

Curriculum Vitae

October 2018

Personal Information

Name/title: **Gavgiotaki Evangelia**

Address: Sgouromalini 34, Heraklion Greece.

Nationality: Greek, Canadian

Cell phone: +30 6982078091

E-mail address: evagavgiotaki@iesl.forth.gr , e.gavgiotaki@med.uoc.gr

Birth date/location: 1989-03-24 Chania, Greece

Education

06/2014- **PhD candidate**, School of Medicine, University of Crete
PhD thesis "Discrimination of breast cancer cells by utilizing non-linear microscopy techniques."

09/2011 - 03/2014 **MSc. in Optoelectronics - Microelectronics**,
Department of Physics, University of Crete
Master thesis: "Determination of lipid depositions via the realization of non-linear imaging measurements and correlation of the data with specific biological processes of various samples."

09/2006- 11/2011 **BSc. in Physics, Department of Physics, University of Crete**

10/2010-10/2011 **Bachelor thesis:** "Femtosecond laser nanosurgery of sub-cellular structures in HeLa cells by employing Third Harmonic Generation imaging modality as diagnostic tool."

Research Experience

- Non-linear imaging (Second and Third Harmonic Generation, Multi Photon Excitation Fluorescence) at microscopic level for biological applications
- Nanosurgery of biological specimens by using ultra-short laser pulses
- Raman Spectroscopy in biological samples
- Fourier Transform Infrared (FTIR) Spectroscopy in biological samples
- Polarization Resolved Second and Third Harmonic Generation measurements
- Manipulation of biological samples (cells, tissues , model organisms)
- Scanning Electron microscopy in biological samples (preparation, fixation of samples)

Scholarships

- **Stavros Niarchos Foundation** - FORTH /ARCHERS: Advancing Young Researchers' Human Capital in Cutting Edge Technologies in the Preservation of Cultural Heritage and the Tackling of Societal Challenges June 2017
- State Scholarships Foundation/ **IKY**- Greece in Health Science April 2017

Research Career Summary

My research interests and expertise are focused on the application of various spectroscopic and imaging techniques with emphasis on advanced microscopic modalities in biomedicine. I have already obtained significant laboratory experience working with laser scanning microscopes on a wide range of linear and non-linear imaging techniques and I have acquired a passion for the biomedical photonics science.

My Bachelor thesis was related to femtosecond laser nanosurgery of sub-cellular organelles in HeLa cells by employing Third Harmonic Generation (THG) as diagnostic tool for the identification of their structures [1]. Later on, during my MSc thesis, I worked on the quantitative determination of lipid depositions in BV2 cells (microglia brain cells) during activation by employing non-linear imaging modalities. The activation of microglial cells is significant as related with brain diseases such as Alzheimer's, schizophrenia and Parkinson's diseases [2].

My PhD thesis was focused on the study of breast cancer by developing non-invasive, new microscopic techniques [4]. Quantitative discrimination of the different subtypes of human breast cancer cell lines was achieved as compared to peripheral blood mononuclear cells (PBMCs) based on their lipid content. These results combined with Fourier Transform Infrared (FTIR) spectroscopy and provided additional valuable chemical information on breast cancer cells, correlating THG signal to lipid drafts [5].

Furthermore, I have worked on the detection of mouse T cells activation achieved by using THG imaging in an attempt to follow the immune response development. THG signal was correlated with Raman Spectroscopy and implemented during T cell activation in the presence of higher concentration of cholesterol and lipids [6]. Finally, non-linear microscopy techniques were used as novel digital pathology methods in human breast cancer tissues. This work has a significant clinical potential since it can monitor quantitative changes in cellular behavior in healthy and pathological human tissues [7].

In a different and very intriguing field, I have contributed in research focused on polarization sensitive second harmonic generation measurements that can quantitatively discriminate aged from fresh starch based glues, used for conservation or restoration of painted artworks or papers and books of cultural heritage [3].

Publications

- 1) G.J Tservelakis, S. Psycharakis, B. Resan, F. Brunner, **E. Gavgiotaki**, K. Weingarten, G. Filippidis "Femtosecond laser nanosurgery of sub-cellular structures in HeLa cells by employing Third Harmonic Generation imaging modality as diagnostic tool" *Journal of Biophotonics* **5**: 200-207 (2012)
- 2) **E. Gavgiotaki**, G. Filippidis, M. Kalognomou, A.A. Tsouko, I. Skordos, C. Fotakis, I Athanassakis "Third Harmonic Generation microscopy as a reliable diagnostic tool for evaluating lipid body modification during cell activation: the example of BV-2 microglia cells" *Journal of Structural Biology* **189** 105–113 (2015)
- 3) S. Psilodimitrakopoulos, **E. Gavgiotaki**, K. Melessanaki, V. Tsafas and G. Filippidis "Polarization Second Harmonic Generation Discriminates Between Fresh and Aged Starch-Based Adhesives Used in Cultural Heritage" *Microscopy and Microanalysis* **22** 1072-1083 (2016)
- 4) **E. Gavgiotaki**, G. Filippidis, C. Kyvelidou, M. Kalognomou, S. Agelaki, V. Georgoulas , I Athanassakis "THG imaging of lipid body profiles in diagnosis of biological samples" *Medical Research Archives* **4**(7):1-11 (2016)
- 5) **E. Gavgiotaki**, G. Filippidis, H. Markomanolaki, G. Kenanakis, S. Agelaki, V. Georgoulas, I. Athanassakis "Distinction between breast cancer cell subtypes using third harmonic generation microscopy" *Journal of Biophotonics* **10**, 1152-1162 (2017) DOI:10.1002/jbio.201600173

- 6) **E. Gavgiotaki** , G. Filippidis. I. Zerva, G. Kenanakis, E. Arhontakis , S. Agelaki, V. Georgoulas, I. Athanassakis "*Detection of the T cell activation state using non-linear optical microscopy*". Journal of Biophotonics (2018) DOI: 10.1002/jbio.201800277
- 7) **E. Gavgiotaki**, G. Filippidis, S. Bovasianos, S. Agelaki, V. Georgoulas, M. Tzardi I. Athanassakis "*Digital pathology in human breast tissues based on non-linear microscopy techniques*" in preparation

Peer Reviewed Conference Proceedings

- 8) **E. Gavgiotaki**, G. Filippidis, S. Psilodimitrakopoulos, H. Markomanolaki, M. Kalognomou, S. Agelaki, V. Georgoulas, I. Athanassakis "*Third Harmonic Generation microscopy as a diagnostic tool for the investigation of microglia BV-2 and breast cancer cells activation*" Proceedings of the Society of Photo-optical Instrumentation Engineers (**SPIE**), **Vol 9536**, Advanced Microscopy Techniques IV; and Neurophotonics II, E. Beaufrepaire; P.T.C. So; F. Pavone; E.M. Hillman Eds, 953614 (2015).
- 9) S. Psilodimitrakopoulos, **E. Gavgiotaki**, K. Melessanaki, V. Tsafas, D. Anglos, G. Filippidis "*Polarization sensitive second harmonic generation imaging microscopy of starch based restoration adhesives*" 16th International Conference on Polymers and Organic Chemistry (**POC-16**) OR 62 p. 93 Crete Greece (2016)
- 10) S. Psilodimitrakopoulos, **E. Gavgiotaki**, K. Melessanaki, V. Tsafas, D. Anglos, G. Filippidis "*Effect of aging in starch based adhesives, studied using second harmonic generation imaging microscopy*" Lasers in the Conservation of Artworks, **LACONA XI**, 29, Krakow, Poland (2016)
- 11) M. Mari, V. Tsafas, **E. Gavgiotaki**, K. Melessanaki, G. Filippidis "*Non-linear imaging techniques as diagnostic tools for Cultural heritage studies*" 10th International Conference on Instrumental Methods and Analysis: Modern trends and Applications (**IMA**) P2-20 Heraklion, Greece (2017)
- 12) **E. Gavgiotaki**, G. Filippidis, I. Zerva, S. Agelaki, V. Georgoulas, I. Athanassakis "*Non-linear microscopy as diagnostic tool for the discrimination of activated T cells*" Proceedings of the Society of Photo-optical Instrumentation Engineers (**SPIE**), **Vol 10414**, Advances in Microscopic Imaging, E. Beaufrepaire; P.T.C. So; F. Pavone; E.M. Hillman Eds, 1041406 (2017)
- 13) **E. Gavgiotaki**, G. Filippidis, S. Bovasianos, S. Agelaki, V. Georgoulas, M. Tzardi & I. Athanassakis "*Non-linear microscopy differentiates normal from pathological breast tissue*", Proceedings of the Society of Photo-optical Instrumentation Engineers (**SPIE**), **Vol 10685** Photonics Europe 10685-163 (2018)

Language skills

- **Greek** Mother tongue
- **English** Fluent
- **Spanish** Elementary
- **French** Elementary

Computer Skills

- **Programming Languages** Fortran, Matlab
- **Operational Systems** Windows , Linux
- **Programs** LabView, Origin, SPSS , Image J, CorelDRAW, GraphPad
- ECDL, IT SKILLS PROFICIENCY CAMBRIDGE

Certificate of laboratory skills

- Seminar of "Laboratory safety" organized by IMBB-FORTH on November 24th, 2015.

Teaching Experience

- 2012-2016** Teaching assistant in the course **Laser and Modern Optics**
2011-2012 Teaching assistant in the course **Advanced physics experiments**
2010-2011 Teaching assistant in the course **Electromagnetism Lab**

All the courses are from the Physics Department of University of Crete.

Conference participation

- 1st International Conference on Nanotechnologies and Bionanoscience (NanoBio2018) 24-28 September, 2018 Heraklion - Crete, Greece – poster presentation
- Biophotonics : Photonic Solution for Better Health Care -SPIE Photonics Europe Strasbourg 23-26 April 2018-poster presentation
- European Conferences on Biomedical Optics (ECBO) Munich- Germany 25-29 June 2017 –oral presentation
- Clinical and Translational Oncology conference Heraklion – Crete, Greece November 2016 – oral presentation
- 2nd Israel – Greece Joint Meeting on Nanotechnology and BioNanoscience – FORTH, Greece October 2016 – poster presentation
- ETPN-11th annual event of European Nanomedicine community - Heraklion – Crete, Greece October 2016 – poster presentation
- 11th Conference on Lasers in the Conservation of Artworks (2016), Cracow Poland September 2016
- 16th International Conference on Polymers and Organic Chemistry (2016), June Heraklion Crete Greece
- 3rd FAST-DOT summer school “Photonics Meets Biology” Heraklion – Crete, Greece September 2015 – poster presentation.
- European Conference in Biomedical Optics - Advanced Microscopy Techniques IV SPIE June 2015 Munich, Germany
- 2nd International Symposium ACTC -Advances in Circulating Tumour Cells from Basic Research to Clinical Practice October 2014 Rethymno, Crete, Greece.

Summer schools

- Training School on Laser Applications for Biology and Biomolecular Systems: an authentic hands-on experience Coimbra Portugal 3-9 July 2017
- Summer school of Biophotonics and molecular Imaging (BiMI) Heraklion – Crete, Greece July 2015.
- Summer school of Biophotonics and molecular Imaging (BiMI) Heraklion – Crete, Greece July 2014.