



Press Release

Aachen, May 5, 2022

Innovative Laser Solutions

Presentation of the Innovation Award for Laser Technology 2020/2022 in Aachen, Germany

Outstanding innovations in laser technology were presented and honoured in the Coronation Hall of Aachen's City Hall on May 4, 2022. The occasion was the presentation of the Innovation Award for Laser Technology in front of around 300 guests. This year's winners of the €10,000 award are Dr. Boris Regaard of TRUMPF Werkzeugmaschinen GmbH + Co. KG (2020) and Stefan Wolf of Primes GmbH. Both were able to impress the high-calibre jury with forward-looking projects. In his laudation, Prof. John Powell from Lulea University of Technology, Sweden, praised the high quality of the projects and the innovative spirit of the award winners. The prizes for 2020 and 2022 were awarded together, as the 2020 award ceremony could not take place due to the restrictions imposed in response to the Corona pandemic.

The Innovation Award for Laser Technology is presented every two years to laser manufacturers and users as well as researchers and developers who have spearheaded a laser technology innovation from application-oriented research to successful industrial implementation. The organisers are the Arbeitskreis Lasertechnik AKL e.V., a network of around 180 laser experts, and the European Laser Institute ELI e.V., a platform that brings together expertise and knowledge of optical technologies.

Dr. Alexander Olowinsky, Chairman of the Board of the European Laser Institute ELI e.V., and Dipl.-Ing. Ulrich Berners, Chairman of the Board of AKL e.V., describe the context of the award: "With the presentation of the Innovation Award for Laser Technology, we want to honour precisely those innovators who have spearheaded an invention in the field of production-oriented laser technology from research through development to market launch." The award-winning projects were met with enthusiasm: "Each of the finalist teams has made a significant contribution to the advancement of science and technology through their innovative achievements."

The following is an overview of the award winners and their projects:

First prizes

The topic of the 2020 award-winning project was "**Active Speed Control – Camera-Based Sensor System for Closed-Loop Feed Regulation in Laser Cutting**". At the heart of Active Speed Control, developed by Dr. Boris Regaard and his team at TRUMPF Werkzeugmaschinen GmbH + Co. KG, Ditzingen, is a camera-based sensor system in the cutting head, whereby real-time image processing analyses the camera data. Based on the data analysis, the feed rate is constantly monitored for optimal results. This ensures maximum cutting speed and a more reliable process. The result is optimised productivity and less scrap and rework. The system has potential for controlling or monitoring other process parameters and is thus a milestone towards the development of a future, fully autonomous laser cutting machine.

The 2022 award-winning project was called "**ScanFieldMonitor (SFM)**". It was developed by Stefan Wolf, Head of Research and Development at PRIMES GmbH, Pfungstadt, and his team as a tool for laser scanner characterisation. The development was prompted by many new applications in the field

of additive manufacturing and e-mobility. The patented measurement principle enables the measurement of laser beam parameters by scanning vectors. The resulting laser scanner characterisation provides all geometric and laser-related parameters relevant for remote applications. In the same operation, beam position and movement of the laser scanner unit in the scan area are determined. The quality of the SFM's measurement principle becomes apparent whenever the behaviour of a dynamic laser plays a role.

Second prizes

The project which was awarded the second prize in 2020 is used in bomb disposal efforts. The innovation, entitled "**New Laser Solution for Defusing Unexploded Ordnance (UXO) by the Use of a Disposable 3D Printed Tool Head,**" was developed by **Dr. Oliver Meier**, managing partner of LASER on demand GmbH, Burgdorf, together with the Laser Zentrum Hannover e.V. and the explosive ordnance disposal service of the Hamburg Fire Department. The new approach involves creating a defined weakening in the cylindrical section of the bomb casing through a laser notching process, which then reduces pressure and thus the detonation force of the bomb. Subsequently, a controlled low energy input triggers a deflagration that is designed to rupture the shell at the notch and eject the detonator. An essential element of the project is the use of standard optical components at an affordable price. If damage occurs during bomb defusing, which is not unlikely, the components can be easily replaced.

The second prize in 2022 goes to the project "**Innovative Surfaces using High-Speed Laser-Biomimetics**" by **Dr. Tim Kunze**, Managing Director of Fusion Bionic GmbH, Dresden, and his team. Functional technical surfaces have so far been produced mainly by coatings and lithographic processes. The potential of these techniques is currently limited, but Direct Laser Interference Patterning (DLIP) technology offers entirely new, limitless possibilities for surface enhancement. For example, surfaces can be created to which ice does not adhere (anti-icing, e.g., for aviation), or implants that are better accepted by the body thanks to their biocompatible and antibacterial surfaces. Fusion Bionic has developed high-throughput manufacturing systems based on DLIP that are compact, robust, and up to 10 times faster than established processes. Without additional steps or chemicals, these DLIP modules create micro- and nanotextures on the surface at speeds of up to 1 m²/min.

Third prizes

"**Unlimited Flexibility for Short Pulse Laser Applications**" is what the neoMOS "SMART" laser system offers. The system, developed by **Dr. Maik Frede** of neoLASE GmbH in Hannover, Germany, implements the philosophy of developing new applications in laser micromachining through the flexible use of short pulse lasers. The integrated ultrashort pulse laser for material processing enables pulse durations from nano to femtoseconds or a combination of different pulse durations in the same process. The basis for this is a novel amplifier technology. Combined with a modular MOPA platform, the "open source" philosophy makes it possible to exchange only a part of the laser (seeder) to set up completely new laser parameters. Different seed lasers allow pulse durations, repetition rates or pulse durations to be changed from the same laser system. It is an example of a new generation of machines that combines the functionality of several laser systems in just one machine.

The project by **Thibault Bautze-Scherff**, Head of Sales at Blackbird Robotersysteme GmbH, Garching b. Munich, is entitled "**Finally United: OCT-Based Process Control and On-The-Fly Remote Laser Welding in One Tool**". The joint development by Blackbird and SCANLAB GmbH, Puchheim, combines all classic monitoring tasks in laser welding in one tool. The combination of on-the-fly functionality, main scanner and OCT sensor is accessible via a common user interface. The system provides the flexibility that is increasingly in demand in production lines, for example to weld different parts in one station, each with its own process monitoring requirements.

Jury

The 2020 and 2022 jury consisted of Dr. Guido Bonati (FISBA AG), Dr. Markus Kogel-Hollacher (Precitec GmbH & Co. KG), Dr. Axel Luft (Scansonic MI GmbH), Prof. Dr. Peter Loosen Fraunhofer-Institut für Lasertechnik ILT), Prof. Dr. Andreas Ostendorf (Ruhr Universität Bochum), Prof. Dr. José Luis Ocaña (Centro Láser UPM Madrid), Dr. Armand Pruijboom (TRUMPF Photonic Components) and Dr. Pablo Romero (AIMEN - Asociación de Investigación Metalúrgica del Noroeste). 2020 also included Dr. Keming Du (EdgeWave) and Dr. Paul Andrew Hilton (TWI Ltd Cambridge). Dr. Hartmut Frerichs (Arbeitskreis Lasertechnik e.V.) and Prof. Dr. Stefan Kaielerle (European Laser Institute e.V.) oversaw the organisation of the event in both years.

Innovation Award for Laser Technology

The **Innovation Award Laser Technology** is a European research prize awarded at 2-yearly intervals by the associations Arbeitskreis Lasertechnik e.V. and European Laser Institute ELI e.V. The award can be conferred to an individual researcher or to an entire project group whose exceptional skills and dedicated work have led to an outstanding innovation in the field of laser technology. The scientific and technological projects must center on the use of laser light in materials processing or the methods of producing such light, and must furthermore be of demonstrable commercial value to industry.

Selection process and finalists

An international jury of key figures representing both industry and research compiles a shortlist of the best candidates. The award winner and the runners-up are then selected by the jury as outstanding finalists based on their achievements and the published criteria. The winner receives €10,000 in prize money and is awarded the title of "AKL Fellow" and "ELI Fellow."



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Further information:

- **Regarding the award and the finalists:** www.innovation-award-laser.org
Descriptions of the realized innovations of the 6 finalists and photos of the awarding ceremony on 4th May 2022 in Aachen's Corontion Hall can be downloaded here.
- **Regarding Arbeitskreis Lasertechnik AKL e.V.:** www.akl-ev.de
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- **Regarding International Laser Technology Congress AKL '22 (May 4-6, 2022):**
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