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MEDVIZ FROM VISION TO DECISION

# NEWSLETTER

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## Dear MedViz Supporter

**In the current issue, the main headliner is a short presentation of the new, external funded MedViz project u-MEDICATE+, financed by the Norwegian Cancer Society, ensuring a Career Development Research Fellowship to Dr. Spiros Kotopoulis. You can also be updated on upcoming events and read an interview with Professor Martin Biermann, Center for Nuclear Medicine / PET, Radiology Dept., HUH.**

## Interview with Professor Martin Biermann

Martin Biermann grew up in Recklinghausen in Nordrhein-Westfalen (Germany) with a population of approximately 120 000, a middle age city from 1236. -I took my MD at Münster University in 1993, entitled "Die Reproduzierbarkeit des kardialen elektrophysiologishen Mappings". I had previously programmed electronic calculators; in the context of my MD Thesis I took up programming seriously. Using Turbo Pascal under DOS 5.0 I rewrote the electrophysiology mapping program that we had got from the University of Maastricht in the matter of one week. My supervisor Professor Günter Breithardt was very surprised about this, but so was I, Martin tells.

-Shortly after joining Breithardt at the Cardiology Department in Münster, I got the opportunity to work with Professor Douglas P. Zipes in USA at the Krannert Institute of Cardiology in Indianapolis/IN. My task was to establish up optical electrophysiological mapping of isolated animal hearts. After two years I succeeded, but then I had built and programmed the optical system – hardware and software – from the ground up. The system was in use until recently. The life style was very American, and I added some 10 kg in body weight which took me years to get rid of. Due to increasing skin problems I concluded that a career in invasive medicine was not smart for me, and Günter Breithardt helped me to get a new job at the Department of Nuclear Medicine at the University of Münster, Professor Biermann explains.

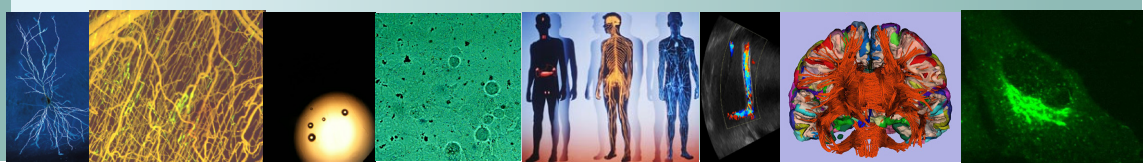
Read the interview with Biermann

## MedViz has got external funding (!)

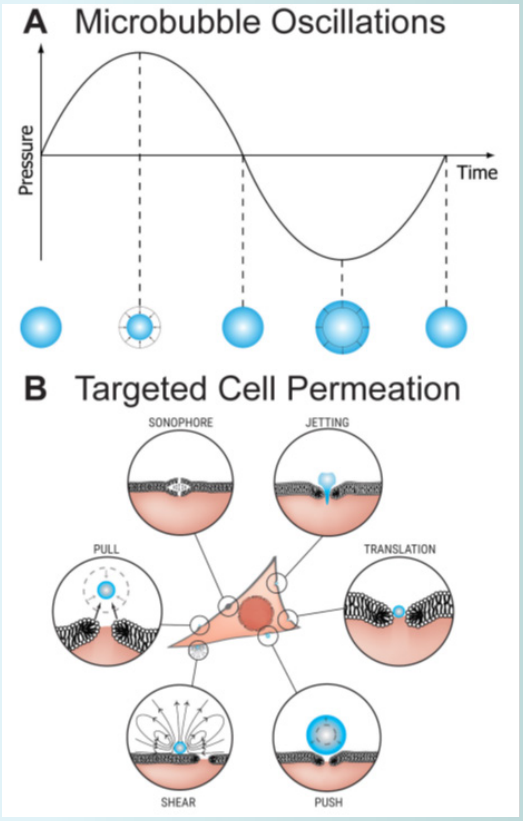
As a spin-off from one of our MedViz Lighthouse projects Multimodal imaging and ultrasound microbubble drug delivery in targeted cancer therapy, managed by Professor Bjørn Tore Gjertsen, the Norwegian Cancer Society has allocated a Career Development Research Fellowship for three years to postdoc Spiros Kotopoulis. MedViz is also contributing with internal funding to this young and talented researcher at Section for Gastroenterology, Haukeland University Hospital. Spiros Kotopoulis' new project, entitled u-MEDICATE+: Ultrasound-Mediated Cancer Therapy, is primarily aimed at understanding and improving a novel cancer treatment technique known as sonoporation. In close cooperation with Dr. Kotopoulis and Professor Gjertsen, the other internal project partners are Professor Emmet McCormack, Department of Clinical Sciences, Professor Odd Helge Gilja, National Center for Ultrasound in Gastroenterology, HUH, Professor Anders Molven, Department of Pathology, HUH and Professor Kamal Babikeir Eln Mustafa, Department of Clinical Dentistry, UiB.

*Postdoc Spiros Kotopoulis in the microbubble lab.*

cmr HELSE BERGEN Haukeland University Hospital



The external partners, Asc. Professor Albert Poortinga, Eindhoven University and Dr. Yrr Asbjørg Mørch, SINTEF will contribute with antibubble and microbubble formulation expertise.




The project aims to usher in a new era for ultrasound-guided drug delivery and pre-clinical tumour modeling. Specifically a first-in-kind theranostic vector "the antibubble" that allows large-payload targeted drug-delivery will be realised. The molecular impact and the optimal ultrasound conditions for sonoporation will be elucidated and a 4D perfused in-vitro organoid PDAC tumour model will be brought into reality where the effect of sonoporation on tumour microstructure will be evaluated

Despite significant advancements in the fight against cancer, it remains a challenging medical problem, particularly in the lungs, liver, prostate, and brain. To date, systemic chemotherapy is a common approach to the treatment of cancer in patients. However, systemic toxicity is a major drawback, limiting the utility and effectiveness of chemotherapeutics. For many forms of cancer, where surgery is rarely an option there has been little change to no change in the survivability, and in some cases, like pancreatic cancer, even the best treatment option is considered palliative. Recent research efforts in the development of drug delivery systems have concentrated on targeted delivery and controlled release of the drug or other agents in the tumour in order to increase the therapeutic efficacy. SONOPORATION is the use of ultrasound and microbubblesto invoke biomechanical effects that increase the permeability of cells in a non-destructive mannerand to release a drug in a specific location, i.e., the tumour (Fig. 1). Therefore instead of continuouslyattempting to create new drugs, sonoporation can make use of existing therapeutic vectors targeting them to the affected part of the body.

*Figure 1. Sonoporation principle, by Spiros Kotopoulis.*

**Objectives in the u-MEDICATE+ project:**

1. **Develop a novel microbubble architecture -the antibubble- optimized for sonoporation-mediated therapy**
2. **High-throughput screening of sonoporation conditions, microbubbles, and molecular signatures for maximum therapeutic efficacy in vitro**
3. **Generation and determination of sonoporation efficacy in human PDAC organoid models**

The project will be administered by MedViz and Spiros will continue to be employed at National Center for Ultrasound in Gastroenterology, Medical Dept., HUH. We wish Spiros the best of luck with the new project!

# Upcoming events

**Geilo Winter School in Scientific Visualization, January 17 – 22, 2016.**
**http://www.sintef.no/projectweb/geilowinterschool/**

**Workshop on Computational Medicine, January 18 – 19, 2016 at Bergen University College**
**http://workshop2016.computationalmedicine.no**

**MedViz Seminar: Innovations in the MedViz Consortium and in Oslo Medtech, February 12**
**http://www.medviz.uib.no/**

**2nd Symposium of Bridging Nordic Imaging and the 1st Cellular Imaging workshop in Gothenburg, Sweden, April 14 – 15, 2016.**
**http://ccigothenburg.com/**

**MedViz and VCBM joint Conference, Bergen, September 7 – 9, 2016**
**http://medvizvcbm.uib.no/**
**Facebook event: https://www.facebook.com/events/770818463024537/**
**Facebook page: https://www.facebook.com/medvizvcbm/ (like it!)**

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