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MEHMET BURCIN UNLU

PROFILE

email: burcin.unlu@gmail.com
burcin.unlu@ozyegin.edu.tr

RESEARCH FIELDS AND EXPERTISE

- Computational Physics: Modeling, Image Reconstruction Algorithms, Physical Cancer Modeling, Computational Medicine
- Biomedical Physics and Imaging: Photo-acoustics, Optical Tomography, Ultrasound

APPOINTMENTS

DEAN, FACULTY OF AVIATION AND SPACE SCIENCES — SEPTEMBER 2023-
Özyeğin University, Çekmeköy Istanbul

PROFESSOR, FACULTY OF ENGINEERING — SEPTEMBER 2023-
Özyeğin University, Çekmeköy Istanbul

PROFESSOR OF PHYSICS — JUNE 2017-SEPTEMBER 2023
Boğaziçi University, Bebek Istanbul

Chair, Department of Physics (2018-2020 & 2022-2023)

VISITING PROFESSOR — AUGUST 2018 -
Hokkaido University, Sapporo, Japan

LECTURER — FEBRUARY 2018-AUGUST 2018
GI-CoRE, **Hokkaido University**, Sapporo, Japan

VISITING SCHOLAR — AUGUST 2017-AUGUST 2018
Laboratory of Artificial Intelligence for Medicine and Biomedical Sciences, Radiation Oncology, **Stanford University**, School of Medicine, CA, USA

ASSOCIATE PROFESSOR OF PHYSICS — 2011-2017
Bogazici University, Bebek Istanbul

ASSISTANT PROFESSOR OF PHYSICS — 2010-2011
Bogazici University, Bebek Istanbul

ASSISTANT PROJECT SCIENTIST — 2007-2009
Center for Functional Onco-Imaging, **University of California, Irvine**, CA, USA

POSTGRADUATE RESEARCHER — 2004-2007
Center for Functional Onco-Imaging, **University of California, Irvine**, CA, USA

EDUCATION

PHD PHYSICS 2000-2004

Stevens Institute of Technology, Hoboken, NJ, USA

MS PHYSICS 1996-1998

Bogazici University, Istanbul, TURKEY

BS PHYSICS 1992-1996

Middle East Technical University, Ankara, TURKEY

ONGOING RESEARCH SUPPORT (TURKEY)

TUBITAK 1004 (Unlu-CoPI) Prostat Kanseri İçin Kateter Tabanlı Fotoakustik Görüntüleme Sistemi Geliştirilmesi **200.000 $.**

TÜBİTAK SAYEM (Unlu-CoPI) with VSY Biotechnology

H2020-MSCA-ITN-2018 (Unlu-CoPI) Active Matter: From Fundamental Science to Technological Applications **250.000 $.**

COMPLETED RESEARCH GRANTS (TURKEY)

NATO (Unlu-PI) Standoff Coherent Detection of Warfare Chemicals via Photoacoustic Spectroscopy **400.000 $.**

TUBITAK 1003 (Unlu-PI) Prostat Kanseri İçin Kateter Tabanlı Fotoakustik Görüntüleme Sistemi Geliştirilmesi

TUBITAK 1001 (Unlu-PI) Nanoparçacıkların Foton/Proton Terapisine Olan Katkısının Akustik ve Fotoakustik Mikroskopla İncelenmesi

TUBITAK 1001 Kanser Tedavisinin Faydasını Optimize Edebilmek İçin Anti-Anjiyojenik İlaçların Hadron Tedavisi ve Kemoterapi ile Birleştirilmesinin Fiziksel Modellemesi

Turkish Ministry of Development - 2015BSV247 (Unlu - PI) Development of Multimodal Biomedical Microscopy Systems & Molecular Imaging Laboratory (3M-Lab) ,**1.000.000 $**

British Council - Newton Fund 216415519 (Jones - PI University College London, Unlu - Co PI) Manipulation and Destruction of Cancer Cells Using Cavitation Bubbles by Optical and Acoustic Tweezers , **100.000 £.**

Marie Curie International Reintegration Grants (IRG), PIRG07-GA-2010-268287 (Unlu-PI), DOT/MRI Dual-Modality Cancer Imaging Using a Bifunctional Contrast Agent 01/09/2010 - 31/08/2014, **100.000 $.**

TUBITAK 1001 113F047 (Unlu-PI) A Novel Physical Model of Drug Delivery in Cancerous Tumors, 01/10/2013 - 30/09/2016 , **80.000 $.**

TUBITAK 1001 112T253 (Unlu-PI) Development of a Photoacoustic Microscopy System for Molecular Imaging of Tumor Angiogenesis 01/01/2013 - 01/01/2016 , **150.000 $.**

BAP 5221 (Unlu-PI) Diffuse Optical Imaging Using Virtual Light Sources 2010 - 2011

BAP 7126 (Unlu-PI) Multiscale Multimodality Imaging of Tumour Angiogenesis 2013-2015

BAP 6190 (Unlu-PI) A Photoacoustic Microscopy System with a Tunable Laser 2011-2014

BAP 10125 (Unlu-PI) A Photoacoustic Microscopy System For Detection of Cancer Cells 2015-2018

COMPLETED RESEARCH GRANTS (USA)

P30 CA-104548 (Nalcioglu, O. - PI) - 04/16/04 – 03/31/09, PHS/NIH National Cancer Institute

Role: Postgraduate Researcher (65%) Combined MR-Diffuse Optics for Functional Imaging

The long-term goal of the project was to construct an MR-compatible optical spectroscopic tomography system for improved spatial localization of optical measurements and accurate optical-MRI co-registration. I contributed to the development of an MR compatible multi-wavelength, multi-detector system and optimization of its performance.

R21 CA120175 (Gulsen, G - PI) - 07/01/07-06/30/11, NIH/NCI

Role: Investigator (15%) - Development of a Multi-Modality System for Onco-Imaging

This project developed a hybrid Near Infrared (NIR) and MRI dynamic imaging system with dual function NIR/MR contrast agents to detect and characterize tumors with a higher sensitivity and specificity than current imaging protocols.

R21 CA121568 (Su, M-Y - PI) - 07/01/07 - 06/30/09, NIH/NCI

Role: Postgraduate Researcher (20%) Combined MRI and Optical Imaging to Improved Breast Cancer Diagnosis

This project investigated the performance of a combined MRI and DOT (Diffuse Optical Tomography) system for improving diagnostic specificity of breast cancer with a small-scale clinical study.

AWARDS

Fulbright Visiting Scholar Fellowship (2017-2018)

Excellence In Teaching Award, 2017 - Bogazici University, Istanbul, TURKEY

Excellence In Teaching Award, 2013 - Bogazici University, Istanbul, TURKEY

PEER-REVIEWED JOURNAL PAPERS

Parlatan, Ugur, et al. "Label-Free Identification of Exosomes using Raman Spectroscopy and Machine Learning." ***Small*** 19.9 (2023): 2205519.

Sueyasu, Shota, et al. "Ionoacoustic application of an optical hydrophone to detect proton beam range in water." ***Medical Physics*** 50.4 (2023): 2438-2449.

Sen, Ayse, et al. "Differentiation of advanced generation mutant wheat lines: Conventional techniques versus Raman spectroscopy." ***Frontiers in Plant Science*** 14 (2023): 1116876.

Otaş, Hasan Ozan, et al. "Application of scanning acoustic microscopy for evaluation of MMP activation in multiple cancer cell lines with a smart probe." ***Turkish Journal of Biology*** 47.3 (2023): 158-169.

Inanç, Arda, et al. "Label-free differentiation of functional zones in mature mouse placenta using micro-Raman imaging." ***bioRxiv*** (2023): 2023-07.

Kecoglu, Ibrahim, et al. "Quantification of salt stress in wheat leaves by Raman spectroscopy and machine learning." ***Scientific Reports*** 12.1 (2022): 7197.

Loc, Irem, et al. "Denoising Raman spectra using fully convolutional encoder–decoder network." ***Journal of Raman Spectroscopy*** 53.8 (2022): 1445-1452.

Parlatan, Ugur, et al. "Atrial fibrillation designation with micro-Raman spectroscopy and scanning acoustic microscope." ***Scientific Reports*** 12.1 (2022): 6461.

Yilmaz, Defne, Mert Tuzer, and Mehmet Burcin Unlu. "Assessing the therapeutic response of tumors to hypoxia-targeted prodrugs with an in silico approach." ***Mathematical Biosciences and Engineering*** 19.11 (2022): 10941-10962.

Koyuncu, Batuhan, Ahmet Melek, Defne Yilmaz, Mert Tuzer, and Mehmet Burcin Unlu. "Chemotherapy response prediction with diffuser elapser network." **Scientific reports** 12, no. 1 (2022): 1-13.

Inanc, Medine Tuna, Irem Demirkan, Cemile Ceylan, Alper Ozkan, Ozcan Gundogdu, Utku Goreke, Umut A. Gurkan, and Mehmet Burcin Unlu. "Quantifying the influences of radiation therapy on deformability of human red blood cells by dual-beam optical tweezers." **RSC Advances** 11, no. 26 (2021): 15519-15527.

Debir, Birses, Cameron Meaney, Mohammad Kohandel, and M. Burcin Unlu. "The role of calcium oscillations in the phenotype selection in endothelial cells." **Scientific reports** 11, no. 1 (2021): 1-12.

Tanoren, Bukem, Ugur Parlatan, Melita Parlak, Berzem Selcuk, Fatma Ates Alkan, Nural Pastaci Ozsobaci, Gurcan Albeniz, Leyla Turker Sener, Isil Albeniz, and Mehmet Burcin Unlu. "Determination of modifications in rat liver due to phthalate uptake by SAM, RS, and ICP-OES." **Analytical Methods** 13, no. 26 (2021): 2926-2935.

Soysal, Kaan Batu, Seyma Parlatan, Metban Mastanzade, Murat Ozbalak, Mustafa Nuri Yenerel, Mehmet Burcin Unlu, Gunay Basar, and Ugur Parlatan. "Raman tweezers as an alternative diagnostic tool for paroxysmal nocturnal hemoglobinuria." **Analytical Methods** 13, no. 35 (2021): 3963-3969.

Tanoren, Bukem, Ugur Parlatan, Melita Parlak, Ibrahim Kecoglu, Mehmet Burcin Unlu, Didem Melis Oztas, Mustafa Ozer Ulukan, Korhan Erkanli, and Murat Ugurlucan. "Aortic aneurysm evaluation by scanning acoustic microscopy and Raman spectroscopy." **Analytical Methods** 13, no. 39 (2021): 4683-4690.

Nakamura, Yuta, Taisuke Takayanagi, Tomoki Uesaka, Mehmet Burcin Unlu, Yasutoshi Kuriyama, Yoshihiro Ishi, Tomonori Uesugi et al. "Range verification of pulsed proton beams from fixed-field alternating gradient accelerator by means of time-of-flight measurement of ionoacoustic waves." **Medical Physics** 48, no. 9 (2021): 5490-5500.

Tanoren, Bukem, Gurcan Albeniz, Mufide Aydogan Ahbab, Leyla Turker Sener, Işıl Albeniz, Fatma Ates Alkan, Nural Pastaci Ozsobaci, Berzem Selcuk, and Mehmet Burcin Unlu. "Examination of Impact of Di (2-ethylhexyl) Phthalate and Dibutyl Phthalate on Rat Internal Organs by Scanning Acoustic Microscopy and Inductively Coupled Plasma Optical Emission Spectroscopy." **Medical Science and Discovery** 8, no. 4 (2021): 275-282.

Altun, Burak, Irem Demirkan, Esin Ozturk Isik, Ozgur Kocaturk, Mehmet Burcin Unlu, and Bora Garipcan. "Acoustic impedance measurement of tissue mimicking materials by using scanning acoustic microscopy." ***Ultrasonics*** 110 (2021): 106274.

Takayanagi, Taisuke, Tomoki Uesaka, Yuta Nakamura, Mehmet Burcin Unlu, Yasutoshi Kuriyama, Tomonori Uesugi, Yoshihiro Ishi et al. "On-line range verification for proton beam therapy using spherical ionoacoustic waves with resonant frequency." ***Scientific Reports*** 10, no. 1 (2020): 1-10.

Güzelçimen, F., Tanören, B., Çetinkaya, Ç., Kaya, M.D., Efkere, H.İ., Özen, Y., Bingöl, D., Sirkeci, M., Kınacı, B., Ünlü, M.B. and Özçelik, S., 2020. The effect of thickness on surface structure of rf sputtered TiO2 thin films by XPS, SEM/EDS, AFM and SAM. ***Vacuum***, p.109766.

Algarawi, M., Erkol, H., Luk, A., Ha, S., Ünlü, M.B., Gulsen, G. and Nouizi, F., 2020. Resolving tissue chromophore concentration at MRI resolution using multi-wavelength photo-magnetic imaging. ***Biomedical Optics Express***, *11*(8), pp.4244-4254.

Demirkan, I., Yaprak, G., Ceylan, C., Algul, E., Tomruk, C.O., Bilen, B. and Unlu, M.B., 2020. Acoustic diagnosis of elastic properties of human tooth by 320 MHz scanning acoustic

microscopy after radiotherapy treatment for head and neck cancer. ***Radiation Oncology***, *15*(1), pp.1-10.

Guney, G., Uluc, N., Demirkiran, A., Aytac-Kipergil, E., Unlu, M.B. and Birgul, O., 2019. Comparison of noise reduction methods in photoacoustic microscopy. ***Computers in Biology and Medicine***, *109*, pp.333-341.

Bilen, B.T., Parlak, M. and Unlu, M.B., 2019. Scanning acoustic microscopy of quantum dot aggregates. ***Biomedical Physics & Engineering Express***, *5*(6), p.065025.

Takayanagi T, *et. al.* "A novel range-verification method using ionoacoustic wave generated from spherical gold markers for particle-beam therapy: a simulation study, **Scientific Reports 9**, no 1, 4011, (2019).

Bilen, Bukem, *et. al.* "Determination of Ultrastructural Properties of Human Carotid Atherosclerotic Plaques by Scanning Acoustic Microscopy, Micro-Computer Tomography, Scanning Electron Microscopy and Energy Dispersive X-Ray Spectroscopy." **Scientific reports** 9, no. 1 (2019): 679.

Bilen, Bukem, *et. al.* "Scanning Acoustic Microscopy and Time-Resolved Fluorescence Spectroscopy for Characterization of Atherosclerotic Plaques", accepted, **Scientific Reports**, (2018).

Uluc N., *et al.*, "An extended photoacoustic transport model for characterization of red blood cell morphology in microchannel flow", in revision, **Biomedical Optics Express** (2018).

Demirkıran A., *et al*. "Analysis of micro cantilevers excited by pulsed-laser-induced photo acoustic waves", **Optics Express**, 26, 4, 4906, (2018).

Yonucu S, et al. "Quantifying the effects of antiangiogenic and chemotherapy drug combinations on drug delivery and treatment efficacy", **PLoS Comput Biol** 13(9): e1005724, (2017).

Alex Luk, Farouk Nouzi, Hakan Erkol, Mehmet Burcin Unlu, Gultekin Gulsen, Ex vivo validation of Photo-Magnetic Imaging, **Opt. Lett.** 42(20), 4171-4174,(2017).

Esra Aytac Kipergil, Hakan Erkol, Serhat Kaya, Gultekin Gulsen and Mehmet Burcin Unlu, "An Analysis of Proton-Acoustic Waves through an Analytical Approach" **Physics in Medicine and Biology**, Volume 62, Number 12, (2017).

Aytac Demirkiran , Nasire Uluc , Seydi Yavas , Tunc Kayıkcıoglu , Sarper Salman , Fatih Ilday , Mehmet Unlu, "Development of a Fiber Laser with Independently Adjustable

Properties for Optical Resolution Photoacoustic Microscopy", 6-38674, **Scientific Reports**, (2016).

Nouizi, F., Erkol, H., Luk, A., Marks, M., Unlu, M. B., & Gulsen, G. (2016). An accelerated photo-magnetic imaging reconstruction algorithm based on an analytical forward solution and a fast Jacobian assembly method. **Physics in Medicine and Biology**, 61(20), 7448.

Nouizi, F., Erkol, H., Luk, A., Unlu, M.B. and Gulsen, G., 2016. Real-time photo-magnetic imaging. **Biomedical Optics Express**, 7(10), pp.3899-3904.

Kwong, Tiffany C., et al. "Differentiation of tumor vasculature heterogeneity levels in small animals based on total hemoglobin concentration using magnetic resonance-guided diffuse optical tomography in vivo." **Applied Optics** 55.21 (2016): 5479-5487.

Erkol, Hakan, et al. "Comprehensive analytical model for CW laser induced heat in turbid media." **Optics Express** 23.24 (2015): 31069-31084.

Erkol, Hakan; Nouizi, Farouk; Unlu, Mehmet; Gulsen, Gultekin "An extended analytical approach for diffuse optical imaging", **Physics in Medicine and Biology** 60.13 (2015): 5103.

Ozturk, Deniz, et al. "Influence of vascular normalization on interstitial flow and delivery of liposomes in tumors." **Physics in Medicine and Biology** 60.4 (2015):1477.

Erkol, Hakan, et al. "Analytical reconstruction of the bioluminescent source with priors." **Optics Express** 22.16 (2014): 19758-19773.

Erkol, Hakan, Esra Aytac-Kipergil, and Mehmet Burcin Unlu. "Photoacoustic radiation force on a microbubble." **Physical Review E** 90.2 (2014): 023001.

Erkol, Hakan, and Mehmet Burcin Unlu. "Spectral power density of the random excitation for the photoacoustic wave equation." **AIP Advances** 4.9 (2014): 097103.

Erkol, Hakan, and Mehmet Burcin Unlu. "Virtual source method for diffuse optical imaging", **Applied Optics** 52.20 (2013): 4933-4940.

Yan, Han, et al. "A gantry-based tri-modality system for bioluminescence tomography." **Review of Scientific Instruments** 83.4 (2012): 043708-043708.

David Thayer, Mehmet Burcin Unlu, Yuting Lin, Kevin Han, Orhan Nalcioglu,Gultekin Gulsen, "Dual-Contrast Dynamic MRI-DOT for Small Animal Imaging", **Technology in Cancer Research and Treatment**, Volume 9, Number 1, (2010).

Mehmet Burcin Unlu, Yuting Lin, and Gultekin Gulsen "Dynamic contrast enhanced diffuse optical tomography (DCE-DOT): experimental validation with a dynamic phantom", **Physics in Medicine and Biology**, 54 (2009).

Mehmet Burcin Unlu, Yuting Lin, Ozlem Birgul, Orhan Nalcioglu, and Gultekin Gulsen, "Simultaneous In vivo Dynamic MR-DOT for Small Animal Imaging", **Journal of Biomedical Optics Letters**, Vol. 13, 060501, (2008).

Mehmet Burcin Unlu, Ozlem Birgul, Roshanak Shafiiha, and Gultekin Gulsen, "A Simulation Study of the Variability of Indocyanine Green Kinetics and Using Structural a priori Information in Dynamic Contrast Enhanced Diffuse Optical Tomography (DCE-DOT)", **Phys. Med. Biol**. Vol. 53, 3189-3200, (2008).

Mehmet Burcin Unlu and Gultekin Gulsen, "Effects of the Time Variation of Bioluminescent Source on the Tomographic Reconstruction", **Applied Optics**, Vol. 47, 799-806, (2008).

M. B. Unlu, O. Birgul, R. Shafiiha, G. Gulsen and O. Nalcioglu, "Diffuse Optical Tomographic Reconstruction Using Multi-frequency Data", **Journal of Biomedical Optics**, Vol. 11, 054008, (2006).

G. Gulsen, O. Birgul, M. B. Unlu, R. Shafiiha and Nalcioglu O. "A Multi-modality system for animal imaging: hybrid MR-DOT system", **J. Tech. Cancer Research & Treatment**, Vol. 5 (4): 351-363 (2006).

Mehmet Burcin Unlu, Bernard Rosen, Peiji Zhao and Hong-Liang Cui, "Multi- band Wigner Function Formulation of Quantum Transport", **Phys. Lett. A**,Vol. 327, 230, (2004).

U. Kayserilioglu, J. Kornfilt, G. Unel, M. B. Unlu, "Fermionic random sets and q-oscillators", **Phys. Lett. A**, 253, 132, (1999).

OTHER SCIENTIFIC ACTIVITIES (SELECTED)

Smart, Thomas J., Mehmet Burcin Unlu, and Philip H. Jones. "Microbubble trapping in inverted optical tweezers." In *Optical Trapping and Optical Micromanipulation XIV*, vol. 10347, p. 1034731. International Society for Optics and Photonics, 2017.

Güney, Gökhan, Özlem Birgül, Esra Aytaç-Kipergil, Aytaç Demirkiran, Nasire Uluç, and M. Burçin Ünlü. "Image reconstruction in photoacoustic microscopy and noise analysis." In Signal Processing and Communications Applications Conference (SIU), 2017 25th, pp. 1-4. IEEE, 2017.

Erkol, H., Nouizi, F., Luk, A. T., Unlu, M. B., & Gulsen, G. (2016, April). A new analytical approach for heat generation in tissue due to laser excitation (Conference Presentation). In SPIE BiOS (pp. 97060L-97060L). International Society for Optics and Photonics.

Erkol, H., Nouizi, F., Luk, A., Unlu, B., & Gulsen, G. (2016, April). An Analytical Approach for Temperature Distribution in Tissue. In Optical Tomography and Spectroscopy (pp. JW3A-12). Optical Society of America.

Erkol, Hakan, et al. "Source-receiver photoacoustic wave interferometry." SPIE BiOS. International Society for Optics and Photonics, 2014.

Erkol, Hakan, et al. "A measurement-based analytical approach to the biolu- minescence tomography problem." SPIE BiOS. International Society for Optics and Photonics, 2014.

Yavas, Seydi, et al. "A novel fiber laser development for photoacoustic mi- croscopy." SPIE BiOS. International Society for Optics and Photonics, 2013.

Erkol, Hakan, et al. "Analysis of laser parameters in the solution of photoa- coustic wave equation." SPIE BiOS. International Society for Optics and Pho- tonics, 2013.

Esra Aytac, Mehmet Burcin Unlu, "Molecular Imaging System for Monitoring Tumor Angiogenesis", APS March Meeting, Y41.00003, Volume 57, Number 1, (2012).

Deniz Ozturk, Sirin Yonucu, Ugur Cetiner, Mehmet Burcin Unlu, A two-phase mixture model of avascular tumor growth, APS March Meeting, L42.00010, Volume 57, Number 1, (2012).

Mitchell Hsing, Yuting Lin, Mehmet Burcin Unlu, Orhan Nalcioglu, Gultekin Gulsen, "Tumor characterization by chromophore concentrations in small ani- mals using a hybrid MRI-DOT system", Multimodal Biomedical Imaging VI,Proc. of SPIE Vol. 7892, 78920L, (2011).

M. B. Unlu, Y. Ling, B. Grimmond, A. Sood, E. Uzgiris, O. Nalcioglu and G. Gulsen, "A Multimodal Contrast Agent for Simultaneous Magnetic Resonance and Optical Imaging of Small Animal", Proc. SPIE, Vol. 7557, 75570C (2010), (Invited paper for special section on Multi-modality Imaging).

Michael Ghijsen, Burcin Unlu, Orhan Nalcioglu, and Gultekin Gulsen, Design of a multimodality breast-like phantom for combined diffuse optical tomography and ultrasound tomography (DOT-UST), Proc. SPIE, Vol. 7567, 75670H (2010)

David Thayer and Ning Liu, Burcin Unlu, Jeon-Hor Chen, Min-Ying Su, Orhan Nalcioglu, and Gultekin Gulsen Development of a combined multifrequency MRI-DOT system for human breast imaging using a priori information, Proc. SPIE, Vol. 7557, 755711 (2010)

Mehmet Burcin Unlu, Ozlem Birgul, Roshanak Shafiiha, and Gultekin Gulsen, "Variability of Pharmacokinetic Parameters in ICG Imaging", Multimodal Opti- cal Imaging, 2008 SPIE Photonics West.

Mehmet Burcin Unlu and Gultekin Gulsen, "Correction for Source Decay in Bioluminescence Tomography", Proceedings of Multimodal Optical Imaging, 2008 SPIE Photonics West.

Mehmet Burcin Unlu and Gultekin Gulsen, "Tomographic Reconstruction of Time-Varying Bioluminescent Sources", Network for Translational Research Optical Imaging (NTROI) Retreat, 2007 in Newport Beach, CA.

Gulsen G., Unlu M. B., Birgul O., and Nalcioglu O. "Simultaneous monitoring of multiple contrast agents using a hybrid MR-DOT system", to be appear in the Proceedings of SPIE (6431-Multi-modal Biomedical Imaging) 20-25 Jan. (2007).

G. Gulsen, M. B. Unlu, O. Birgul, H. Yan and O. Nalcioglu, "A Multi-modality system for dynamic imaging of cancer", Proceedings of IEEE, International Symposium on Biomedical Imaging, April 6-9, (2006) (*Invited paper for special section on Multi-modality Imaging).

G. Gulsen, M. B. Unlu, O. Birgul, H. Yan, and O. Nalcioglu, "A Dual Modal- ity System for Dynamic Contrast Enhanced Imaging," OSA Biomedical Optics Topical Meeting, Technical Digest, p. TuG1, (2006).

O. Birgul, M. B. Unlu, R. Shafiiha, G. Gulsen, and O. Nalcioglu, "Selection of Optimal Modulation Frequencies in Multi-Frequency DOT," OSA Biomedical Optics Topical Meeting, Technical Digest, p.SH43, (2006).

O. Birgul, G. Gulsen, R. Shafiiha, M. B. Unlu, and O. Nalcioglu, "In vivo Small Animal Imaging using Combined MR-DOT System," OSA Biomedical Optics Topical Meeting, Technical Digest, p. TuG1, (2006).

R. Shafiiha, M. B. Unlu, G. Gulsen, O. Birgul, M. J. Hamamura, Y. Chu, and O. Nalcioglu, "Improving the Accuracy of the Chromophore Reconstruction in Dif- fuse Optical Tomography by Using Structural and Functional-priors from MRI", Proceedings of ISMRM 14th Scientific Meeting, (2006).

G. Gulsen, O. Birgul, R. Shafiiha, M. B. Unlu, and O. Nalcioglu, “Design and implementation of a multi-frequency diffuse optical tomography system (MF- DOT) system compatible with MRI,” Network for Translational Research Optical Imaging (NTROI) Retreat June (3-5) 2005 in Newport Beach, CA.

M. B. Unlu, O. Birgul, and G. Gulsen, “Bioluminescence tomography with a- priori information” Network for Translational Research Optical Imaging (NTROI) Retreat June (3-5) 2005 in Newport Beach, CA, (P).

Mehmet Burcin Unlu, Ozlem Birgul and Gultekin Gulsen, “3D Bioluminescence tomography for animal imaging”, Era of Hope DOD Breast Cancer Research Program Meeting, Philadelphia PA, (2005).

Mehmet Burcin Unlu, Hong-Liang Cui, “Wigner function equations for Rashba effect resonant tunneling structures”, Arxiv preprint, cond-mat/0407218, (2004).

M. B. Unlu and H. L. Cui, "Quantum transport in staggered band-gap res- onant tunneling heterostructures", IEEE Nano-Technology Conference, San Francisco, CA, Aug., 2003.

G. Recine, M.B. Unlu, and H.L. Cui, "Parallel Wigner-Poisson simulation of multi-band tunneling structures on a 130-processor cluster computer", IEEE Nano-Technology Conference, Washington, Aug. 2002.

P. Zhao, M. B. Unlu, G. Recine, H.L. Cui, and D. Woolard, "Three-band model of resonant tunneling diodes", IEEE Nano-Technology Conference, Washing- ton, Aug. 2002.

PATENTS

Gulsen, G., Thayer, D., Yuting, L.I.N. and Unlu, M.B., The Regents Of The University Of California, 2015. Method and apparatus for photomagnetic imaging. U.S. Patent 9,078,587.

ACTIVE RESEARCH COLLABORATIONS

Dr. Lei Xing, Stanford University

Dr. Gultekin Gulsen, University Of California Irvine

Dr. Mohammad Kohandel, University of Waterloo

Dr. Omer Ilday, Bilkent University

Dr. Giovanni Volpe, University of Gothenburg

Dr. Phil Jones, University College London

TEACHING & ADVISING

TEACHING

Courses @Bogazici University, Istanbul, TURKEY

Physics 101 - Physics I - Mechanics

Physics 102 - Physics II - Waves&Optics&Thermodynamics

Physics 201 - Physics III - Electricity&Magnetism

Physics 202 - Physics III - Introduction to Modern Physics

Physics 311 - Modern Physics I

Physics 312 - Modern Physics II

Physics 337 - Introduction to Physical Methods in Medical Diagnosis

Physics 390 - Computer Assisted Data Analysis in Physics

Physics 401 - Electromagnetism I

Physics 402 - Electromagnetism II

Physics 48 M - Biophysics

Physics 58 M - Physics of Medical Imaging

Physics 491 - Introduction to Research in Physics I

Physics 492 - Introduction to Research in Physics II

THESES SUPERVISED

| Student Name | Year | Thesis Title | Thesis Type |

| DEFNE YILMAZ | 2023 | Modeling of drug delivery by modifying tumor microenvironment | PhD |

| TUNA PESEN İNANÇ | 2022 | Probing mechanical and chemical properties of biological materials by multiple modalities | PhD |

| ÇAĞRI ŞENEL | 2022 | Numerical modeling, design, and time-frequency metrology applications of low-noise optical frequency combs | PhD |

| BİRSES DEBİR | 2022 | The role of trigger waves in cancer angiogenesis | PhD |

| İREM DEMİRKAN | 2020 | Mechanical characterization of cells and tissues by scanning acoustic microscopy and optical tweezers | PhD |

| NASİRE ULUÇ | 2018 | Photoacoustic signal characterization of cell morphology in microchannel flow | PhD |

| ŞİRİN YONUCU | 2018 | Physical modeling of drug transport in cancer | PhD |

| AYTAÇ DEMİRKIRAN | 2018 | Photoacoustic signal detection via atomic force microscopy cantilevers | PhD |

| ESRA AYTAÇ KİPERGİL | 2017 | A hybrid optical tweezers and photoacoustic microscopy system | PhD |

| TOLGA GÜRCAN | 2022 | Total internal reflection holographic microscopy for cell extension imaging | Masters |

| MELİTA PARLAK | 2020 | Tissue imaging with scanning acoustic microscopy and raman spectroscopy | Masters |

| GİZEM ALPAKUT | 2020 | Glass welding using custom developed femtosecond fiber laser for microfluidic device development | Masters |

| ERKAM BODUR | 2017 | On the radial monotonicity of the ensemble average propagator | Masters |

| KADİR ŞİMŞEK | 2017 | Diffusion-attenuated mr signal for particles subject to forces or in disordered media | Masters |

| SERHAT KAYA | 2016 | Active brownian particles propelled by sound | Masters |

| MERT TUZER | 2015 | Ultrasound simulations using computed tomography images as priors | Masters |

| DEFNE YILMAZ | 2015 | Acoustic radiation enhanced drug delivery | Masters |

| MUSTAFA ÜMİT ARABUL | 2013 | Development of a novel fiber laser based backward-mode photoacoustic microscopy system and image characterization | Masters |

| DENİZ ÖZTÜRK | 2013 | Physical modeling of drug delivery in solid tumors | Masters |

| DUYGU KABA | 2013 | A mathematical model of drug delivery by modifying the tumor microenvironment: MMP activation | Masters |

| ŞİRİN YONUCU | 2012 | Mathematical modeling of MMPs in cancer | Masters |

| AYTAÇ DEMİRKIRAN | 2012 | Physics of bioluminescent light transport in tissue | Masters |

| NASİRE ULUÇ | 2012 | Physics of diffuse optical imaging | Masters |

| ESRA AYTAÇ KİPERGİL | 2012 | Development of a Photoacoustic Microscopy System | Masters |