BIOMEDICAL TECHNOLOGY
ΒΙΟΑΤΡΙΚΗ ΤΕΧΝΟΛΟΓΙΑ

Vasilis Ntziachristos

IBMI :Institute for Biological and Medical Imaging

CBI :Chair for Biological Imaging

Technische Universität München & Helmholtz Zentrum München

HelmholtzZentrum münchen
German Research Center for Environmental Health

Technology driven Medicine

Medical Devices - Artificial Intelligence

Technology driven Medicine

Ποιος κανει αυτα τα μηχανηματα και μεθόδους?
Πως αποφασιζει καποιος τι να κάνει?

TECHNOLOGY DEVELOPMENT

ANIMAL — HUMAN

First MSOT small animal prototype

2nd-Gen. Small Animal MSOT

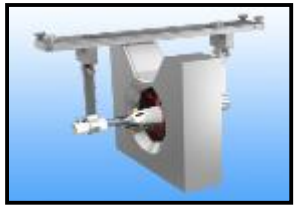
First Prototype Clinical system

Handheld MSOT - US Clinical System

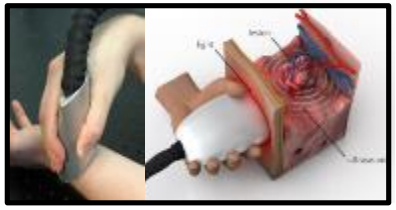
Mesoscopic RSOM Prototype

2010	2011	2012	2013	2014	2015	2016
64 channels 10 Hz laser 10 sec. tuning	256-512 channels 10 Hz laser 10 sec. tuning		256-512 channels 100 Hz laser 10 sec. tuning	256-512 channels 100 Hz laser 0.1 sec. tuning		

MSOT



hMSOT



German Innovation Award

Der Deutsche Innovationspreis

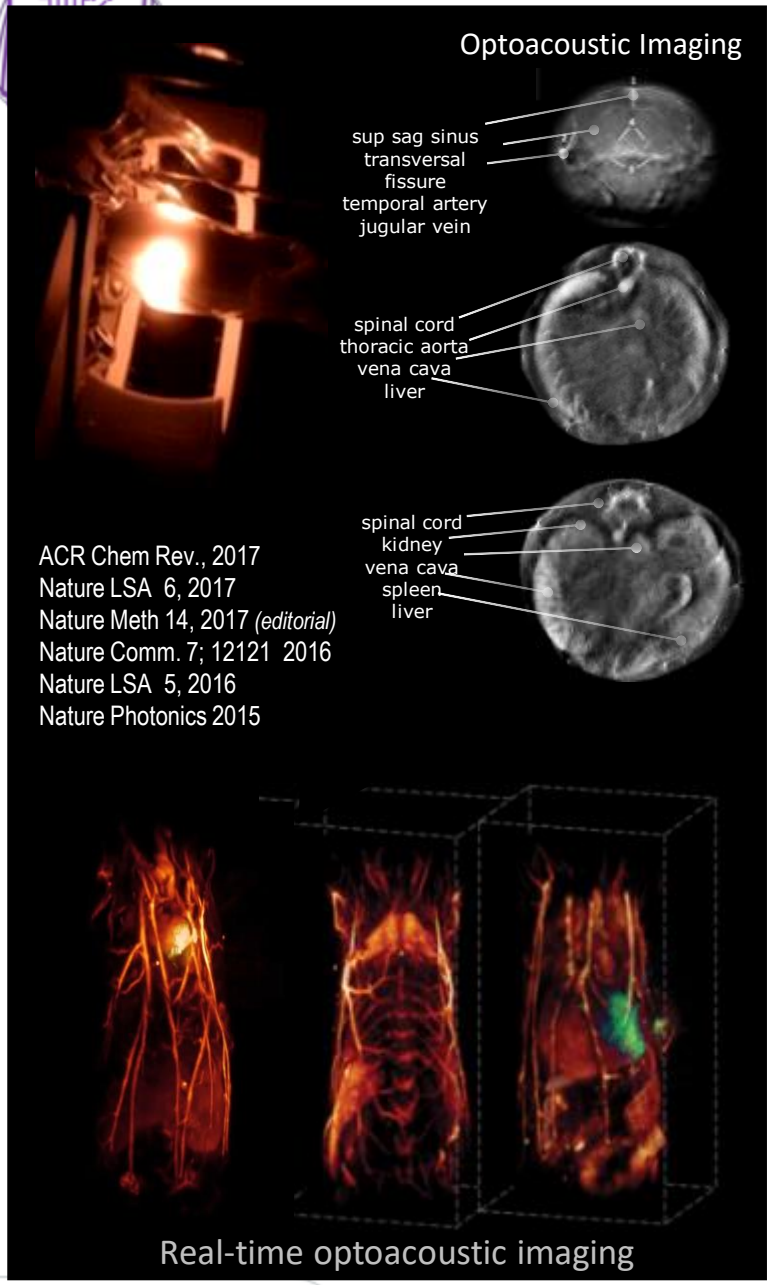
Preisträger 2014

hRSOM

GLOBAL PLACEMENT

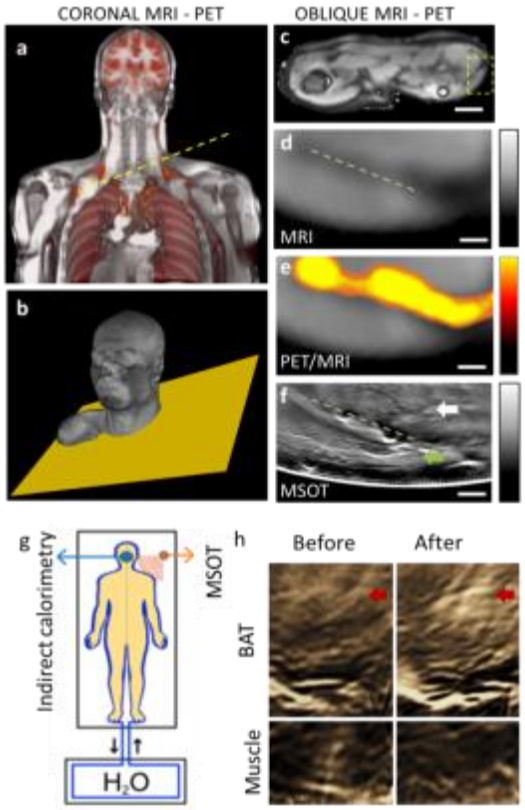
iTheraMedical

SMALL ANIMAL IMAGING



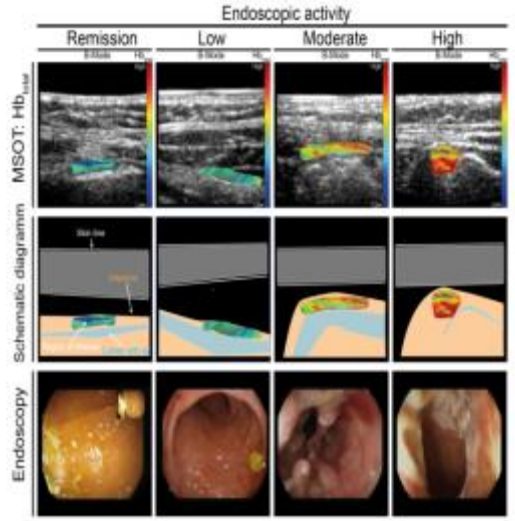
ACR Chem Rev., 2017
Nature LSA 6, 2017
Nature Meth 14, 2017 *(editorial)*
Nature Comm. 7; 12121 2016
Nature LSA 5, 2016
Nature Photonics 2015

IMAGING METABOLISM



Cell Metabolism 27(3):689-701 2018
Cell doi: j.cell.2018.10.016 2018

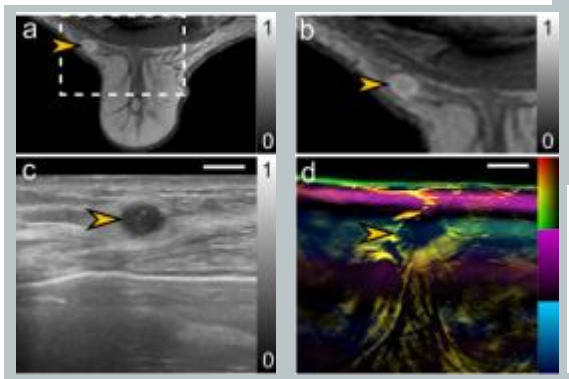
IMAGING INFLAMMATION

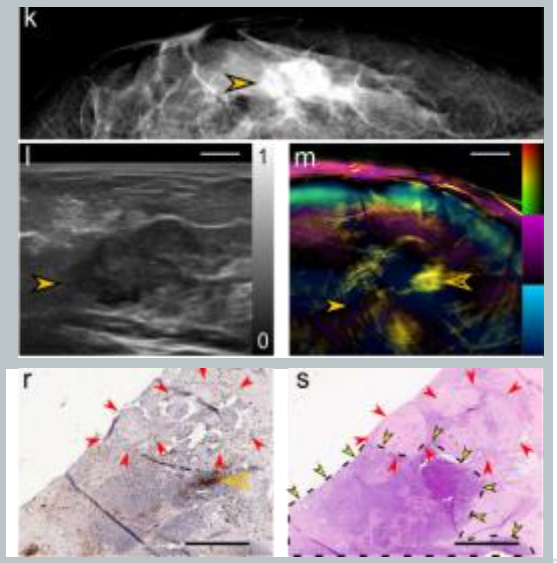


New England J. of Medicine 376:129 2017
Nature Medicine in press (2019)

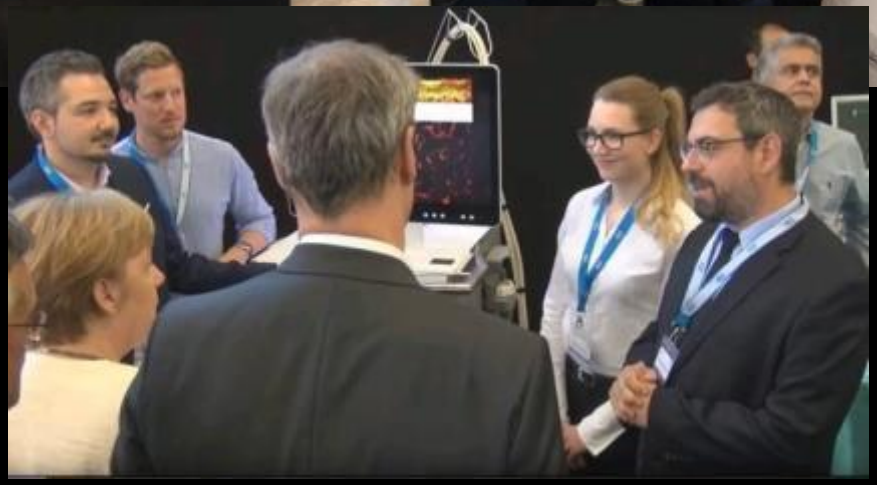
BREAST CANCER IMAGING

Clin Cancer Res 23:6912 (2017)






MSRM
Acuity



Munich School of BioEngineering

Munich School of BioEngineering

People

Steering Committee

Prof. Dr. Franz Pfeiffer
Profile
Chair

Prof. Dr. Axel Haase
Profile
GSB

Prof. Dr. Vasilis Ntziachristos
Profile
Chair

Prof. Dr. Andreas Herkersdorf
Profile
Chair

Prof. Dr. Markus Schwaiger
Profile
Chair (deutsch)

Prof. Dr. Andreas Bausch
Profile
Chair

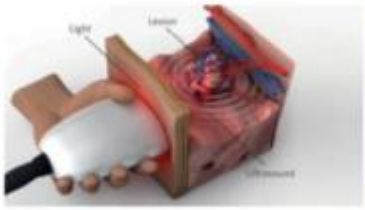
Microscopy and Biomedical Imaging

This research area focuses on creating novel microscopy and imaging methods and concepts in obtaining biological information from bio-sensing and biomedical imaging approaches, including bio-analytics, proteomics, visible light, x-ray, magnetic resonance, nuclear medicine, electron, and ultrasound imaging.

The following selected research topics list some examples of current activities that are pursued by the MSB principal investigators.

Biomedical Imaging

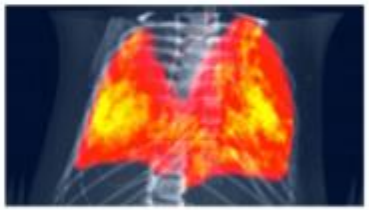
BIOLOGICAL AND OPTICAL IMAGING



PI Vasilis Ntziachristos

Optoacoustic imaging, or photoacoustic imaging, is insensitive to photon scattering within biological tissue and, unlike conventional optical imaging methods, and makes high-resolution optical visualization deep within tissue possible. Recent advances in laser technology, detection strategies and inversion techniques have led to significant improvements in the capabilities of optoacoustic systems. A key empowering feature - pioneered at TUM - is the development of video-rate multispectral imaging in two and three dimensions, which offers fast, spectral differentiation of distinct photo-absorbing modalities.

PHASE-CONTRAST X-RAY IMAGING



PI Franz Pfeiffer

The basic physics principles of x-ray image formation in radiology have remained essentially unchanged since Röntgen first discovered x-rays over a hundred years ago. The conventional approach relies on x-ray attenuation as the sole source of contrast and ignores another, complementary source of contrast. Phase-contrast imaging techniques, on the other hand, offer ways to augment or complement standard attenuation contrast by incorporating phase information. In the recent past several developments have been made that now allow translating x-ray phase-contrast to future clinical applications in radiography and computed tomography.

TranslaTUM
Technical University of Munich

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TranslaTUM - May 2017
Image: A. Heddergott

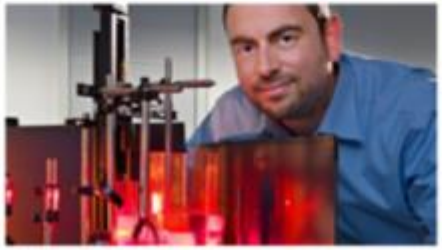
TranslaTUM

Center for Translational Cancer Research (TranslaTUM)

At the university hospital Klinikum rechts der Isar, TUM is creating a center for translational research in oncology that is unparalleled in Germany. The Center is located in close proximity to the university hospital, supporting rapid translation of novel knowledge and technology into patient care. TranslaTUM is operational since September 2017.

OVERCOMING DISCIPLINARY BORDERS TO FIGHT CANCER

Biological Imaging



Ntziachristos develops new imaging technology for medicine and life sciences.
Image: A. Heddergott

Immune signals and cancer

Ruland's research focuses on the signaling processes in the immune system.
Image: A. Heddergott

Der Spezialist für Bilder

Süddeutsche Zeitung
SZ.de Zeitung Magazin

Vasilis Ntziachristos macht Aufnahmen aus dem Körperinneren. (Foto: Stephan Rumpf)

Vasilis Ntziachristos macht Aufnahmen aus dem Körperinneren

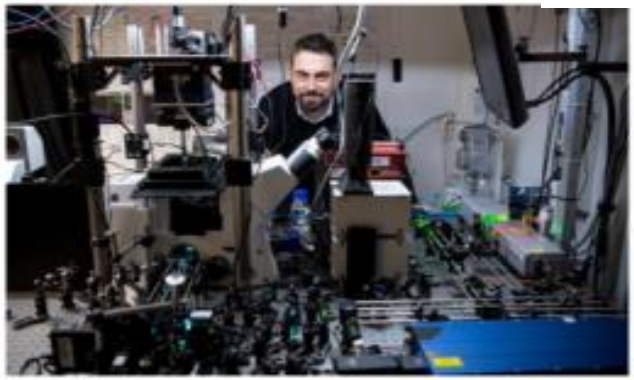
Die Bilder wirken wie Gemälde, wie Kompositionen aus Linien und Klecksen, und solange man verdrängt, was sie darstellen, sind sie durchaus schön. Tatsächlich zeigen die Bilder, die Vasilis Ntziachristos in sein Büro gehängt hat, Krebsgeschwüre. Es sind

FOCUS ONLINE

Politik Finanzen Wissen Gesundheit Kultur Panorama Sport Digital Reisen

Optoakustik

Neue Methode soll tiefer gehende Diagnosen ermöglichen



Optoakustik - Vasilis Ntziachristos

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transforming discovery

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Engineering & Metabolism

The Directors' View - Listen to our podcast

HPC – VORENTWURF, Mai 2018 Perspektive Gaborplatz

Enabling Technologies Center

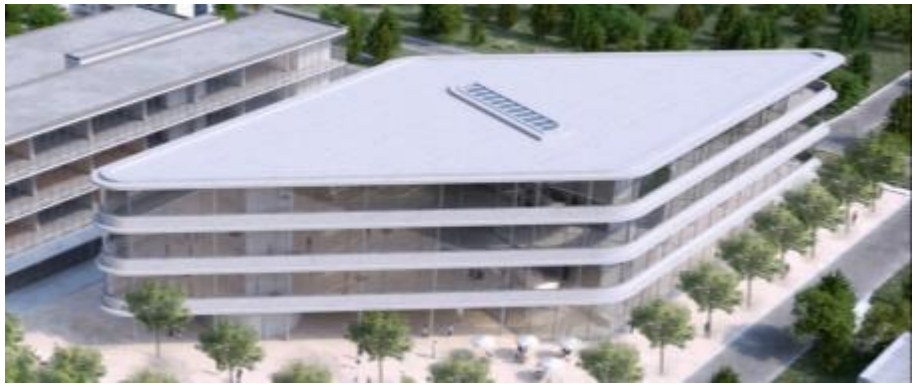
New culture

…..got funde

New Culture – Bringing Engineering as the driver of Medicine

Munich School of Bioengineering

Helmholtz Pioneer Campus



TranslaTUM

Enabling Technologies Center

Institute / Chair for Biological and Medical Imaging

Impact lives – stay healthy

BIOLOGY

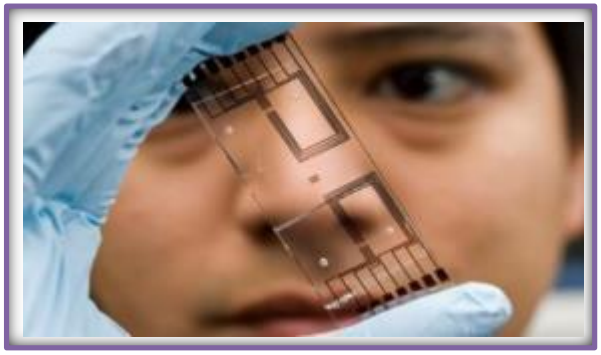
Discovery - Knowledge

+

Problem Solving

Bioengineering

Convert Discovery to Address Clinical Need



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Solutions in Medicine

Earlier Diagnostics

Better treatments