**CONRAD W. MERKLE, PH.D.**

conrad.merkle@gmail.com

**EDUCATION**

**2012 – 2018 | Ph.D. in Biomedical Engineering, University of California, Davis**

Designated Emphasis in Biophotonics and Bioimaging

**2008 – 2012 | B.S. in Bioengineering, University of Maryland, College Park**

Gemstone and Honors Programs

**RESEARCH EXPERIENCE**

**2013 – 2018 | Graduate Student Researcher, Srinivasan Lab at University of California, Davis**

The primary focus of my research in the Srinivasan Lab was to develop and apply new techniques for imaging hemodynamic and metabolic information using optical coherence tomography (OCT). In addition to constructing and testing imaging systems, processing raw image data, and conducting numerous small animal studies in the eye and brain using visible wavelength spectroscopic OCT, 1300nm OCT, and 1700nm deep penetration OCT, I have also worked to develop a new technique termed dynamic contrast optical coherence tomography (DyC-OCT) for studying microvascular flow and heterogeneity. My work in this lab has resulted in three primary and five second author papers so far.

**2012 – 2013 | Graduate Student Researcher, Marcu Lab at University of California, Davis**

While in the Marcu Lab, I assembled a multi-channel fluorescence lifetime imaging (FLIm) system, processed FLIm data, and developed tissue-mimicking phantoms for testing FLIm probes. I additionally developed and constructed a FLIm probe for use with the da Vinci surgical robot.

**2011 – 2012 | Volunteer Researcher, Food and Drug Administration at White Oak**

At the FDA I researched differences in structure, quality, and release rates for different methods of coating stents with drug-eluting polymers. As part of my research, I fabricated drug coatings for stents and wrote standard operating procedures for various instruments. I also analyzed samples using a confocal microscope and worked on image reconstruction of the 3D data. This work resulted in one co-authored paper.

**2008 – 2012 | Gemstone Student Researcher, University of Maryland, College Park**

While at the University of Maryalnd, I participated in a 4-year interdisciplinary team research project in which we investigated differences in the movement of infants at high and low risk for autism spectrum disorders using motion capture technology. I worked on data capture and participant interaction, data processing, and grant and thesis writing. We received IRB approval and a grant from the Howard Hughes Medical Institute, and our final thesis can be found in the University of Maryland Digital Repository.

**TEACHING EXPERIENCE**

**2014 | Teaching Assistant, University of California, Davis**

BIM142 Biomedical Imaging | Lectured, held office hours, wrote exam questions, and proctored

**2012 | Grader, University of Maryland, College Park**

BIOE 420 Bioimaging | Graded and proctored

**ACADEMIC AND PROFESSIONAL HONORS**

**University of California, Davis**

BRAIN 2017 Early Career Investigator Travel Bursary (2017)

Graduate Student Travel Award (2017)

National Eye Institute Travel Grant (2016)

Graduate Program Fellowship (2014-2015)

SPIE Officer Travel Grant (2014)

Earle C. Anthony Fellowship (2013-2014)

Graduate Assistance in Areas of National Need (GAANN) Fellowship (2012)

**University of Maryland, College Park**

Graduated Cum Laude with a BS in Bioengineering (2012)

Honors Citation (2012)

Gemstone Citation (2012)

Student’s Choice Award at the Bioengineering Senior Capstone Design Competition (2012)

Academic Honors all 8 semesters (2008-2012)

President’s Scholarship (2008-2012)

Distinguished Scholar Award (2008-2012)

Jack I and Dorothy G Bender Memorial Scholarship (2009-2010)

**Professional and Honor Societies**

Primannum Honor Society

Phi Kappa Phi Honor Society

Tau Beta Pi Engineering Honor Society

Golden Key International Honour Society

OSA active member and former student chapter president

SPIE active member and former student chapter president

**PUBLICATIONS**

Merkle CW, Chong SP, Kho AM, Dubra A, Srinivasan VJ, “Visible light optical coherence microscopy with femtoliter volume resolution,” Accepted by Optics Letters (2017).

Merkle CW, Leahy C, Srinivasan VJ, “Dynamic contrast optical coherence tomography images transit time and quantifies microvascular plasma volume and flow in the retina and choriocapillaris,” Biomed. Opt. Express (2016), vol. 7, no. 10, pp. 752–755.([link](http://bme.ucdavis.edu/srinivasanlab/files/2016/09/boe-7-10-4289.pdf)).

Merkle CW, Srinivasan VJ, “Laminar microvascular transit time distribution in the mouse somatosensory cortex revealed by Dynamic Contrast Optical Coherence Tomography,” Neuroimage (2016), 125: 350-362. ([link](http://bme.ucdavis.edu/srinivasanlab/files/2015/11/Merkle_NI_2016.pdf)).

Bernucci M, Merkle CW, Srinivasan VJ, “Investigation of artifacts in retinal and choroidal OCT angiography with a contrast agent,” Accepted by Biomed. Opt. Express (2018).

Zhu J, Merkle CW, Bernucci MT, Chong SP, Srinivasan VJ, “Can OCT Angiography Be Made a Quantitative Blood Measurement Tool?” Applied Sciences (2017)*,* 7(687). ([link](https://bme.ucdavis.edu/srinivasanlab/files/2017/07/applsci-07-00687.pdf)). This review paper is featured on [the cover of Applied Sciences](https://bme.ucdavis.edu/srinivasanlab/files/2017/07/big_cover-applsci-v7-i7.png).

Chong SP, Merkle CW, Cooke DF, Zhang T, Radhakrishnan H, Krubitzer L, Srinivasan VJ, “Non-invasive, in vivo imaging of subcortical mouse brain regions with 1.7 μm Optical Coherence Tomography,” Opt Letters (2015), 40(21): 4911-4914 ([link](http://bme.ucdavis.edu/srinivasanlab/files/2015/10/Chong_OL_2015.pdf)). This paper is featured in [Spotlight on Optics](https://www.osapublishing.org/spotlight/summary.cfm?URI=ol-40-21-4911).

Chong SP, Merkle CW, Leahy C, Srinivasan VJ, “Cortical Metabolic Rate of Oxygen (CMRO2) assessed using combined Doppler and spectroscopic OCT,” Biomed. Opt. Express (2015), 6(10): 3941-3951 ([link](http://bme.ucdavis.edu/srinivasanlab/files/2015/09/Chong-BOE-2015-ii.pdf)).

**Chong SP, Merkle CW, Leahy C, Radhakrishnan H, Srinivasan VJ. Quantitative microvascular hemoglobin mapping using visible light spectroscopic Optical Coherence Tomography. Biomed Opt Express (2015), 6(4):1429-50. doi: 10.1364/BOE.6.001429.**

**McDermott M, Chatterjee S, Hu X, Ash-Shakoor A, Avery R, Belyaeva A, Cruz C, Hughes M, Leadbetter J, Merkle C, Moot T, Parvinian S, Patwardhan D, Saylor D, Tang N, and Zhang T. Application of Quality by Design (QbD) Approach to Ultrasonic Atomization Spray Coating of Drug-Eluting Stents. AAPS PharmSciTech. (2015), doi: 10.1208/s12249-014-0266-9. PubMed PMID: 25563817.**

**CONFERENCES AND PRESENTATIONS**

**Talks**

Merkle C, Chong S, Zhu J, Kholiqov O, Dubra A, and Srinivasan V. Visible light optical coherence microscopy imaging of the mouse cortex with femtoliter volume resolution. Photonics West 2018. Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XXII.

Merkle C and Srinivasan V. Laminar cortical blood flow in mice is quantified by dynamic contrast optical coherence tomography. BRAIN & BRAIN PET 2017. Imaging Applications.

Merkle C and Srinivasan V. Quantification of rat retinal and choroidal blood plasma kinetics, volume, and flow in vivo using dynamic contrast optical coherence tomography. Photonics West 2017.  Ophthalmic Technologies XXVII.

Merkle C and Srinivasan V. Dynamic contrast optical coherence tomography: quantitative measurement of microvascular transit-time distributions in vivo. Photonics West 2016. Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XX.

Merkle C and Srinivasan V. Uncovering microvascular transit time distributions in the mouse cortex using DyC-OCT. University of California, Davis Biomedical Engineering Graduate Group Student Research Conference 2015.

Merkle C, Chong SP, Radhakrishnan H, Leahy C, and Srinivasan V. Optical coherence imaging of microvascular oxygenation and hemodynamics. University of California, Davis Biomedical Imaging Conference 2014.

**Posters**

Merkle C and Srinivasan V. Imaging microvascular hemodynamics in the rat retina and choroid with dynamic contrast OCT. The Association for Research in Vision and Ophthalmology Annual Meeting 2016.

Merkle C, Chan A, and Srinivasan V. A comparison of OCT techniques for blood velocimetry. Photonics West 2015.

**Conference Proceedings**

Chan A, Merkle C, Lam E, and Srinivasan V. Maximum likelihood estimation of blood velocity using Doppler optical coherence tomography, Proc. SPIE 8934, Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII, 89342J (March 4, 2014); doi: doi:10.1117/12.2036491;  <http://dx.doi.org/10.1117/12.2036491>

Chong SP, Merkle C, Radhakrishnan H, Leahy C, Dubra A, Sulai Y, and Srinivasan, V. Optical Coherence Imaging of Microvascular Oxygenation **and Hemodynamics. CLEO: 2014; 2014 2014/06/08; San Jose, California: Optical Society of America.**

**PhD Dissertation**

**Merkle C. Quantitative Optical coherence tomography methods for functional microvascular imaging. 2018.**

**Undergraduate Thesis**

Chai E, Chavis J, Chodnicki K, Crisci T, Destler N, Graham D, Jordan K, Landa R, Merkle C*,* Park S, Paxton C, Sood R, Tanner J, and Wray B. Assessing the viability of studying motion indicators of autism spectrum disorders in infants at high and low risk for ASD using a passive motion capture system. Digital Repository at the University of Maryland. 2012. <http://hdl.handle.net/1903/12484>