

*visions for
better health care*
Biophotonics
Research Program

The continuous column of the German Biophotonics research program reports on the collaborative research projects, provides event and literature information, and keeps you up to date on trends and meetings in the field of Biophotonics.



Targeting Unmet Medical Needs

Physicians demand novel biophotonic solutions at Photonics Europe

A fresh impetus for researchers was provided by the conference “Biophotonics – Photonic Solutions for Better Health Care”, which took place from April 12 to 15 as part of Photonics Europe in Brussels. For the first time, the oral program featured not only premium-class talks on the latest technological advances in the field, but also a dedicated medical session entitled “Towards a Better Health Care: Unmet Medical Needs”. The European Network of Excellence “Photonics4Life” had invited renowned physicians to unravel challenges in various medical fields, ranging from oncology to infectious diseases, and to state their expectations on user-oriented optical solutions.

“Time matters”, was the clear message of Michael Bauer (Univ. Hospital Jena, Germany) who spoke on diagnostic needs in the field of sepsis. In order to avoid mortal cases, the analysis time for pathogen identification must be reduced from currently about 36 hours to about 30 minutes after onset of sepsis. Not only the pathogen must be reliably identified but also resistances and host responses must be determined. This means that blood-culture based procedures must be replaced by photonic point-of-care solutions combined with molecular biology techniques.

In the field of oncology, all speakers expected further major benefits from novel optical procedures for tumor diagnosis. Their potential for an early recognition and detailed description of tumors should be exploited further in order to promote less invasive, targeted therapies. Pathologist Axel Niendorf (Inst. for Diagnostic Histopathology, Germany) recommended that molecular diagnostics should be applied to complement rather than replace morphological assessment. Such multimodal approaches could provide major advances in tumor grading and enable individual therapy recommendations. Katarina Svanberg

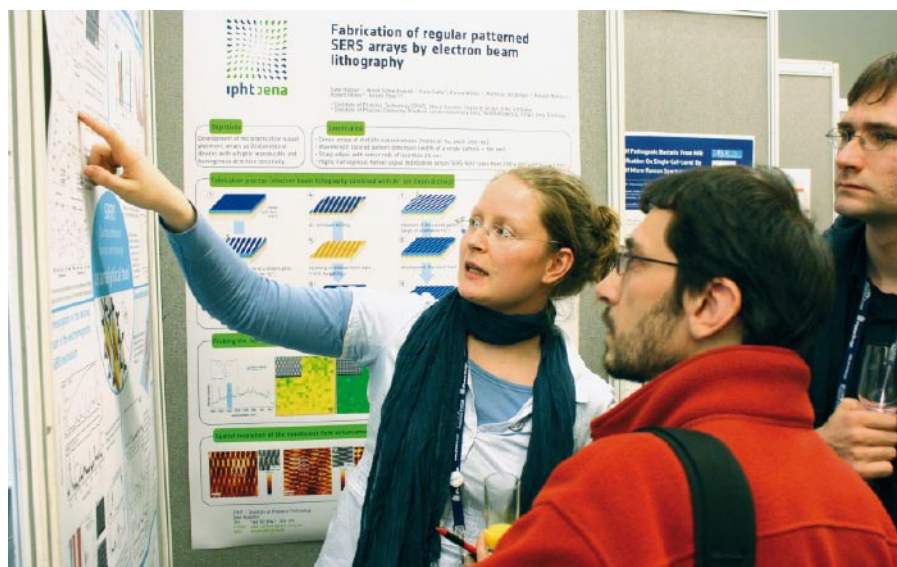


FIGURE : Biophotonics attracted much interest at “Photonics Europe” in Brussels. Here, Dana Cialla (Univ. of Jena, Germany) presents her work in the poster session. (Courtesy of Photonics4Life)

(Lund Univ., Sweden) and Alfonso Crisci (Univ. of Florence, Italy) emphasized the importance of in-vivo fluorescence diagnosis for improved therapies, e.g. by using it for a fast and reliable intraoperative delineation of tumors. The benefits of non-invasive optical biopsies in dermatology were approved by Daniela Massi (Univ. of Florence, Italy) and Hans Peter Berlien (Elisabeth Klinik, Germany). However, the available imaging and manipulation methods, e.g. the use of short laser pulses, and their effects should be studied further to allow their routine use in dermatology.

The session attracted big interest so that Photonics4Life coordinator Juergen Popp judges it as a successful step towards a closer cooperation of users and developers, and plans to present similar formats in upcoming conferences. With activities like this, the P4L network aims to close the gap between users and developers of biophotonic solu-

tions. According to experts, this gap is the most important bottleneck to further advances in the field. The Brussels meeting also paved the way towards the worldwide network “Biophotonics4Life”, whose members met to agree on first joint activities. Photonics Europe clearly showed that medicine and the life sciences rank among the most important applications of photonics. Two out of three opening lectures on Monday featured groundbreaking biomedical applications of light, given by award-winning researchers Stefan Hell (Max-Planck-Institute of Biophysical Chemistry, Germany) and Kishan Dholakia (Univ. of St. Andrews, UK). With about 130 talks and posters, the sub-conference on biophotonics was the largest of the 19 technical conferences.

www.Photonics4Life.eu

German Biophotonics Research Program · www.biophotonik.org
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Biophotonics4Life Worldwide Consortium



The Biophotonics4Life Worldwide Consortium (BP4L) connects nodes of biophotonics researchers, educators, organizations, companies, and other enthusiasts to better harness global talent and resources and focus them on the most important end-user needs.

Biophotonics, the application of photon-based technologies and methods to bioscience and medicine, is becoming increasingly important for elucidating fundamental biological phenomena and for providing minimally-to-non-invasive means of diagnosing and treating disease, and therefore cost-effective solutions to clinical challenges. Its visual nature and interdisciplinarity enables educators to engage diverse students and prepare them for 21st century careers. In the private sector, companies of all sizes are actively involved in research, development, manufacture and distribution of biomedical and scientific instrumentation that is based on biophotonics and other innovative technologies, improving patients' lives and creating economic value in the process. Besides healthcare needs, biophotonics can also address challenges in agriculture, food safety, clean water, security against biothreats, and biometrics.

The Consortium is anchored by nodes of biophotonics stakeholders in various regions of the world (20 nodes as of April 28, 2010),

whose representatives are actively involved in all issues of Consortium governance. In each region, a local hub organizes the node and its activities. The NSF Center for Biophotonics Science and Technology (CBST) headquartered at UC Davis, located at the UC Davis Medical Center in Sacramento, California, the Canadian Institute for Photonic Innovation, Quebec City, Canada and the Photonics4Life Network of Excellence in Europe founded the BP4L Consortium. CBST provides the initial infrastructure and headquarters, with support from the National Science Foundation. Dennis Matthews, Director of the Center for Biophotonics, Brian Wilson, Director of the Laboratory for Applied Biophotonics at University Health Network in Canada, and Juergen Popp, Scientific Director of the Institute of Photonic Technology at Friedrich Schiller University Jena and coordinator of the Photonics4Life Network of Excellence in Europe currently co-chair the Consortium.

BP4L Consortium participants can communicate and collaborate by means of the www.biophotonicsworld.org portal developed by CBST and the Canadian Institute for Photonics Innovations (CIPI) to become the social knowledge network that leverages both vetted information (knowledge bank) and social content to create a collaborative community. The knowledge repository

contains various resources (lectures, movies, etc.), links to relevant journals, federated search, relevant job postings, news and events. A series of tools are or will soon become available to the community: blogs, discussions, wikis, collaborative spaces, social tagging, and others. The biophotonics community will also benefit from web-based seminars and workshops, recorded or live televised lectures or podcasts, information about exchange programs for students and scientists and will have the ability to forge collaborative efforts to obtain research funding.

Biophotonics4Life Worldwide Consortium · www.biophotonicsworld.org
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