

Timothy D. Weber

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Personal

Born in Portland, ME.

United States Citizen.

Education

2020	Ph.D. Biomedical Engineering, Boston University <i>Thesis Advisor: Jerome Mertz</i>
2017	M.S. Biomedical Engineering, Boston University
2014	B.S. Biomedical Engineering & Applied Math, Columbia University

Research Positions

2021–	Postdoctoral Associate Fujimoto Lab, Research Laboratory of Electronics, MIT
2020–2021	Postdoctoral Associate Mertz Lab, Department of Biomedical Engineering, Boston University
2015–2020	Graduate Researcher Mertz Lab, Department of Biomedical Engineering, Boston University
2013–2014	NSF REU Student Molecular Physics Laboratory, SRI International, Menlo Park, CA
2012–2013	Undergraduate Research Participant Hillman Lab, Department of Biomedical Engineering, Columbia University

Leadership Positions

2019	Symposium Co-Organizer, Neurophotonics Center Symposium, Boston University
2018	Co-founder and Treasurer, OSA and SPIE Student Chapters, Boston University
2017–2019	Conference Co-Organizer, Boston Photonics Conference

Awards

2018	Edmund Optics Educational Award Finalist
2017	Selection for Frontiers in Neurophotonics Summer School Laval University, Quebec City
2016	Graduate Student Teaching Award Boston University Department of Biomedical Engineering
2015 & 2016	NSF Graduate Research Fellowship Program Honorable Mention
2014	Dean's Fellowship Award Boston University College of Engineering

Editorial Activities

Journal Reviews

Biomedical Optics Express
Journal of Biomedical Optics
Neurophotonics
Optical Engineering
Optics Express
Optics Letters
PLoS ONE

Book Reviews

J. Mertz, *Introduction to Optical Microscopy*, 2nd ed. (Cambridge University Press, 2019).

Teaching

2016, 2017	Biomedical Engineering Measurements II (Boston University) 45 students per semester Laboratory instructor and grader, 15 hours per week
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Invited Presentations

2019	"Transillumination Techniques in Ophthalmic Imaging" Medical College of Wisconsin Eye Institute, Milwaukee, Wisconsin
2024	"High-speed, multi-Z confocal microscopy for voltage imaging in densely labeled neuronal populations" MGH Wellman Center Optics Chapter, Boston, Massachusetts

Publications

Journal Articles

- Y. Sun, **T. D. Weber**, J. G. Fujimoto, S. Rosen, P. A. VanderLaan, "Rapid Examination of Lung Tissues by Nonlinear Microscopy" *Am. J. Clin. Pathol.* *accepted* (2024).
- L. C. Cahill, T. Yoshitake, M. Rosen, **T. D. Weber**, J. G. Fujimoto, S. Rosen, "Data retrieval from archival renal biopsies using nonlinear microscopy," *PLoS ONE*. **19**(3), e0299506 (2024).
- Y. D. Guzmán-Arocho*, **T. D. Weber***, T. St Jacques, J. G. Fujimoto, S. Rosen, Y. Sun, "Rapid Examination of Non-Processed Renal Cell Carcinoma using Nonlinear Microscopy," *in press Arch. Pathol. Lab. Med.* (2024).
- T. D. Weber***, M. V. Moya*, K. Kılıç, J. Mertz, and M. N. Economo, "High-speed, multi-Z confocal microscopy for voltage imaging in densely labeled neuronal populations," *Nat. Neurosci.* **26**(9), 1642–1650 (2023).
- A. S. Abdelfattah, J. Zheng, A. Singh, Y.-C. Huang, D. Reep, G. Tsegaye, A. Tsang, B. J. Arthur, M. Rehorova, C. V. L. Olson, Y. Shuai, L. Zhang, T.-M. Fu, D. E. Milkie, M. V. Moya, **T. D. Weber**, A. L. Lemire, C. A. Baker, N. Falco, Q. Zheng, J. B. Grimm, M. C. Yip, D. Walpita, M. Chase, L. Campagnola, G. Murphy, A. M. Wong, C. R. Forest, J. Mertz, M. N. Economo, G. Turner, M. Koyama, B.-J. Lin, E. Betzig, O. Novak, L. D. Lavis, K. Svoboda, W. Korff, T.-W. Chen, E. R. Schreiter, J. P. Hasseman, I. Kolb, "Sensitivity optimization of a rhodopsin-based fluorescent voltage indicator," *Neuron* **111**(10), 1547–1563 (2023).
- S. Gigan, O. Katz, H. B. de Aguiar, E. Andresen, A. Aubry, J. Bertolotti, E. Bossy, D. Bouchet, J. Brake, S. Brasselet, Y. Bromberg, H. Cao, T. Chaigne, Z. Cheng, W. Choi, T. Čížmár, M. Cui, V. Curtis, H. Defienne, M. Hofer, R. Horisaki, R. Horstmeyer, N. Ji, A. LaViolette, J. Mertz, C. Moser, A. P. Mosk, N. Pégard, R. Piestun, S. Popoff, D. Phillips, D. Psaltis, B. Rahmani, H. Rigneault, S. Rotter, L. Tian, I. M. Vellekoop, L. Waller, L. Wang, **T. Weber**, S. Xiao, C. Xu, A. Yamilov, C. Yang, H. Yılmaz, "Roadmap on Wavefront Shaping and deep imaging in complex media," *J. Phys. Photon.* **4**, 42501 (2022).
- T. D. Weber**, N. Khetan, R. Yang, and J. Mertz, "Ultrasound differential phase contrast using backscattering and the memory effect," *Appl. Phys. Lett.* **118**, 124103 (2021).
- J.-M. Tsang, H. J. Gritton, S. L. Das, **T. D. Weber**, C. S. Chen, X. Han, and J. Mertz, "Fast, multiplane line-scan confocal microscopy using axially distributed slits," *Biomed. Opt. Express* **12**(3), 1339–1350 (2021).
- T. D. Weber** and J. Mertz, "In vivo corneal and lenticular microscopy with asymmetric fundus retroillumination," *Biomed. Opt. Express* **11**(6), 3263–3273 (2020).
- T. D. Weber** and J. Mertz, "Non-mydratic chorioretinal imaging in a transmission geometry and application to retinal oximetry," *Biomed. Opt. Express* **9**(8), 3867–3882 (2018).
- R. Yang, **T. D. Weber**, E. D. Witkowski, I. G. Davison, and J. Mertz, "Neuronal imaging with ultrahigh dynamic range multiphoton microscopy," *Sci. Rep.* **7**, 5817 (2017).

Conference Talks

- T. D. Weber**, Y. D. Guzmán-Arocho, L. P. Wu, J. Zhang, J. G. Fujimoto, B. Gershman, S. Rosen, and Y. Sun, "Examination of Non-Processed Bladder Tissue by Nonlinear Microscopy," *USCAP Annual Meeting*, New Orleans, LA, 14 March 2023.

M. J. Counsilman, Y. Liu, Y. Sun, S. Rosen, L. Cahill, T. Yoshitake, J. Fujimoto, Y. Wu, A. Kleeman, J. Sun, **T. Weber**, S. Doshi, P. Chang, and A. Wagner, "Feasibility of nonlinear microscopy technique for evaluating prostatectomy margins in real time," AUA Annual Meeting, New Orleans, LA, 13–16 May 2022.

T. D. Weber, M. V. Moya, M. N. Economo, and J. Mertz, "Multi-plane 3D optical voltage imaging using high-speed multi-Z confocal microscopy," *Proc. SPIE* 11946, 11946-3 (2022).

T. D. Weber and J. Mertz, "High-resolution corneal and lens imaging with retroillumination microscopy," *Proc. SPIE* 11623, 1162323 (2021).

T. D. Weber and J. Mertz, "Corneal Imaging with Retroillumination Microscopy," *accepted for IONS Ireland 2020*, Cork, Ireland, 25–28 May 2020 (postponed).

T. D. Weber and J. Mertz, "Non-contact in vivo corneal microscopy with asymmetric fundus retroillumination" ARVO Imaging in the Eye Conference, Baltimore, MD, 1–2 May 2020 (moved online).

T. D. Weber and J. Mertz, "Ocular fundus imaging with transmitted light," *Proc. SPIE* 10858, 1085816 (2019).

T. D. Weber and J. Mertz, "Retina and Choroid Imaging with Transcranial Back-illumination," in *Biophotonics Congress: Biomedical Optics Congress 2018 (Microscopy/Translational/Brain/OTS)*, OSA Technical Digest (Optical Society of America, 2018), paper CF3B.8.

Conference Posters

T. D. Weber, S. dos Reis Freire, I. Nasser, D. E. Eckhoff, M. P. Curry, A. Bonder, Z. G. Jiang, J. G. Fujimoto, and G. A. Pihan, "Rapid High-Resolution H&E-Like Histopathology of Liver Tissue Immediately After Biopsy with Non-Linear Microscopy (NLM): Implications for Emergent Diagnosis of Severe Liver Diseases and Qualification of Donor Liver Allograft," *USCAP Annual Meeting*, Baltimore, MD, 26 March 2024.

S. dos Reis Freire, **T. D. Weber**, J. G. Fujimoto, and G. A. Pihan, "Most CT-Guided Core Needle Biopsies of Musculoskeletal Lesions Can Be Diagnosed Immediately After Biopsy in Unfixed, Undecalcified Tissue Using Nonlinear Microscopy (NLM)," *USCAP Annual Meeting*, Baltimore, MD, 26 March 2024.

Y. D. Guzmán-Arocho, **T. D. Weber**, L. P. Wu, J. G. Fujimoto, S. Rosen, and Y. Sun, "Rapid Examination of Non-Processed Renal Tissue by Nonlinear Microscopy: Benign Renal Parenchyma and Tumors," *USCAP Annual Meeting*, New Orleans, LA, 15 March 2023.

Y. D. Guzmán-Arocho, **T. D. Weber**, J. G. Fujimoto, S. Rosen, and Y. Sun, "Rapid Examination of Non-Processed Tissue by Nonlinear Microscopy: Benign Testicular Parenchyma and Tumors," *USCAP Annual Meeting*, New Orleans, LA, 15 March 2023.

D. R. Ram, **T. D. Weber**, L. Wang, J. G. Fujimoto, S. Rosen, and Y. Sun, "Augmentation of Prostatic Tissue Sampling for Molecular Analysis Using Nonlinear Microscopy," *USCAP Annual Meeting*, New Orleans, LA, 14 March 2023.

S. dos Reis Freire, **T. D. Weber**, J. G. Fujimoto, and G. A. Pihan, "Clinical Grade H&E-like Histopathology at Cellular and Subcellular Resolution Within Minutes of Tissue Biopsy or Resection Using Nonlinear Microscopy," *USCAP Annual Meeting*, New Orleans, LA, 14 March 2023.

Y. Wu, T. Yoshitake, L. C. Cahill, S. Rosen, L. P. Wu, D. Pauli, **T. D. Weber**, S. P. Doshi, P. Chang, A. A. Wagner, J. G. Fujimoto, and Y. Sun, "Nonlinear Microscopy: A Tool to Assess Intraoperative Radical Prostatectomy Margins," *USCAP Annual Meeting*, Los Angeles, CA, 22 March 2022.

T. D. Weber and J. Mertz, "Corneal Imaging with Retroillumination Microscopy," *accepted for Optics and Photonics in Medicine and Biology Gordon Research Conference, Lewiston, ME, 12–17 July 2020 (cancelled)*.

T. D. Weber and J. Mertz, "Non-contact phase-gradient corneal microscopy with asymmetric transillumination," *accepted for ARVO Annual Meeting, Baltimore, MD, 3–7 May 2020 (moved online)*.

T. D. Weber and J. Mertz, "Differential phase contrast corneal microscopy," *Proc. SPIE 11218, 1121871 (2020)*.

T. D. Weber and J. Mertz, "Transcranial Transmission Fundus Imaging," *ARVO Annual Meeting, Vancouver, Canada 28 Apr.–2 May 2019, abstract 6095*.

T. D. Weber and J. Mertz, "Transcranial vs. Transpupil Illumination for Fundus Imaging," *ARVO Imaging in the Eye Conference, Vancouver, Canada, 26–27 Apr. 2019, abstract PBo29*.

T. D. Weber and J. Mertz, "Transcranial Retina and Choroid Imaging," *Image Science Gordon Research Conference, Easton, MA, 17–22 June 2018*.

Patents

J. Mertz, A. Badon, **T. Weber**, S. Xiao, J.-M. Tsang Min Ching, "Multi-Z confocal imaging system," *U.S. Patent 11,042,016 (2021)*.

T. D. Weber and J. Mertz "Anterior Eye Microscopy and Uses Thereof" *U.S. Provisional Application 62/940,539 (2019)*.