

Oguzhan Avci

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Education

- **Boston University College of Engineering** Boston, MA
Doctor of Philosophy in Electrical Engineering (GPA: 3.9/4.0) 9/2012–9/2017
- **University of California, San Diego Jacob School of Engineering** La Jolla, CA
Exchange Student, Department of Electrical and Computer Engineering 9/2010–6/2011
- **Bilkent University Faculty of Engineering** Ankara, Turkey
Bachelor of Science in Electrical and Electronics Engineering (Magna Cum Laude) 9/2008–6/2012

Professional Experience

- **Apple Inc.** Cupertino, CA
Instrumentation Design Scientist – Laser Systems 10/2017–Present
- **Optical Characterization and Nanophotonics Laboratory, Boston University** Boston, MA
Graduate Research Assistant, Ph.D. Candidate 6/2013–9/2017
–Designed, modeled, & developed *Wide-field Interferometric Microscopy (WIM)* for nanoparticle sensing and characterization
–Enhanced nanoparticle sensitivity in WIM via pupil function engineering
–Enhanced nanoparticle image resolution in WIM via structured illumination & image reconstruction
- **Mitsubishi Electric Research Laboratories** Cambridge, MA
Graduate Research Intern 5/2015–8/2015
–Designed, modeled, and implemented an *LED-based LiDAR system* for autonomous driving
- **Harvard-MIT Division of Health Science and Technology** Cambridge, MA
Undergraduate Research Intern 6/2011–9/2011
–Designed a *temperature-controlled microfluidic system* to locally capture and release CD4 cells
- **Nano-Optics Research Laboratory, Koc University** Istanbul, Turkey
Undergraduate Research Intern 7/2010–8/2010
–Designed circuits for *PIC microcontroller based stepper motor driven linear translation stage* to be used in ophthalmological applications

Skills

- **Programming Languages:** Java, Python, VHDL, 8051 & PIC Assembly, Tcl, HTML.
- **Applications:** MATLAB, LabVIEW, Zemax, BackTrack, PSpice, L^AT_EX, AutoCAD, Adobe Illustrator, MS Office.
- **Nanofabrication:** Optical (UV) lithography, mask design, wet etching.
- **Biochemistry:** Biological sample preparation and surface functionalization.
- **Operating Systems:** Windows, Mac OS X, Linux.

Previous Projects

- Designed and implemented a Bluetooth enabled Encryption/Decryption device to be used with smartphones for secure communication. The project included implementation of the RSA algorithm on an FPGA chip, and duplex communication system between Bluetooth module and FPGA chip using a microcontroller.

- Built and tested a transceiver TRC-10 operating in the 10-meter amateur band.
- Designed and implemented a FPGA controlled digital thermometer in VHDL.
- Designed and implemented an 8051 microcontroller based heater in assembly language for 8051. The project included serial port communication for temperature and time inputs from the user, and displaying the current and target temperature as well as the remaining time on an LCD.
- Designed and implemented an English-Turkish, Turkish-English dictionary and game applications in Java. The project included Java Database Connection (JDBC) to access the Microsoft Access database.

Teaching Experience

- **Boston University** Boston, MA
Graduate Teaching Fellow *2012–2013*
 - Fall 2012: EC 441 - Introduction to Computer Networking
 - Spring 2013: EK 307 - Electronic Circuit Theory

Journal Publications

- Avci, O., Yurdakul, C., Matlock, A., Tian, L., Unlu, M. S. (2017), Reconstruction in Wide-field Interferometric Microscopy for Imaging Low-index Nanoparticles Beyond the Diffraction Limit. (in preparation)
- Aygun, U., Avci, O., Seymour, E., Urey, H., Unlu, M. S., Ozkumur, A. Y. (2017), Label-free and High-throughput Detection of Biomolecular Interactions Using a Flatbed Scanner Biosensor. ACS Sensors. doi: 10.1021/acssensors.7b00263
- Sevenler, D. D., Avci, O., Unlu, M. S. (2017), Quantitative Interferometric Reflectance Imaging for the Detection and Measurement of Biological Nanoparticles. Biomedical Optics Express. doi: 10.1364/BOE.8.002976
- Avci, O., Yurdakul, C., Unlu, M. S. (2017), Nanoparticle Characterization in Wide-field Interferometric Microscopy by Supervised Learning from Model. Applied Optics. doi: 10.1364/AO.56.004238
- Avci, O., Campana, M. I., Yurdakul, C., Unlu, M. S. (2017), Pupil Function Engineering for Enhanced Nanoparticle Visibility in Wide-field Interferometric Imaging. Optica. doi: 10.1364/OPTICA.4.000247
- Trueb, J.*, Avci, O.*, Sevenler, D. D., Connor, J. H., Unlu, M. S. (2016), Robust Visualization and Discrimination of Nanoparticles by Interferometric Imaging. IEEE Journal of Selected Topics in Quantum Electronics. doi: 10.1109/JSTQE.2016.2639824
- Avci, O., Adato, R., Ozkumur, A. Y., Unlu, M. S. (2016), Physical Modeling of Interference Enhanced Imaging and Characterization of Single Nanoparticles. Optics Express. doi: 10.1364/OE.24.006094
- Avci, O., Unlu, N. L., Ozkumur, A. Y., Unlu, M. S. (2015), Interferometric Reflectance Imaging Sensor (IRIS) – A Platform Technology for Multiplexed Diagnostics and Digital Detection. Sensors. doi: 10.3390/s150717649
- Zhang, X., Daaboul, G. G., Spuhler, P. S., Freedman, D. S., Yurt, A., Ahn, S., Avci, O., Unlu, M. S. (2014), Nanoscale Characterization of DNA Conformation Using Dual-color Fluorescence Axial Localization and Label-free Biosensing. Analyst. doi: 10.1039/C4AN01425A
- Gurkan, U. A., Tasoglu, S., Akkaynak, D., Avci, O., Unluisler, S., Canikyan, S., MacCallum, N. and Demirci, U. (2012), Smart Interface Materials Integrated with Microfluidics for On-Demand Local Capture and Release of Cells. Advanced Healthcare Materials. doi: 10.1002/adhm.201200009

Conference Preceedings

- Matlock, A. C., Avci, O., Unlu, M. S., and Tian, L. (2017), Differential Phase Contrast and Digital Refocusing in a Computational Reflection Interferometric Microscope for Nanoparticle Imaging, *Imaging and Applied Optics 2017 (3D, AIO, COSI, IS, MATH, pcAOP)*, paper CTh4B.2. doi: 10.1364/COSI.2017.CTh4B.2
- Aygun, U., Avci, O., Seymour, E., Sevenler, D. D., Unlu, M. S., Urey, H., Ozkumur, A. Y. (2016), Low Cost Flatbed Scanner Label-Free Biosensor. *Proc. SPIE 9699, Optics and Biophotonics in Low-Resource Settings II*, 969906. doi: 10.1117/12.2214113
- Unlu, M. S., Connor, J. H., Scherr, S., Daaboul, G. G., Seymour, E. C., Unlu, N. L., Trueb, J., Sevenler, D. D., Avci, O. (2016), Digital Detection of Biomarkers for High-Sensitivity Diagnostics at Low-Cost. *Proc. SPIE 9699, Optics and Biophotonics in Low-Resource Settings II*, 969906. doi: 10.1117/12.2214113

Patents

- Method and System for Enhanced Single Particle Reflectance Imaging, U.S. Patent pending, filed on May 9, 2017.

Ad Hoc Reviewer

- **OSA:** *Optics Express, Applied Optics*
- **De Gruyter:** *Nanophotonics*
- **Elsevier:** *Sensors and Actuators B: Chemical*

Related Coursework

- **Boston University - Electrical and Computer Engineering** *2012–2014*
Advanced Optical Microscopy and Biological Imaging, Biomedical Optics and Biophotonics, Optical Fibers and Waveguides, Lasers, Nanomedicine: Principles and Applications, Introduction to Photonics, Solar Energy Systems.
- **University of California, San Diego - Electrical and Computer Engineering** *2010–2011*
Introduction to Digital Signal Processing, Biomedical Imaging and Sensing, Linear Control System Theory, Introduction to Active Circuit Design, Linear System Fundamentals, Fundamentals of Devices and Materials, Electromagnetism, Engineering Probability and Statistics.
- **Bikent University - Electrical and Electronics Engineering** *2008–2012*
Biomedical Signals and Instrumentation, Detection and Estimation Theory, Computer Networks, Introduction to Digital Circuit Design, Analog Electronics, Circuit Theory, Microprocessors, Linear Algebra, Differential Equations and Complex Analysis.

Memberships

- IEEE, OSA, SPIE

Languages

- English, German and Turkish