

## **GEORGE J. TSEREVELAKIS, Ph.D.**

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### **EDUCATION AND RESEARCH**

#### **Foundation for Research and Technology – Hellas, Institute of Electronic Structure and Laser, Optical Biomedical Imaging Laboratory**

- Postdoctoral Fellow with Dr. Giannis Zacharakis, Jan. 2015 – Present

Project 1: Development of a time domain photoacoustic microscopy system integrated with optical imaging modalities into a single instrument

Project 2: Development of a multimodal photoacoustic tomography imaging system (setup and reconstruction algorithms) combined with optical imaging methods

Project 3: Applications of photoacoustic imaging in biomedical research and cultural heritage items diagnostics

Project 4: Development of a multi-parametric label-free imaging system for the early diagnosis of neurodegenerative disorders through the ocular cavity

Project 5: Development of spectroscopic and optoacoustic sensors for biomarker monitoring in the infrared

#### **Technical University of Munich, Germany / Institute of Biological and Medical Imaging (IBMI)**

- Postdoctoral Fellow with Prof. Vasilis Ntziachristos, Jan. 2013 – Dec. 2014

Project 1: Development of a five-modal, label-free hybrid microscope integrating multiphoton imaging techniques (two-photon excitation fluorescence, second and third harmonic generation) with photoacoustic microscopy and photoacoustic mesoscopy modalities for multi-scale imaging

Project 2: Development and optimization of a frequency domain photoacoustic microscope using modulated CW laser sources for biomedical applications

#### **Department of Physics, University of Crete, Heraklion, Greece / Foundation for Research and Technology – Hellas, Institute of Electronic Structure and Laser, Non-linear Imaging Laboratory**

- Ph.D. in Physics supervised by Prof. Costas Fotakis, Apr. 2013

Thesis: “*Non-linear optical procedures for the diagnostics and processing of biological samples by using ultra-short laser pulses*”

Project 1: Optimization and further development of a multiphoton microscope (2-photon excitation fluorescence, second and third harmonic generation)

Project 2: Integration of a nanosurgery sub-system for the in-vivo processing of microscopic biological specimens

Project 3: Application of multiphoton techniques in open issues in biomedical research (embryogenesis, aging processes and IVF)

Project 4: Non-biomedical applications of multiphoton techniques in cultural heritage diagnostics and laser-polymer interactions

### **Department of Medicine, University of Crete, Heraklion, Greece**

- M.Sc. in Optics and Vision, Dec. 2008

### **Department of Physics, University of Crete, Heraklion, Greece**

- B.Sc. in Physics, Nov. 2006 (Grade: 7.29 / 10)

## **REFERENCES**

Prof. Costas Fotakis  
Professor of the Physics Department  
of the University of Crete  
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## **PARTICIPATION IN RESEARCH PROGRAMS**

1. **Transfer of Knowledge Marie Curie project NOLIMBA** “Non Linear imaging at microscopic level for biological applications” (2006-2010).
2. **Large scale Integrated project (IP) FAST-DOT** “Compact Ultrafast laser sources based on novel quantum dot structure” (2008-2012).
3. **Laserlab Europe** “The integrated initiative of European Laser Research Infrastructures” (2015-).
4. **THALIS Grant “Minos”** with Biomedical Sciences Research Centre Alexander Fleming (2013-2015).
5. **ESPA Excellence Grant** “Skin-DOctor” (2012-2015).
6. **FP7 E.U. ITN “OILTEBIA”** (2013-2017).
7. **ESPA BIOIMAGING-GR** “A Greek Research Infrastructure for Visualizing & Monitoring Fundamental Biological Processes” (2017-).
8. **POLITEIA - KRIPIS II** “Culture-Technology: New technologies in research, study, documentation and accessibility in the information of items and monuments of cultural heritage” (2017- ).
9. **ESPA EPAnEK** “Competitiveness, Entrepreneurship & Innovation” (2018-).

## **SCHOLARSHIPS**

1. Scholarship from the Department of Medicine, University of Crete during M.Sc. studies (2007-2008).
2. Scholarship “Heraclitus II – University of Crete”, funded by the European Social Fund and national resources during Ph.D. studies (2010-2013).
3. Scholarship ARCHERS (Advancing Young Researchers’ Human Capital in Cutting Edge Technologies in the Preservation of Cultural Heritage and the Tackling of Societal Challenges) funded by Stavros Niarchos Foundation (2017-2018).

## **AWARDS AND DISTINCTIONS**

1. M.Sc. studentship awarded from the Department of Medicine, University of Crete for excellent performance in the first year of M.Sc. studies. (2007-2008).

2. Best oral presentation (1st place) for the paper “Imaging C. Elegans embryogenesis by third harmonic generation microscopy”, International Student Workshop on Laser Applications 2011, Bran, Romania.

## **PRESENTATIONS**

1. Cell division stage in C. elegans imaged using third harmonic generation microscopy (poster presentation) International summer school in ultrafast nonlinear optics 2010, Heriot-Watt University, Edinburgh, Scotland (2010).
2. Femtosecond laser nanosurgery experiments on HeLa cancer cells (poster presentation) Annual meeting of Photonics 4 life, FORTH, Heraklion, Greece (2011).
3. Imaging C. Elegans embryogenesis by third harmonic generation microscopy (oral presentation), International Student Workshop on Laser Applications 2011, Bran, Romania (2011).
4. Hybrid photoacoustic and confocal laser scanning microscopy on the investigation of ciliary body anatomy (oral presentation), 2nd Imaging Technology Summer Workshop of the ESMI- TOPIM TECH, Chania, Greece (2017).
5. Combined photoacoustic and optical microscopy for the detailed description of ciliary body anatomy (oral presentation), PHOTONICA Conference, Belgrade, Serbia (2017).
6. Optical resolution photoacoustic microscopy for the study of craniosynostosis in mouse models (poster presentation), European Molecular Imaging Meeting, San Sebastian, Spain (2018).
7. Listening to laser light interactions with objects of art: A novel photoacoustic diagnosis approach (oral presentation), Stavros Niarchos Foundation – FORTH seminar, Heraklion, Greece (2018).
8. Photoacoustic imaging in Cultural Heritage diagnostics (oral presentation), OPTO-CH workshop, Heraklion, Greece (2018).

## **JOURNALS REFEREED**

I have served as a referee in the following peer-reviewed journals: Micron, Journal of Biomedical Optics, Biomedical Optics Express, Applied Physics A, Ultrasonics, International Journal of Thermophysics, Optical and Quantum Electronics, Sensing and Imaging. I have additionally served as an external reviewer for the evaluation of Advanced ERC grant proposals.

## **SUPERVISORY EXPERIENCE**

1. “Femtosecond laser nanosurgery of subcellular structures in HeLa cells by employing Third Harmonic Generation imaging modality as diagnostic tool”, E. Gavgiotaki, Diploma Thesis, Physics Department, University of Crete, 09/2011 (scientific advisor).
2. “Third Harmonic Generation imaging as a diagnostic tool for the pre-implantation mouse embryo development”, A. Kleovoulou, Diploma Thesis, Physics Department, University of Crete, 09/2011 (scientific advisor).
3. “Identification of sub-cellular structures in *C. Elegans* nematode using Third Harmonic Generation microscopy”, B. Petanidou, Diploma Thesis, Physics Department, University of Crete, 04/2013 (scientific advisor).
4. “Applying photoacoustic microscopy for the detection of underdrawings in paintings”, I. Vrouvaki, Diploma Thesis, Chemistry Department, University of Crete, 06/2016 (scientific advisor).
5. “Structural evaluation of animal ocular models by means of photoacoustic microscopy”, S. Avtzi, Master Thesis, Medical School, University of Crete, 11/2016 (member of the scientific supervision committee).
6. “A photoacoustic imaging methodology for the characterization of contact lenses”, M. Tsagkaraki, Master Thesis, Medical School, University of Crete, 02/2017 (member of the scientific supervision committee).
7. “Exploitation of non-linear effects for the discrimination of absorbers in optical resolution photoacoustic microscopy using single wavelength excitation”, K. Lemonaki, Master Thesis, Physics Department, University of Crete, 09/2017 (scientific advisor).
8. “Hybrid photoacoustic and fluorescence microscopy for in-vivo observations”, A. Ntalopoulos, Master Thesis, Physics Department, University of Crete, 09/2018 (scientific advisor).
9. “Development of a photoacoustic monitoring system for the study of laser ablation processes upon the removal of encrustation from stonework”, A. Papanikolaou, Master Thesis, Physics Department, University of Crete, 09/2018, (scientific advisor).
10. “Investigation of ocular melanoma biopsy specimens using combined photoacoustic and optical microscopy” E. Karamouzi, Diploma Thesis, Chemistry Department, University of Crete, 2018-ongoing (scientific advisor).
11. “Development of a multiparametric label-free imaging system for the early diagnosis of neurodegenerative disorders through the ocular cavity”, K. Mavrakis, PhD Thesis, Department of materials science and technology, University of Crete, 2018-ongoing (scientific advisor).
12. “Development of spectroscopic and optoacoustic techniques for biomarker monitoring in the infrared”, M. Orfanakis, PhD Thesis, Medical School, University of Crete, 2018-ongoing (scientific advisor).

## **TEACHING EXPERIENCE**

1. Visiting Professor in the Biology Department of the University of Crete (2018-2019) for the undergraduate courses: a) “Essential bioimaging techniques” (Fall semester), b) Physical Chemistry (Spring semester).
2. Lecturer in the 2<sup>nd</sup> Biophotonics and Molecular Imaging Summer School, Heraklion Crete, Greece (27/7 – 31/7/2015).
3. Laboratory instructor in the undergraduate course “Laboratory of laser and modern optics”, Department of Physics, University of Crete (2009-2013, 2015-today).
4. Teaching assistant in the undergraduate course “Physics Laboratory II- Electromagnetism”, Department of Physics, University of Crete (2006).
5. Teaching assistant in the undergraduate course “Introduction to Programming – Fortran”, Department of Materials Science and Technology, University of Crete (2005).
6. Teaching assistant in the undergraduate course “Introduction to Computers”, Department of Physics, University of Crete (2003).