Optical Amplifiers from the National Polytechnic Institute of Grenoble (INPG) in 1998.

Umicore is a Belgium based global materials technology and recycling group with about 10,400 employees and revenues (excluding metal) of € 3.3 billion (turnover of € 13.7 billion) in 2018. Umicore generates the majority of its revenues and dedicates most of its R&D efforts to clean technologies, such as emission control catalysts, materials for rechargeable batteries and recycling. Umicore's overriding goal of sustainable value creation is based on an ambition to develop, produce and recycle materials in a way that fulfils its mission: materials for a better life. Umicore's business unit Electro-Optic Materials (EOM) is creating material solutions for optical and electronic applications to customers around the world. The hyper-connectivity megatrend is at the center of our new product and services developments. This megatrend is a combination of ubiquitous communication networks, sensors and artificial intelligence and it will create exciting new possibilities and opportunities in our businesses and personal lives. **www.umicore.com**

Ben Depuydt (Technology Manager) received a PhD in Physics from the University of Ghent in Belgium. He has been with Umicore's business unit Electro-Optic Materials since 1998, where his responsibilities have moved from process- and product development over technology management towards new business development. He has technological and market experience in the fields of semiconductors, metallurgy, opto-electronics and photonics, photovoltaics and LEDs. He has been chairing the International CPV-Consortium (Concentrated Photovoltaics) since 2016.

UNIVERSITY OF TARTU 1632

University of Tartu Institute of Physics is the biggest research institute in Estonia in the field of physics, materials science and nanotechnology. Over 170 researchers cover a wide range of topics by means of theoretical and experimental methods, incl. various aspects of thin films, optical and luminescent materials as well as their radiation damage. Also studies in photonics, sensorics (incl. graphene), surface science, spectroscopy of low density matter (ionic liquids in gas phase, free standing clusters, etc.) and various properties of nanomaterials are well-known. Institute is actively contributing to the development of advanced research infrastructures (RI) internationally (FinEstBeAMS at MAX IV LaB, European Spallation Sources) and is responsible for national RI roadmap object NAMUR+ designed for studies of nanomaterials. In fall 2019 an Interdisciplinary Centre for Computational Imaging and Processing in High Resolution will be launched with opening an ERA Chair position, funded by H2020. **www.ut.ee/et**

Marco Kirm (Professor) received his PhD degree in Physics from the University of Lund (Sweden) in 1995, studying luminescence properties of wide gap insulators using synchrotron radiation. Thereafter, he was a PostDoc at Hamburg University and a beamline scientist of the SUPERLUMI station at HASYLAB. Since 2004, he has been performing the duties of a research director and director of the Institute of Physics (Estonia) where he is presently working as a professor of experimental physics. His present research focuses on novel light emitting materials and ultrafast processes in scintillators. During 2012-2017, he was appointed as a Vice Rector for Research of the University of Tartu. He is a spokesperson of the Estonian-Finish beamline FinEstBeAMS at MAX IV Lab in Lund. He is actively involved into the INTEREG innovation projects "Science Link", "Baltic Tram" and "CAROTS" (2019-2021) with an aim to strengthen industry academia cooperation in the Baltic Sea Region.

V&A-PHOTONICS

MEMBER of EPIC

V&A-Photonics co-develops and markets photonics integrated solutions for telecom, data communications, and sensing applications. We also, offer R&D services for customers who would like to develop their own products. Operating from offices in Eindhoven in the Netherlands and Wuxi in China we link Photonic integrated systems end users with technology developers. If you are a product supplier searching for co-developer V&A-Photonics is your ideal partner.**www.va-photonics.com**

Sami Musa (CTO) obtained a PhD in integrated optics from Twente University in the Netherlands in 2003. Following his graduation, he took several research positions in academic and industrial institutions including Technical Universities of Delft and Eindhoven in the Netherland, University of Limerick in Ireland and ASML. In 2011, he Joined Vision and Actions as a CTO. In 2017 he co-founded V&A-Photonics, a company active in photonic business development between Europe and China. Currently, he serves as CTO of V&A-Photonics. Dr. Musa has 18 US and International patents and co-authored more than 30 scientific papers.

VALO INNOVATIONS

MEMBER of EPIC

VALO Innovations develops, manufactures and distributes innovative ultrashort pulse laser systems for various applications. Founded in 2018, the know-how of the company is based on more than 12 years of experience in the field of ultrafast fiber technology. Beside our innovative products with pulse durations below 40 fs at different power levels, we are able to develop customized solutions for specific applications to fulfill our customer needs. **www.valo-innovations.com**

Oliver Prochnow (CEO & Co-Founder) studied physics at the Leibniz University of Hannover (Germany). He did his diploma thesis and PhD at the Laser Zentrum Hannover. Afterwards, he became Director of Research & Development at Venteon Laser Technologies for 7 years. In 2018, he founded VALO Innovations GmbH together with Alexander Pape. Up to now, he has more than 12 years of experience in the field of ultrafast fiber technologies.

vario-optics ag

MEMBER of EPIC

vario-optics, founded in 2009 as a spinoff of Varioprint AG, located in Heiden (Switzerland) is a leading supplier of Electro Optical Circuit Boards (EOCB). This novel technology allow for compact integration of optical and electronic features. The products cover applications from communication to sensing and are sold globally to all major markets, such as telecom, industry, medical, automotive, military and aerospace. **www.vario-optics.ch**

Tobias Lamprecht (CTO) is currently working with vario-optics, a Swiss company providing electro-optical circuit boards based on planar waveguides. He has previously been with IBM Research Zurich, Switzerland, pursuing research on polymer optical waveguides. He earned his Ph.D. from the University of Twente, Enschede, The Netherlands and has a background in Microsystems Engineering and Optics gained at the University of Applied Sciences NTB Buchs, Switzerland.

veoneer

Veoneer is the world's largest pure-play company focused on Advanced Driving Assistance Systems (ADAS) and Automated Driving (AD). Veoneer have 7,900 people in 13 countries worldwide, working on automotive sensing and decision-making using radar, vision, LiDAR, night vision, electronic controls, and human-machine

interface, aiming for the demands of mass production and real-world use. The Company has 9 manufacturing sites and 17 technical centres with 2700 associates in engineering, of which 65% in software. The company currently serves 22 OEMs. **www.veoneer.com**

Jan-Erik Källhammer (Director Visual Enhancement & Cognitive Systems) has 20 years' experience with automotive active safety development. He was responsible for the inception and development of a Night Vision Drivers Vision Enhancement based on an uncooled long-wave infrared camera. The system is now on the market in Audi, BMW, Cadillac, Mercedes, Peugeot, and some luxury cars. Current works focus on visual enhancement in darkness and inclement weather (Night Vision, LIDAR, gated imaging). Jan-Erik has a Ph.D. in Cognitive Systems from the department of Information and Computer Science at Linköping University, Sweden, an M.S. In E.E. from Duke University, and a M.S. in M.E. from Luleå Technical University, Sweden. Jan-Erik has co-authored 30 articles and conference papers and has 20 patent proposals or granted patents.

VERTILAS®

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VERTILAS develops and manufactures innovative laser diodes for gas sensing (TDLAS - Tunable Diode Laser Absorption Spectroscopy), optical communications and customer specific applications in the NIR (near infrared) range. VERTILAS long wavelength VCSELs (Vertical Cavity Surface Emitting Laser) are available from 1270nm to 2360nm with a wide range of packaging options, incl. cooled and uncooled TO packages, as well as LC-TOSAs and pigtails. VERTILAS VCSELs are specifically designed and manufactured to offer excellent single mode performance. For sensing and spectroscopy markets, Vertilas can offer single mode VCSELs in 15 standard wavelengths and additional wavelengths can be manufactured on demand. They offer a wide and fast tuning range to enable rapid and precise measurements for ppm and ppb sensitivity levels. For communications applications, Vertilas VCSELs achieve 10.3 Gbps and up to 40Gbps transmission performance. Furthermore, for customer specific applications, Vertilas can offer 1D and 2D VCSEL arrays. Vertilas VCSEL technology enables system designers to reduce power consumption by 50% and more compared with other lasers technologies. **www.vertilas.com**

Christian Neumeyr (CEO) has over 25 years of experience in the semiconductor and optoelectronics industry, with 20 years in optical communications and more than 12 years in sensing and industrial applications. Since 2006, Mr. Neumeyr has been CEO at VERTILAS. He holds a university degree in electrical engineering and an MBA. He had held executive positions at several leading and innovative technology companies, including Marketing Director at Infineon, Vice President at Multilink Technology and Director Business Line at Broadcom. He took on several international assignments and lived for several years in Japan, UK and the US where he developed a wide network of contacts in various business fields and with a wide range of industrial players and technical and academic institutions and universities. His professional accomplishments include managing complex R&D projects, defining new products for communications and industrial applications, establishing and managing fast-growing and profitable business lines and expanding product lines and businesses into new markets.

VIGO SYSTEM

MEMBER of EPIC

VIGO System is the leading manufacturer of standard and customized High Operating Temperature HgCdTe detectors. The mission of VIGO System is to provide fast and convenient, easy to use IR detectors at any wavelength from 2 to 16 µm, reaching fundamental BLIP limits without cryocooling. In our offer, we have detection modules consisting of an infrared detector and preamplifier integrated into a compact case. Modules are available with different spectral response ranges, time response characteristics and gains. In

addition to our large variety of standard modules, we offer professional custom designed devices and complete solutions for various measurement systems and broad range of applications. **www.vigo.com.pl**

Aneta Michałkiewicz (Technology Development Director) received her Ph.D. degree in photonics engineering from Warsaw University of Technology in 2009. She has extensive experience in projects management in different sectors and frameworks. She started her career by managing R&D European projects at Warsaw University of Technology. Later, she gained experience as the Programme Officer in Foundation for Polish Science. During the last 5 years, she was leading European projects (FP7 and H2020) as well as ESA project in Airbus DS subsidiary in Poland, where she was a head of division. In 2018, she joined VIGO SYSTEM where she leads Technology Development Division.

VIS
Vertically Integrated Systems

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VI Systems: **VIS** is a fabless developer and producer of optical engines for data transmission at ultrahigh bit rates and the related electro-optic components for applications in data communications and access networks. An interconnect capable of the speed while allowing cost- and power efficiency and at a very small footprint will be successful in the market, the VIS device concept fulfils these requirements. **www.v-i-systems.com**

Nikolay Ledentsov (CEO) received his Diploma of Electrical Engineer from the Electrical Engineering Institute in Leningrad (LETI) (Electrotechnical University) in 1982. He received the Cand. Sci. (Ph.D.) and the Dr. Sci. degrees in physics and mathematics from the A. F. Ioffe Institute, Saint Petersburg, Russia in 1987 and 1994, respectively. Since 1994, he has been a Professor of electrical engineering in LETI and, later, a Professor of physics and mathematics at the A. F. Ioffe Institute. Since 1998, he has been also DAAD and DFG Professor at the Technical University of Berlin (1998-2007). He has co-authored 800 papers in leading technical journals and conference proceedings and 29 patent families. His Hirsch factor is 78. He is a Member of the Russian Academy of Sciences, Fellow of the Institute of Physics, and Senior Member IEEE. His current research focuses on physics and technology of semiconductor nanostructures and the related optoelectronic devices. Prof. Ledentsov received the Young Scientist Award from the International Symposium on Compound Semiconductors (1996) for pioneering contributions to the field of quantum dots and quantum dot lasers, Humbold Fellowship (1995), the State Prize of Russia for Science and Technology (2001), the Prize of the Berlin-Brandenburg Academy of Sciences (2002), and other awards and recognitions. He is founder and Chief Executive Officer of VI-Systems GmbH (2006).

VIVIDQ

VividQ is a leading software company, providing the world's first software framework for real-time 3D holographic display. VividQ was founded in 2017 by a technical team of PhD graduates from Oxford, St Andrews, and Cambridge. Built on precision and innovation, VividQ's deep tech software creates commercially viable solutions for pioneering technology companies, bringing an immersive and natural viewing experience to users. With partners across the world and cutting-edge expertise, VividQ is delivering the future of holography. **www.vivid-q.com**

Andrzej Kaczorowski (Co-founder and CTO) is a Holography Evangelist and the Co-founder and CTO of VividQ. Andrzej has been researching the field of Holography since 2011, focusing on efficient algorithms enabling real-time hologram generation throughout his doctoral studies. He led the proof of principle work that preceded founding of VividQ. Passionate about technology, from its academic inception to commercialisation, Andrzej now manages VividQ's research team and drives the long-term technology vision of the company. Andrzej authors several journal publications, as well as the founding patent, and has spoken at multiple conferences and events, such as Science: Polish Perspectives (2013, 2016) and TEDxWarsaw (2014). Andrzej has an interdisciplinary scientific background - he holds a PhD and MRes in Photonic Systems Development from the University of Cambridge and a BSc in Physics and Computer Science from King's College London.

VPIphotonics provides professional simulation software and design services for optical component and subsystem manufacturers, as well as system and network integrators. VPIphotonics offers a suite of software environments supporting design, analysis and optimization applications for integrated photonics, optoelectronics, fiber optics, transmission systems and networks. VPIphotonics off-the-shelf and customized solutions are valued for their powerful and comprehensive simulation capabilities and high degree of flexibility. They are applied in research and development, product design and marketing by hundreds of companies, and for teaching and research at over 160 academic institutions worldwide. **www.VPIphotonics.com**

André Richter (General Manager) is an expert with 20+ years of experience in the field of optical communications and photonics. He received his M.Sc. degree from Georgia Tech, USA and Ph.D. from TU Berlin, Germany. André co-authored 100+ publications and contributed to 15+ international R&D projects. Being with the VPIphotonics team since 1997, André generated numerous novelties in industry research and education, commercialization and market development. He held management positions with responsibilities for technical services, product management, research & development before being appointed as General Manager in 2013.

The VR/AR Association (VRARA) is an international organization designed to foster collaboration between innovative companies and people in the VR and AR ecosystem that accelerates growth, fosters research and education, helps develop industry standards, connects member organizations and promotes the services of member companies. **www.thevrara.com**

Philip Wogart (Executive Director DACH Region) founded HEADGEAR in early 2014 as a VR/AR studio focused on Entertainment, Marketing and Education/Training experiences. Since then it has become a research and development house solely focused on immersive experiences on mobiles and standalone HMDs, working with the likes of Qualcomm, Epic Games, Google, Oculus, HTC, Pico Interactive, Zappar, 8th Wall, Roccat & Axel Springer. His varied background includes being a Startup Founder twice over, a Product Evangelist for SaaS online marketing platforms; Games Producer on mobile/social apps; and even Java software development used in Blu-ray discs and pre-smartphone market. For the last couple years, he has also help developed the Creative Technology curriculum at the Miami Ad School Europe, where he's responsible for teaching the Gaming and Immersive Technologies courses. Philip holds a Masters of Science degree in Virtual Environments from University College London's Bartlett School of Architecture as well as co-chairs the Location Based Entertainment Committee for the VR/AR Association.

V-Research, since its founding in 2004, has viewed research and innovation as increasingly important for the high-tech as well as for the manufacturing industry. V-Research aims for bringing the newest research results to the industry and translate it into commercial applications. The industrial use of this knowledge is carried out with the aim of achieving rapidly useable results for the best possible benefit and success of the customers. The Product portfolio includes: Photonics, fundamental research for lighting applications, construction of assemblies, plant configuration and commissioning, tribological optimization, and failure analysis. **www.v-research.at**

Heinz Seyringer (CEO) has a background in physics and mathematics with a focus on photonics. He was managing director of Photeon, which was specialized on integrated optical chips for telecom and sensor applications and moved after 9 years to the Zumtobel Group where he was responsible for the research collaborations of the group. He served in the board of directors of EPIC and is currently chairman of the Austrian photonics platform, Photonics Austria and in the executive board of Photonics21. Since September 2017, he is CEO of V-Research.

The **W3+ FAIR** is an interdisciplinary networking trade fair for the fields of optics, electronics, mechanics and high-tech innovations. It provides these high-tech sectors with a new, multidisciplinary forum for information, innovation and contact in the traditional location of Wetzlar (26.-27.02.2020) in Germany and new in the Rheintal region (D/A/CH/LI) (18.-19.09.2019) In cooperation with EPIC, Wetzlar Network, Swissphotonics and Photonics Austria and key industry partners, the W3+ Fair promotes communication and networking among experts and paves the way for innovative solutions and new business - a real model for success. **www.w3-messe.de**

Jörg Brück (Project Director) is a trained banker who worked for 12 years at Commerzbank Frankfurt. Before switching to the events industry in 2004, he was employed for 5 years as commercial manager of a medium-sized company. After that, he worked for altogether 5 years: first as director of a multifunctional arena and later as managing director of a trade fair and congress center. In 2010, he set up his own business, Backstage Consulting GmbH, and, among other things, has been working for Fleet Events as project director of W3 + FAIR/Convention since 2013.

WISTA-Management GmbH WISTA Management GmbH (WISTA) is an experienced developer of Science and Technology Parks based on enabling technologies, such as photonics and optics / microsystems and materials / ICT / biotech / renewable energies and photovoltaics. It has given proof that Adlershof has become the largest and most successful site of its kind in Germany. WISTA covers a wide ranging scope of capabilities alongside value-added chains. That makes it possible to turn scientific findings into innovative products. WISTA knows to bringing together:

- scientists, entrepreneurs and start-up companies,
- the culture of science, of creatives, and business founders

- what kind of labs and offices, and which infrastructure young companies need,
- how to establish state-of-the-art start-up centres and technology centres.

Thus, WISTA is a facilitator of a grassroots economic development. **www.wista.de**

Bernd Ludwig (Head of Centres for Photonics & Optics and Renweable Energies & Photovoltaics) came from the biotech sector, in which he holds his PhD. in medical virology. Thereafter, he worked as campaigner for Friends of the Earth Germany (BUND) and subsequently as consultant and networker for Berlin's biotech sector. Since nearly 18 years, he is working for the science and technology park Berlin Adlershof, where he is heading the two tech centres, helping tech companies to grow.

Yelo, founded in 1983, specialise in the design and manufacture of burn-in and life test equipment for optoelectronic devices. With an experienced team of 50, Yelo has grown to become one of the industry's leading and most trusted names for burn-in equipment. The company is vertically integrated and possesses full design and manufacturing capabilities. One of Yelo's biggest strengths is its in-house mechanical design capability which looks after device fixturing and probing for many different types of devices (bare chip, laser bar, chip on carrier, chip on substrate and packaged devices). Another key strength is its Research and Development division which provides solutions for complex issues such as thermal management. By having early discussions in the design phase of a new photonics device, Yelo can advise a suitable approach needed to enable safe, repeatable device testing. **www.yelo.co.uk**

Richard Furey (CEO) is an Electronic Engineering graduate of Southampton University (1977) and is currently CEO of Yelo, a company that he co-founded in 1983. He has over 40 years of experience in test, including the design of general instrumentation, test system architecture and test systems for optoelectronic devices. In 2010, he led the management buyout of Yelo from its Canadian parent and is now responsible for corporate strategy as well as product development. He is a chartered engineer and a Fellow of the IET. He is active in the Northern Ireland Science Park where he is an EIR (Entrepreneur in Residence) and helps with the mentoring of start-up companies.

Yole Développement (Yole), founded in 1998, has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS and image sensors, Compound Semiconductors, RF Electronics, Solid-state lighting, Displays, Software, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics, Batteries & Energy Management and Memory. The "More than Moore" market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO, KnowMade and Blumorpho, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. **www.yole.fr**

Jean-Christophe Eloy (CEO and Founder) is President and CEO of the Yole Développement company. Created in 1998, the market research & strategy consulting company has grown to become a group of companies providing marketing, technology and strategy consulting, media in addition to corporate finance services. His mission is to oversee the strategic direction of Yole Group of Companies. With System Plus Consulting, Blumorpho, PISEO, KnowMade and Yole Développement, Yole Group of Companies has developed a unique understanding of technologies to accurately evaluate markets, applications, solutions and strategies. With more than 70 analysts, including PhD and MBA qualified industry veterans, the group collects information, identifies trends, challenges, emerging markets, and competitive environments and then turns that information into results to give a complete picture of the industry's landscape. All year long, Jean-Christophe builds deep relationships with leading semiconductor companies, discussing and sharing information across his global network. His aim is to get a comprehensive understanding of their strengths and guide their success.

Eric Mounier (Project Manager) has almost 20 years of experience in MEMS, Sensors and Photonics applications, markets, and technology analyses and provides deep industry insight into current and future trends. As a Fellow Analyst in MEMS & Photonics Technology & Market, in the Photonics, Sensing & Display division, he is a daily contributor to the development of MEMS and Photonics activities at Yole Développement (Yole), with a large collection of market and technology reports as well as multiple custom consulting projects: business strategy, identification of investments or acquisition targets, due diligences (buy/sell side), market and technology analysis, cost modelling, technology scouting, etc. Previously, Eric Mounier held R&D and Marketing positions at CEA Leti (France). He has spoken in numerous international conferences and has authored or co-authored more than 100 papers. Eric has a Semiconductor Engineering Degree and a Ph.-D in Optoelectronics from the National Polytechnic Institute of Grenoble (France).

Dan Vilenski — Speaker. Dan Vilenski (Entrepreneur, Founder and CEO of Applied Materials (Israel) & Founder and CEO of KLA, Israel) founded, integrated and managed in Israel three independent subsidiaries for leading American high-tech companies: Kulicke and Soffa (K&S), and KLA Instruments and Applied Materials. All three firms operate in the field of semiconductor capital equipment and employ about 2000 employees with about $1.6 billion sales from Israel. Dan is active as a volunteer for numerous educational and industrial activities, including the interactive Museum of Science in Haifa, Young Entrepreneurs program and several other entrepreneurship programs for young students. He was the Chairman of the Board of the United States-Israel Educational Foundation, the bi-national commission responsible for Israel's participation in the Fulbright Program. Dan serves on the Board of Governors of the Technion and is a member of the Board and active chairman of several High-Tech Israeli companies. He received his B.Sc. and M.Sc. from the Technion - Israel Institute of Technology in Haifa. From 1967 to 1969, Dan was a staff member at Carnegie Mellon University in Pittsburgh USA.

Stefan Weber — Participant. Stefan Weber (Entrepreneur) is a physicist with 12+ years of professional experience as a serial entrepreneur and in the optical industry. He was developing new laser pulse modulation techniques during his PhD thesis at the FU Berlin. During his time as Post-Doc at the EPFL and the University of Geneva, he designed a new type of OMEMS micromirror array for the Deep Ultraviolet. While Product Manager for Jenoptik Optical Systems GmbH, he brought novel sensors for next-generation lithography to serial production for large customers from the semiconductor equipment industry. He next was COO of the nanotechnology start-up SwissLitho AG, an ETH Zurich spin-off commercializing IBM Research technology. As COO of modum.io AG in Zurich, he developed highly secure, fully compliant IoT sensors for the Swiss National Post's temperature-controlled logistics distribution of pharmaceuticals using Blockchain technology. Recently, he started to independently build up new teams and consult startups from various sectors, including Photonics, IoT, Embedded, Distributed Ledger, Medtech, Logistics, Nanotech and Optics.

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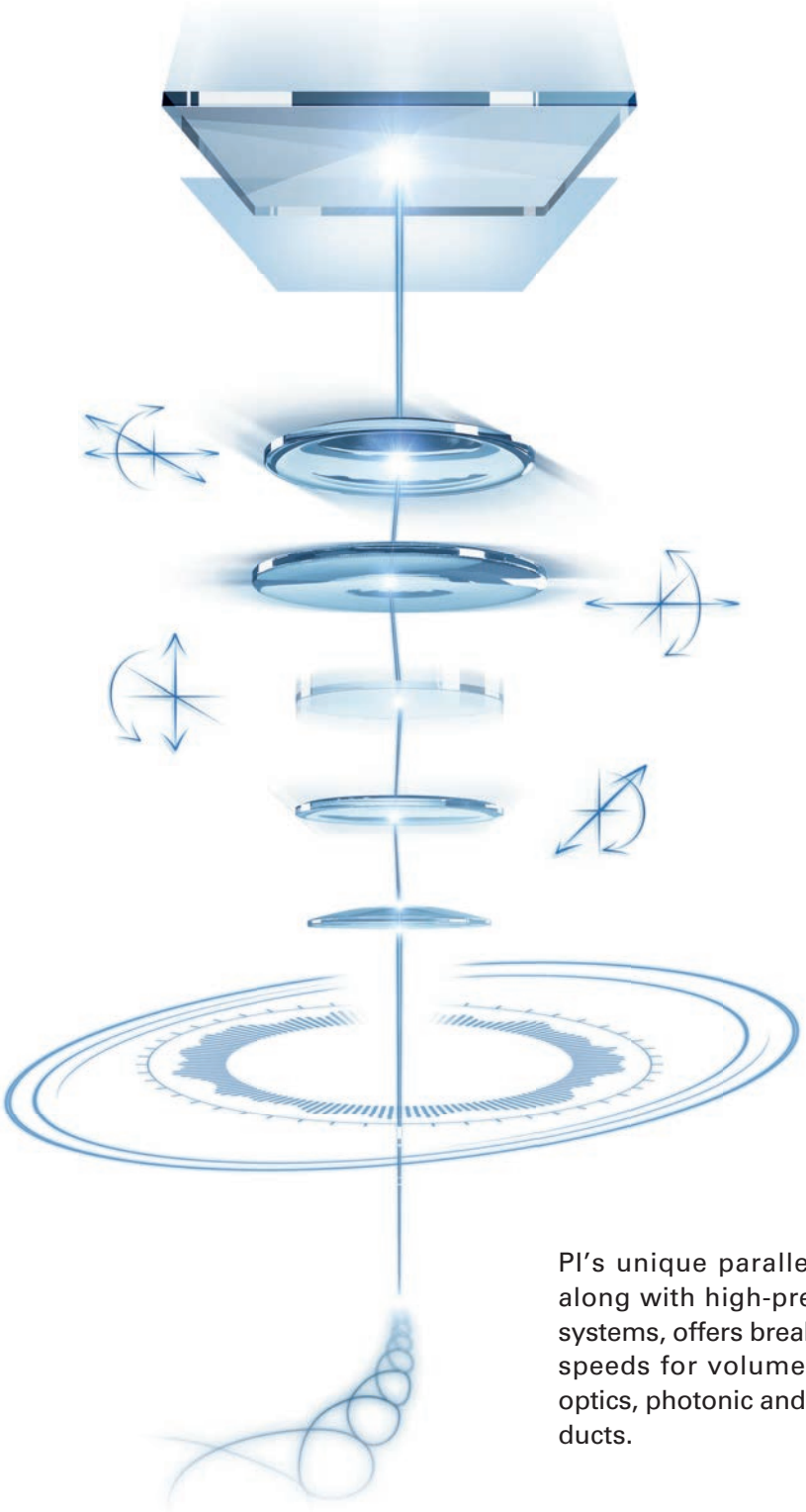

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