



## European Commission backs biophotonics 'FAMOS' consortium with €10.1M for project to develop new lasers for earlier, better diagnosis of major diseases

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The European Commission has awarded €10.1M FP7 grant to a pan-European biophotonics consortium, 'FAMOS' which plans to develop a new generation of advanced lasers and light sources that they expect to deliver dramatic advances to the diagnosis and treatment of major diseases including skin cancer and Age-related Macular Degeneration.

The four-year project, named 'FAMOS' (which means 'excellent' in German) has 17 partners from 8 countries, and is led by Professor Wolfgang Drexler at the Medical University of Vienna.

As Prof. Drexler explained:

*"Lasers and light-based methods have long promised to deliver benefits to clinicians through **faster, more accurate, more sensitive, and more cost-effective** diagnosis of cancer and other important diseases, but so far most optical diagnostic instruments are expensive, complex and have limited performance. A key reason for this is that the lasers and light sources they use, are adapted from other industrial and scientific applications, and have not been optimized for these new clinical uses. Now in FAMOS, we will develop and demonstrate the next generation of light sources to produce **step changes in cost/performance** that will trigger development of a whole new world of non-invasive clinical diagnostic tools"*

Although the new lasers will have many applications, the FAMOS consortium is focusing its efforts on un-met clinical needs where optical diagnosis could bring huge benefits, such as:

- Replacing surgery with non-invasive treatments as the standard for the commonest type of skin cancer, by better monitoring of tumour response and clearance
- Reducing mortality from melanoma and colorectal cancers by earlier detection and accurate non-invasive diagnosis
- Reducing blindness from the increasingly common diseases such as diabetes and age-related macular degeneration (AMD) by earlier detection and better monitoring of novel emerging drug treatments

€10.1M plus €3.2M contributed from the consortium's own resources will fund the research and development of the new light sources, their integration into prototype optical diagnostic instruments, and their initial clinical evaluation.

FAMOS is a world-class multidisciplinary team of 7 leading academic biophotonic institutions, and 10 top SMEs and companies from 8 countries with crucial complementary knowledge of laser physics, optical engineering, biomedical engineering, wave front engineering, computer sciences, signal post processing, medical physics and preclinical and translational sciences.

The FAMOS consortium partners can be divided into three groups subject to their major role:

**Photonics research and technology supply partners**, comprising:

- Technical University of Denmark
- Ferdinand Braun Institute, Germany
- EXALOS AG, Switzerland
- NKT Photonics, Denmark
- Femtolasers Produktions GmbH, Austria
- Elforlight Ltd, UK
- InnoLas Laser GmbH, Germany

**Biomedical and translational research partners** (including clinical expertise), comprising:

- Medical University Vienna, Austria
- University College London, UK
- Helmholtz Zentrum Munchen, Germany
- Weizmann Institute of Sciences, Israel
- University of St Andrews, UK
- XVUE Ltd, Greece

**Medical instrument manufacturers**, comprising:

- Michelson Diagnostics Ltd, UK
- Imagine Eyes SA, France
- iThera Medical, Germany
- JenLab GmbH, Germany

The FAMOS consortium is guided by a **Clinical Advisory Board**, comprising:

- Professor Dr. Gregor Jemec, Chair of Dept. of Dermatology, University of Copenhagen, Roskilde Hospital, Denmark
- Professor Dr. Alain Gauderic, Department of Ophthalmology, Hôpital Lariboisière, Paris, France

- Professor Dr. J Bergman, Director of Endoscopy, Dept. of Gastroenterology & Hepatology, University of Amsterdam, Netherlands
- Professor Dr. James G Fujimoto, Dept. of Electrical Engineering and Computer Science, MIT, USA
- Professor Dr. Leonard Fass, Department of Bioengineering, Imperial College, UK

The FAMOS consortium invites interested clinicians, industry and investors to get in touch and get involved in this exciting project!

The primary contact for FAMOS is Professor Wolfgang Drexler, Medical University of Vienna:

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## Notes

### **About Medical University Vienna, Center for Medical Physics & Biomedical Engineering**

Since more than two decades the Center of Medical Physics and Biomedical Engineering is one of the pioneers in the field of optical coherence tomography (OCT) with the vision to establish this technique as a high speed ultrahigh resolution volumetric imaging modality but with microscopic resolution enabling non- to minimally-invasive optical biopsy of (sub)cellular tissue microstructure and depth resolved tissue function. To further enhance resolution/contrast and tissue penetration of OCT, synergistic imaging modalities (multiphoton/ CARS microscopy / endoscopy, fluorescence lifetime imaging and photoacoustic imaging) are interfaced to state-of-the-art OCT technology to establish unprecedented multimodal imaging at the molecular, (sub)cellular, tissue biopsy, animal model (preclinical) and patient level in the field of regenerative medicine, neurosciences, cancer and ophthalmic diagnosis.

Contact details – as above.

### **DTU Fotonik, Technical University of Denmark**

The Department of Photonics Engineering at the Technical University of Denmark (DTU) has approximately 200 employees; outstanding fully equipped state-of-the-art photonics labs and access world-class cleanroom. Within light sources and biophotonics, the core competencies include development of light sources for biomedical optics, development and characterization of light sources for OCT including frequency swept sources, OCT system design and development, and clinical studies of OCT in dermatology and ophthalmology. DTU has long-standing relationships with local hospitals for clinical testing within dermatology (Roskilde

Hospital) and ophthalmology (Glostrup Copenhagen University). The role of DTU in FAMOS is to further develop compact, high-performance pump sources for Ti:S applications, develop and integrate sources into biomedical imaging system, including optical coherence tomography, coherent anti-Stokes Raman spectroscopy, multi-photon tomography and photoacoustic tomography. DTU will also lead the FAMOS dissemination.

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### **About Elforlight Ltd**

Elforlight Limited is a manufacturer of leading edge Diode Pumped Solid State Lasers. The Company's short pulse nanosecond lasers have found favor among researchers in the field of Optical Resolution Photo Acoustic Microscopy, enabling high resolution imaging in dermatology and ophthalmology. Elforlight also supplies high repetition rate UV lasers for MALDI-MSI (Matrix Assisted Laser Desorption Ionization Mass Spectrometry Imaging), greatly reducing the time required to acquire large area high resolution images mapping chemical distribution by molecular mass, for example in drug discovery and proteomics.

Further information about Elforlight is available on the Internet at <http://www.elforlight.com/> or by email to [info@elforlight.com](mailto:info@elforlight.com).

### **About EXALOS AG**

EXALOS is a technology driven Swiss company focusing on the design, development and sales of advanced light sources based on Superluminescent Light Emitting Diodes ("SLEDs") and Swept Laser Sources ("Swept Sources").

EXALOS' swept laser technology has the potential to radically impact the way lasers are used in Optical Coherence Tomography (OCT). The great flexibility of the laser with respect to center wavelength, sweep bandwidth and linewidth will impact the next generation of OCT-based medical instruments. Founded in 2003, EXALOS is today one of the key supplier for light sources in the field of optical coherence tomography. The company is headquartered in Schlieren, Switzerland with sales and support offices in USA, Switzerland and China. Further information about EXALOS is available on the Internet at <http://www.exalos.com/> or by email to [sales@exalos.com](mailto:sales@exalos.com)

### **About Ferdinand Braun Institut**

The Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH) researches electronic and optical components, modules and systems based on compound semiconductors. These devices are key enablers that address the needs of today's society in fields like communications, energy, health, and mobility. In optoelectronics, FBH develops light sources from the near infrared to the ultra-violet spectral range: high-power diode lasers with excellent beam quality, UV light sources and hybrid laser modules.

Applications range from medical technology, high-precision metrology, and sensors to optical communications in space. The FBH has a strong international reputation and ensures rapid transfer of technology by working closely with partners in industry and research. The institute has a staff of 250 employees and a budget of 22 million Euros.

Further information at <http://www.fbh-berlin.com>

#### **About Femtolasers Produktions GmbH**

Femtolasers is the world leading manufacturer of commercial ultra-fast laser systems generating very short light pulses that last only a couple of femtoseconds, i.e. one millionth of one billionth of a second. The Vienna-based company, founded in 1994 and globally represented by 19 distributors, uses highly innovative mirror technology to develop and produce very compact turn-key laser devices that serve a plethora of applications in the fields of spectroscopy, microscopy, biology, chemistry, medical imaging or quality assessment. Further information about FEMTOLASERS is available on the Internet at <http://www.femtolasers.com>.

#### **About the Institute for Biological and Medical Imaging (IBMI):**

The Institute for Biological and Medical Imaging (IBMI) is a joined research facility of the Helmholtz Zentrum München, German Research Center for Environmental Health, in close collaboration with the Technical University Munich (TUM). IBMI is a highly interdisciplinary institute with focus on the development of imaging technologies in basic research, pre-clinical research, drug discovery and in clinical applications. It employs about 70 scientists and engineers with focus on imaging technology development, image processing and reconstruction and the development and use of animal models for developing in-vivo imaging applications, with a view towards improving understanding on disease development and treatment and clinical translation.

Further information about IBMI is available on the Internet at <http://www.helmholtz-muenchen.de/en/ibmi//> or by email to [v.ntziachristos@tum.de](mailto:v.ntziachristos@tum.de)

#### **About Imagine Eyes SA:**

Imagine Eyes develops ophthalmic instruments that analyze the eye at the microscopic scale. Conceived from a revolutionary technology, adaptive optics, its products enable cellular-level retinal imaging, precision measurement of the eyes' refractive errors and vision simulation. Founded in 2003 and based in Orsay, France the maintains its position as a technology leader thanks to its intensive R&D program, broad portfolio of patents and the marketing of cutting-edge products that have been rapidly adopted by its customers.

Further information is available from Mark Zacharria, Head of Global Communications, +33 (0)1 64 86 15 66 or by email at <http://www.imagine-eyes.com/contact/>

**About InnoLas Laser GmbH:**

InnoLas Laser GmbH (INL) was founded in 1995 and develops and manufactures highest quality laser sources for scientific and industrial applications. It is one of very few laser manufacturers worldwide with the ability to develop specialized laser technology for all pulsed YAG lasers.

The company has around 30 employees, with 8 working on research and development. In the field of lasers for research, InnoLas delivers systems that are exactly tailored to their applications. The lasers are either diode- or flash lamp pumped, with repetition rates from 1Hz up to 1kHz, and pulse energies from a few millijoules to several joules. Further information is available at [www.innolas.com](http://www.innolas.com)

**About iThera Medical GmbH**

iThera Medical develops and markets a novel in vivo biomedical imaging technology, "MSOT" = multispectral optoacoustic tomography. MSOT utilizes the photoacoustic effect to visualize and quantify anatomical, functional and molecular information, in deep tissue and in real time. Today, MSOT allows the study of disease processes on a molecular level as well as the analysis of pharmacokinetic properties for new substances in small animals. For the future, MSOT also promises to become a valuable tool for clinical diagnostics. The company is headquartered in Munich, Germany with sales and support offices in Lancaster, UK and Connecticut, USA. Further information about iThera Medical is available on the Internet at <http://www.ithera-medical.com/> or by email to [info@ithera-medical.com](mailto:info@ithera-medical.com)

**About Jenlab GmbH:**

JenLab GmbH is a technology provider in the field of clinical multiphoton tomography for skin cancer detection and *in vivo* intra-tissue drug screening as well as in the field of femtosecond laser nanoprocessing in life sciences. The company was founded as high-tech spin-off of the Friedrich Schiller University Jena in 1999 in Jena (Germany) by a biophysicist, a chemist, an engineer, and a professor of medicine. JenLab has offices in Jena and Saarbrücken in Germany. Further information is at <http://jenlab.de>

**About Michelson Diagnostics Ltd:**

Michelson Diagnostics is a rapidly growing medical device company which has developed and brought to market a scanning device used to improve and accelerate care for patients suffering from non-melanoma skin cancer. Michelson Diagnostics' core product – the VivoSight<sup>™</sup> OCT scanner – is used by dermatologists to see below the surface of the patient's skin, allowing them to gather additional information about their patient's condition, and is the first of its kind available to dermatologists. Founded in 2006, Michelson Diagnostics designs highly innovative instruments using multi-beam optical coherence tomography solutions. The company is headquartered in Kent, England with sales and support offices in Munich, Germany and Massachusetts, USA.

Further information about Michelson Diagnostics is available at <http://www.md-ltd.co.uk/> or +44(0)208 308 1695, by email to [ola.olarimi@md-ltd.co.uk](mailto:ola.olarimi@md-ltd.co.uk).

### **About NKT Photonics A/S**

NKT Photonics A/S is the result of a merger in 2009 between Crystal Fibre A/S – the largest commercial supplier of microstructured specialty fiber and Koheras A/S – the leading company within ultra precise fiber lasers and SuperK Supercontinuum White Light Lasers. We focus on commercial optical solutions that simplify the value chain and bring enhancement for the end-customer. Our vision is to continuously increase the functionality embedded in the fiber and thereby provide robust and simplified system architectures for our customers.

The company is headquartered close to Copenhagen, Denmark with sales and support offices in Germany, France and USA.

Further information about NKT Photonics is available at [www.nktphotonics.com](http://www.nktphotonics.com) or by email to [general\\_enquiry@nktphotonics.com](mailto:general_enquiry@nktphotonics.com)

### **About University College London (UCL)**

UCL is one of the UK's leading multidisciplinary universities with a long tradition of internationally renowned research expertise (its academics and graduates have won 18 Nobel Prizes) across the physical, engineering, clinical and life sciences. The UCL Photoacoustic Imaging Group is based in the Department of Medical Physics and Bioengineering and has over a decade of experience in the development and application of biomedical photoacoustic imaging techniques. The group's research encompasses non invasive and endoscopic imaging devices, modelling optical and acoustic wave propagation in tissue, image reconstruction methods, quantitative spectroscopy and the preclinical and clinical application of the technique. It pioneered the award winning Fabry Perot based photoacoustic scanner and was responsible for the development of a widely used open source photoacoustic signal modelling and image reconstruction Matlab toolbox ("k-wave"). Further information can be found at <http://medphys.ucl.ac.uk/research/mle/>

### **About University of St Andrews:**

The University of St Andrews is Scotland's first university and the third oldest in the English speaking world, founded in 1413. Over six centuries, it has established a reputation as one of Europe's leading and most distinctive centres for teaching and research. The School of Physics and Astronomy has an internationally recognised and vibrant set of research programmes including one in photonics. We benefit from strong activities in biophotonics and that the School of Medicine is adjacent (and linked) to the School of Physics and Astronomy. The St Andrews team have pioneered new routes for shaping light and its use in manipulation and imaging over the last decade. Further information may be found at <http://photon.st-andrews.ac.uk/manipulation/>

**About Weizmann Institute of Science:**

The Weizmann Institute of Science in Rehovot, Israel, is one of the world's top-ranking multidisciplinary research institutions. Noted for its wide-ranging exploration of the natural and exact sciences, the Institute is home to 2,600 scientists, students, technicians and supporting staff. WIS research covers modern molecular biology, mathematics and computer science, physics and chemistry. Further information at [www.weizmann.ac.il](http://www.weizmann.ac.il)

**About XVUE Ltd:**

XVUE is a privately owned company established in early 2004. The company's main focus is the development of innovative imaging and image processing platforms and their application to the fields of medical imaging and in broadcasting. The company attains significant R&D experience in image processing, image reconstruction, signal processing, acquisition and video processing using Matrox Hardware and GPU co-processing. Xvue is based in Artemis, near Athens Greece and is active in three continents, including Europe, with major countries of interest being Norway, Germany, the Netherlands, Mexico, Malaysia and the Middle East countries. More information about Xvue on the web at [www.xvue.com](http://www.xvue.com).