Hao F. Zhang

Curriculum Vitae

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EMPLOYMENT

2013−present	Associate Professor, Department of Biomedical Engineering and Department of Ophthalmology (by courtesy), Northwestern University, IL
2011−2012	Assistant Professor, Department of Biomedical Engineering and Department of Ophthalmology (by courtesy), Northwestern University, IL
2007–2010	Assistant Professor, Department of Electrical Engineering and Computer Science University of Wisconsin-Milwaukee, Milwaukee, WI
2006–2007	Postdoctoral Fellow, Department of Biomedical Engineering Washington University in St. Louis, St. Louis, MO

EDUCATION

2006	Ph.D.	Biomedical Engineering, Texas A&M University, College Station, Texas
2000	M.S.	Biomedical Engineering, Shanghai Jiao Tong University, Shanghai, China
1997	B. E.	Computer Science, Shanghai Jiao Tong University, Shanghai, China
1997	B. E.	Instrumentation Engineering, Shanghai Jiao Tong University, Shanghai, China

PEER-REVIEWED JOURNAL ARTICLES ([§]Corresponding author; [*]Equal contribution)

1. Jisheng Xiao, Siyu Chen, Ji Yi, Hao F. Zhang, and Guillermo A. Ameer, "A cooperative copper metal–organic framework-hydrogel system improves wound healing in diabetes," *Advanced Functional Materials*, in press (2016)
2. Biqin Dong, Xiangfan Chen, Fan Zhou, Chen Wang, Hao F. Zhang, and Cheng Sun, "Gigahertz all-optical modulation using reconfigurable nanophotonic metamolecules," *Nano Letters*, in press (2016)
3. Andre Childs, Hao Li, Dani Lewittes, Biqin Dong, Wenzhong Liu, Xiao Shu, Cheng Sun, and Hao F. Zhang[§], "Fabricating customized hydrogel contact lens," *Scientific Reports* 6, 34905 (2016)
4. Ji Yi, Zhen Puyang, Liang Feng, Lian Duan, Peiji Liang, Vadim Backman, Xiaorong Liu, Hao F. Zhang[§], "Optical detection of early damages in retinal ganglion cells in a mouse model of partial optic nerve crush injury," *Investigative Ophthalmology & Vision Science* 57, 5665–5671 (2016)
5. Biqin Dong, Siyu Chen, Fan Zhou, Christina Chan, Ji Yi, Hao F. Zhang, and Cheng Sun, "Real-time Functional Analysis of Inertial Microfluidic Devices via Spectral Domain Optical Coherence Tomography," *Scientific Reports* 6, 3225 (2016)
6. Biqin Dong, Cheng Sun, and Hao F. Zhang[§], "Optical detection of ultrasound in photoacoustic imaging," *IEEE Transactions on Biomedical Engineering*, in press (2016)
7. Siyu Chen, Qi Liu, Xiao Shu, Brian Soetikno, Shanbao Tong, and Hao F. Zhang[§], "Imaging hemodynamic response after ischemia stroke in mouse cortex using visible-light optical coherence tomography," *Biomedical Optics Express* 7, 3377-3389 (2016)
8. Joel Kaluzny, Hao Li, Wenzhong Liu, Peter Nesper, Justin Park, Hao F. Zhang, and Amani A. Fawzi, "Bayer filter snapshot hyperspectral fundus camera for human retinal imaging," *Current Eye Research*, in press (2016)
9. Yunxiao Zhu, Ryan Hoshi, Siyu Chen, Ji Yi, Chongwen Duan, Robert D. Galiano, Hao F. Zhang, and Guillermo A. Ameer, "Sustained release of stromal cell derived factor-1 from an antioxidant thermoresponsive hydrogel enhances dermal wound healing in diabetes," *Journal of Controlled Release* 238, 114-122 (2016)
10. Biqin Dong[*], Luay Almassalha[*], Yolanda Stypula-Cyrus, Ben E. Urban, T. Quyen Nguyen, Cheng Sun, Hao F. Zhang[§], and Vadim Backman, "Super-resolution intrinsic fluorescence imaging of chromatin utilizing native,

unmodified nucleic acids for contrast," *Proceedings of the National Academy of Sciences of the USA* 113, 9716-9721 (2016)

11. Hao Li, Wenzhong Liu, Biqing Dong, Joel V. Kaluzny, Amani A. Fawzi, and Hao F. Zhang[§], "Snapshot hyperspectral retinal imaging using compact spectral resolving detector array," *Journal of Biophotonics*, doi:10.1002/jbio.201600053 (2016)
12. Biqin Dong[*], Luay Almassalha[*], Ben E. Urban[*], T. Quyen Nguyen[*], Satya Khuon, Teng-Leong Chew, Vadim Backman, Cheng Sun, and Hao F. Zhang[§], "Super-resolution spectroscopic microscopy via photon localization," *Nature Communications* 7, 12290 (2016)
13. Ben E. Urban, Biqing Dong, Vadim Backman, Cheng Sun, and Hao F. Zhang[§], "Subsurface super-resolution imaging of unstained polymer nanostructures," *Scientific Reports* 6, 28156 (2016)
14. Liang Feng, Hui Chen, Ji Yi, John B. Troy, Hao F. Zhang, and Xiaorong Liu, "Long-term protection of retinal ganglion cells and visual function by brain-derived neurotrophic factor in mice with sustained ocular hypertension," *Investigative Ophthalmology & Vision Science*, 57, 3793-802 (2016)
15. Siyu Chen, Xiao Shu, Ji Yi, Amani A. Fawzi, and Hao F. Zhang[§], "Dual-band optical coherence tomography using a single supercontinuum laser source," *Journal of Biomedical Optics* 21, 066013 (2016)
16. Wenzhong Liu and Hao F. Zhang[§], "Photoacoustic imaging of the eye: a mini review," *Photoacoustics*, in press (2016)
17. Xiao Shu, Magalie Bondu, Biqin Dong, Adrian Podoleanu, Lasse Leick, and Hao F. Zhang[§], "Single all fiber-based nanosecond-pulsed supercontinuum source for simultaneous multispectral photoacoustic microscopy and optical coherence tomography," *Optics Letters* 41, 2743-2746 (2016)
18. Ronil Shah, Brian Soetikno, Ji Yi, Wenzhong Liu, Dimitra Skondra, Hao F. Zhang, and Amani A. Fawzi, "Visible-light optical coherence tomography angiography for monitoring laser-induced choroidal neovascularization in mice," *Investigative Ophthalmology & Vision Science* 57, OCT86–OCT95 (2016)
19. Wenzhong Liu, Hao Li, Ronil S. Shah, Xiao Shu, Robert A. Linsenmeier, Amani A. Fawzi, and Hao F. Zhang[§], "Simultaneous optical coherence tomography angiography and fluorescein angiography in rodents with normal retina and laser-induced choroidal neovascularization," *Optics Letters* 40, 5782-5785 (2015)
20. Brian T. Soetikno, Ji Yi, Ronil Shah, Wenzhong Liu, Patryk Purta, Hao F. Zhang, and Amani A. Fawzi, "Inner retinal oxygen metabolism in the 50/10 oxygen-induced retinopathy model," *Scientific Report* 5, 16752 (2015)
21. Hao Li, Wenzhong Liu, and Hao F. Zhang[§], "Investigating the influence of chromatic aberration and optical illumination bandwidth on fundus imaging in rats," *Journal of Biomedical Optics* 20, 106010 (2015)
22. Xiao Shu, Wenzhong Liu, and Hao F. Zhang[§], "A Monte Carlo investigation on quantifying the retinal pigment epithelium melanin concentration by photoacoustic ophthalmoscopy," *Journal of Biomedical Optics* 20, 106005 (2015)
23. Ji Yi, Wenzhong Liu, Siyu Chen, Vadim Backman, Nader Sheibani, Christine Sorenson, Amani A. Fawzi, Robert A. Linsenmeier, and Hao F. Zhang[§], "Visible light optical coherence tomography measures retinal oxygen metabolic response to systemic oxygenation," *Light: Science & Applications* 4, e334 (2015)
24. Ji Yi, Siyu Chen, Xiao Shu, Amani Fawzi, and Hao F. Zhang[§], "Human retinal imaging using visible-light optical coherence tomography guided by scanning laser ophthalmoscopy," *Biomedical Optics Express* 6, 3701-3713 (2015)
25. Wenzhong Liu, Ji Yi, Siyu Chen, Shuliang Jiao, and Hao F. Zhang[§], "Measuring retinal blood flow in rats using Doppler optical coherence tomography without knowing eyeball axial length," *Medical Physics* 42, 5356 (2015), PMCID: PMC4545096
26. Siyu Chen, Ji Yi, Wenzhong Liu, Vadim Backman, and Hao F. Zhang[§], "Monte Carlo investigation of optical coherence tomography retinal oximetry," *IEEE Transactions on Biomedical Engineering* 62, 2308-2316 (2015), PMCID: PMC4565794
27. Siyu Chen, Ji Yi, and Hao F. Zhang[§], "Measuring oxygen saturation in retinal and choroidal circulations in rats using visible light optical coherence tomography angiography," *Biomedical Optics Express* 6, 2840-2853 (2015), PMCID: PMC4541512
28. Ben E. Urban, Ji Yi, Siyu Chen, Biqin Dong, Yongling Zhu, Steven H. DeVries, Vadim Backman, and Hao F. Zhang[§], "Super-resolution two-photon microscopy via scanning patterned illumination," *Physical Review E* 91, 042703 (2015)

29. Xiaojing Liu, Tan Liu, Rong Wen, Yiwen Li, Carmen A. Puliafito, Hao F. Zhang and Shuliang Jiao, "Optical coherence photoacoustic microscopy for *in vivo* multimodal retinal imaging," *Optics Letters* 40, 1370-1373 (2015)
30. Hui Chen, Yan Zhao, Mingna Liu, Liang Feng, Zhen Puyang, Ji Yi, Hao F. Zhang, Jianhua Cang, John B Troy and Xiaorong Liu, "Progressive degeneration of retinal and superior collicular functions in mice with sustained ocular hypertension," *Investigative Ophthalmology & Visual Science* 26, IOVS-14-15691 (2015), PMCID: PMC4365983
31. Biqin Dong, Hao Li, Zhen Zhang, Kevin Zhang, Siyu Chen, Cheng Sun, and Hao F. Zhang[§], "Isometric multimodal photoacoustic microscopy based on optically transparent micro-ring ultrasonic detection," *Optica* 2, 169-176 (2015)
32. Siyu Chen, Ji Yi, Biqin Dong, Cheng Sun, Patrick Kiser, Thomas J. Hope, Hao F. Zhang[§], "Imaging endocervical mucus anatomy and dynamics in macaque female reproductive track using optical coherence tomography," *Quantitative Imaging in Medicine and Surgery* 5, 40-45 (2015), PMCID: PMC4312293
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34. Wei Song, Qing Wei, Wenzhong Liu, Tan Liu, Ji Yi, Nader Sheibani, Amani Fawzi, Robert A Linsenmeier, Shuliang Jiao, and Hao F. Zhang[§], "A combined method to quantify the retinal metabolic rate of oxygen using photoacoustic ophthalmology and optical coherence tomography," *Scientific Reports* 4, 6525 (2014), PMCID: PMC4185377
35. Ji Yi, Siyu Chen, Vadim Backman, and Hao F. Zhang[§], "*In vivo* functional microangiography by visible-light optical coherence tomography," *Biomedical Optics Express* 5, 3603-3612 (2014), PMCID: PMC4206328
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37. Ben Urban, Ji Yi, Vladislav Yakovlev, and Hao F. Zhang[§], "Investigating femtosecond-laser induced two-photon photoacoustic generation", *Journal of Biomedical Optics* 19, 085001 (2014), PMCID: PMC4118047
38. Biqin Dong, Siyu Chen, Zhen Zhang, Cheng Sun, and Hao F. Zhang[§], "Photoacoustic probe using a micro-ring resonator ultrasonic sensor for endoscopic applications," *Optics Letters* 39, 4372-4375 (2014), PMCID: PMC4560527
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40. Wei Song, Qing Wei, Rui Zhang, and Hao F. Zhang[§], "*In vivo* photoacoustic chorioretinal vascular imaging in albino mouse," *Chinese Optics Letters* 12, 051704 (2014)
41. Hao Li[*], Biqing Dong[*], Zhen Zhang, Hao F. Zhang[§], and Cheng Sun, "A transparent broadband ultrasonic detector based on optical micro-ring resonator for functional photoacoustic imaging," *Scientific Reports* 4, 4496 (2014), PMCID: PMC3968454
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44. Tan Liu, Hao Li, Wei Song, Shuliang Jiao, and Hao F. Zhang[§], "Fundus camera guided photoacoustic ophthalmoscopy," *Current Eye Research* 38, 1229-1234 (2013), PMCID: PMC3986591
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49. Wenzhong Liu, Tan Liu, Wei Song, Ji Yi, and Hao F. Zhang[§], "Automatic retinal vessel segmentation based on active contours method in Doppler spectral-domain optical coherence tomography," *Journal of Biomedical Optics* 18, 016002 (2013), PMCID: PMC3537324
50. Wei Song[*], Qing Wei[*], Liang Feng, Vijay Sarthy, Shuliang Jiao, Xiaorong Liu, and Hao F. Zhang[§], "Multimodal photoacoustic ophthalmoscopy in mouse," *Journal of Biophotonics* 6, 505-512 (2013), PMCID: PMC3986594
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53. Wei Song[*], Qing Wei[*], Tan Liu, David Kuai, Janice M. Burke, Shuliang Jiao, and Hao F. Zhang[§], "Integrating photoacoustic ophthalmoscopy with scanning laser ophthalmoscopy, optical coherence tomography, and fluorescein angiography for a multimodal retinal imaging platform," *Journal of Biomedical Optics* 17, 061206 (2012), PMCID: PMC3380928, (***Featured article, 2012 top downloads***)
54. Vladislav V. Yakovlev, Georgi I. Petrov, Hao F. Zhang, Gary D. Noojin, Patrick A. Thomas, Michael L. Denton, Benjamin A. Rockwell, and Robert J. Thomas, "Chemically specific imaging through stimulated Raman photoexcitation and ultrasound detection: mini review," *Australian Journal of Chemistry* 65, 260–265 (2012), PMCID: PMC3691871
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57. Qing Wei, Tan Liu, Shuliang Jiao, and Hao F. Zhang[§], "Image chorioretinal vasculature in albino rats using photoacoustic ophthalmoscopy," *Journal of Modern Optics* 58, 1997–2001 (2011), PMCID: PMC3987921
58. Xiangyang Zhang, Hao F. Zhang, Carman A. Puliafito, and Shuliang Jiao, "Simultaneous *in vivo* imaging of melanin and lipofuscin in the retina with photoacoustic ophthalmoscopy and autofluorescence imaging," *Journal of Biomedical Optics* 16, 080504 (2011), PMCID: PMC3162618
59. (Invited) Hao F. Zhang[§], Carman A. Puliafito, and Shuliang Jiao, "Photoacoustic ophthalmoscopy for *in vivo* retinal imaging: current status and prospects," *Ophthalmic Surgery, Lasers & Imaging* 42, S106–S115 (2011), PMCID: PMC3291958
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61. Xiangyang Zhang, Minshan Jiang, Amani A. Fawzi, Xiang Li, K. Kirk Shung, Carmen A. Puliafito, Hao F. Zhang[§], and Shuliang Jiao, "Simultaneous dual molecular contrasts provided by the absorbed photons in photoacoustic microscopy," *Optics Letter* 35, 4018–4020 (2010), PMCID: PMC3293242
62. Vladislav V. Yakovlev, Hao F. Zhang[§], Gary D. Noojin, Michael L. Denton, Robert J. Thomas, and Marlan O. Scully, "Stimulated Raman photoacoustic imaging," *Proceedings of the National Academy of Sciences of the USA* 107, 20335–20339 (2010), PMCID: PMC2996670
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68. Jing Wang, Tan Liu, Shuliang Jiao, Ruimin Chen, Qifa Zhou, K. Kirk Shung, Lihong V. Wang, and Hao F. Zhang[§], "Saturation effect in functional photoacoustic imaging," *Journal of Biomedical Optics* 15, 021317 (2010), PMCID: PMC3188629
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71. Dong Liang, Hao F. Zhang, and Leslie Ying, "Compressed-sensing photoacoustic imaging based on random optical illumination," *International Journal of Functional Informatics and Personalised Medicine* 4, 394–406 (2009), PMCID: PMC3546493
72. Vladislav V. Yakovlev, Georgi I. Petrov, Hao F. Zhang, Gary D. Noojin, Michael L. Denton, Robert J. Thomas, and Marlan O. Scully, "Stimulated Raman scattering: old physics, new applications," *Journal of Modern Optics* 15, 1970–1973 (2009), PMCID: PMC2846720
73. Shuliang Jiao, Zhixing Xie, Hao F. Zhang[§], and Carmen A. Puliafito, "Simultaneous multimodal imaging with integrated photoacoustic microscopy and optical coherence tomography," *Optics Letters* 34, 2961–2963 (2009), PMCID: PMC2883610
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78. Konstantin Maslov[*], Hao F. Zhang[*], Song Hu[*], and Lihong V. Wang, "Optical-resolution photoacoustic microscopy for *in vivo* imaging of single capillaries," *Optics Letters* 33, 929–931 (2008) (***Top 5 download between 2008-2013***)
79. Konstantin Maslov[*], Hao F. Zhang[*], and Lihong V. Wang, "Effects of wavelength-dependent fluence attenuation on the noninvasive photoacoustic imaging of hemoglobin oxygen saturation in subcutaneous vasculature *in vivo*," *Inverse Problems* 23, S113–S122 (2007)
80. Hao F. Zhang[*], Konstantin Maslov[*], and Lihong V. Wang, "*In vivo* imaging of subcutaneous structures using functional photoacoustic microscopy," *Nature Protocols* 4, 797–804 (2007)
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82. Mathangi Sivaramakrishnan, Konstantin Maslov, Hao F. Zhang, George Stoica, and Lihong V. Wang, "Limitations of quantitative photoacoustic measurement of blood oxygenation in small vessels," *Physics in Medicine and Biology* 52, 1349–1361 (2007)
83. Hao F. Zhang, Konstantin Maslov, Meng-Lin Li, George Stoica, and Lihong V. Wang, "*In vivo* volumetric imaging of subcutaneous microvasculature using photoacoustic microscopy," *Optics Express* 14, 9317−9323 (2006)
84. Hao F. Zhang, Konstantin Maslov, George Stoica, and Lihong V. Wang, "Imaging acute thermal burns by photoacoustic microscopy," *Journal of Biomedical Optics* 11, 054033 (2006)

85. Hao F. Zhang*, Konstantin Maslov*, George Stoica, and Lihong V. Wang, "Functional photoacoustic microscopy for high-resolution and noninvasive *in vivo* imaging," *Nature Biotechnology* 24, 848−851 (2006)
86. Jung-Taek Oh, Meng-Lin Li, Hao F. Zhang, Konstantin Maslov, Grogre Stoica, and Lihong V. Wang, "Three-dimensional imaging of skin melanoma *in vivo* by dual-wavelength photoacoustic microscopy," *Journal of Biomedical Optics* 11**,** 034032 (2006)
87. Meng-Lin Li, Hao F. Zhang, Konstantin Maslov, and Lihong V. Wang, "Improved *in-vivo* photoacoustic microscopy based on a virtual-detector concept," *Optics Letters* 31, 474−476 (2006)

BOOKS AND BOOK CHAPTERS

1. Vadim Backman, Adam Wax, and Hao F. Zhang, *Biophotonics Laboratory* (CRC Press, 2016)
2. Hao F. Zhang and Shuliang Jiao, "*Photoacoustic microscopy and its ophthalmic applications*" in *Emerging Imaging Technologies in Medicine*, edited by Mark A. Anastasio and Patrick J. La Riviere (Taylor & Francis, 2013)
3. Shuliang Jiao and Hao F. Zhang, "*Multimodal microscopy for comprehensive tissue characterization*" in *Advanced Biophotonics: Slicing Tissue with Photons*, edited by Valery Tuchin and Ricky Wang (Taylor & Francis 2012)
4. Hao F. Zhang, Konstantin Maslov, and Lihong V. Wang, "*Dark-field confocal photoacoustic microscopy*" in *Photoacoustic Imaging and Spectroscopy*, edited by Lihong V. Wang (Taylor & Francis, New York, NY, 2008)

INVITED PRESENTATIONS

1. Invited speaker, *Frontiers in Imaging Science*, HHMI Janelia Research Campus, Ashburn, VA (2017)
2. Invited speaker, *AAAS Annual Meeting*, Boston, MA (2017)
3. Seminar, Department of Biomedical Engineering, University at Buffalo, Buffalo NY (2016)
4. Seminar, College of Applied Physics, University of Kent, Canterbury, UK (2016)
5. Seminar, Department of Vision Neuroscience, University College London, London, UK (2016)
6. Seminar, Department of Biomedical Engineering, Nan Jing University, Nan Jing, China (2016)
7. Seminar, Department of Electronic Engineering, SooChow University, Su Zhou, China (2016)
8. Invited speaker, *Optics Society of America Biomedical Optics Workshop*, Fort Lauderdale, FL (2016)
9. Seminar, Genentech, South San Francisco, CA (2016)
10. Invited speaker, *Hyperspectral Imaging Workshop*, *IMEC Technology Forum*, Brussels, Belgium (2015)
11. Seminar, NKT Photonics, Copenhagen, Denmark (2015)
12. Invited speaker, *Association for Ocular Circulation Meeting*, Beijing, China (2015)
13. Seminar, Department of Ophthalmology, University of Pittsburg School of Medicine, Pittsburg, PA (2015)
14. Invited speaker, *Biennial Meeting of International Society for Eye Research*, San Francisco, CA (2014)
15. Seminar, Department of Biomedical Engineering, University of Wisconsin, Madison, WI (2014)
16. Invited speaker, *Twenty Years of Super-Resolution – The Next 20 Years Symposium*, Turku, Finland (2013)
17. Invited speaker, *The International Forum of Advancing Novel Digital and Minimal-Invasive Biomedical Engineering*, Shanghai, China (2013)
18. Seminar, Department of Physics, Harbin Institute of Technology, Harbin, Hei Long Jiang, China (2013)
19. Invited speaker, *MOI Cross-sectional Group Session: Functional Optical Imaging*, A*ssociation for Research in Vision and Ophthalmology Annual Conference*, Seattle WA (2013)
20. Lecturer, *NSF Short Course on Novel Super-resolution Methods for Bioimaging*, San Diego, CA (2013)
21. Seminar, College of Information Technology, Wuhan University of Technology, Wuhan, Hu Bei, China (2013)
22. Seminar, Department of Ophthalmology, Tong Ji Hospital, Hua Zhong University of Science and Technology, Wuhan, Hu Bei, China (2013)
23. Seminar, Department of Chemistry, University of Texas at Dallas, Dallas, TX (2013)
24. Seminar, Department of Biomedical Engineering, Texas A&M University, College Station, TX (2013)

25. Invited speaker, *Design and Quality of Biomedical Technologies Conference*, *SPIE Photonics West*, San Francisco, CA (2013)
26. Seminar, Department of Ophthalmology and Vision Science, The University of Illinois Chicago, Chicago, IL (2013)
27. Seminar, Fitzpatrick Institute for Photonics, Duke University, Durham, NC (2012)
28. Invited speaker, *Association for Ocular Circulation Meeting*, Portland, Oregon (2012)
29. Invited speaker, *Northwestern University-Shanghai Jiao Tong University Mini-symposium on Vision Research*, Shanghai, China (2012)
30. Seminar, Department of Biomedical Engineering, University of Iowa, Iowa City, IA (2012)
31. Applied Physics Colloquium, National University of Ireland, Galway, Ireland (2012)
32. Seminar, Promega Corp., Madison, WI (2012)
33. Invited speaker, *MEMS Adaptive Optics VI Conference*, *SPIE Photonics West*, San Francisco, CA (2012)
34. Invited speaker, *Frontiers in Science*, Shanghai Jiao Tong University, Shanghai, China (2011)
35. Keynote speaker, *Observing the Invisible – Novel Imaging Horizons*, Center for Biotechnology, Turku, Finland (2011)
36. Invited speaker, *Microscopic Image Analysis with Applications to Biology*, *ACM Conference on Bioinformatics, Computational Biology and Biomedicine*, Chicago, IL (2011)
37. Invited speaker, *Chicago Innovation Spotlight*, Chicago, IL (2011)
38. Invited speaker, 1st Workshop on Data Analysis and Modeling Retina in Health and Disease, Madison, WI (2011)
39. Grand Round, Department of Ophthalmology, Northwestern University (2011)
40. Invited speaker, *Cancer Center Program in Cancer Bioengineering*, *Nanotechnology and Chemistry Mini-Symposium*, Northwestern University (2011)
41. Seminar, Cell Imaging Facility, Feinberg School of Medicine, Northwestern University (2011)
42. Seminar, Advanced Topics in Vision, Northwestern University (2011)
43. Invited speaker, *The 41th Winter Colloquium on the Physics of Quantum Electronics*, Snowbird, UT (2011)
44. Inaugural speaker, The Medical College of Wisconsin *The Spotlight on Translational Science Seminar*, Milwaukee, WI (2010)
45. Invited speaker, The Medical College of Wisconsin *Ophthalmology Annual Fall Alumni Symposium*, Milwaukee, WI (2010)
46. Invited speaker, *Optics Society of America Frontiers in Optics*, Rochester, NY (2010)
47. Seminar, Athinoula A. Martinos Center for Biomedical Imaging, Harvard University (2010)
48. Seminar, Department of Ophthalmology, University of University-Madison (2010)
49. Seminar, Department of Ophthalmology, Northwestern University (2010)
50. Seminar, Department of Bioengineering, University of Washington (2010)
51. Seminar, Department of Biomedical Engineering, Northwestern University (2010)
52. Seminar, Department of Biomedical Engineering, University of Wisconsin-Madison (2010)
53. Seminar, Department of Biomedical Engineering, University of Minnesota (2009)
54. Colloquium, Department of Physics, University of Wisconsin-Milwaukee (2008)
55. Seminar, Department of Radiology, University of Chicago (2008)
56. Seminar, Center for Quality Engineering & Failure Prevention, Northwestern University (2008)
57. Seminar, Department of Biophysics, Medical College of Wisconsin (2008)
58. Seminar, Laboratory of Optical and Computational Instrumentation, University of Wisconsin-Madison (2007)
59. Seminar, Department of Biological Engineering, University of Missouri-Columbia (2007)
60. Seminar, Department of Mechanical, Aerospace, and Biomedical Engineering, University of Tennessee (2007)
61. Seminar, Department of Biomedical Engineering, Stony Brook University (2007)

INTELLECTUAL PROPERTY

1. Ben E Urban, The-Quyen Nguyen, Biqin Dong, Vadim Backman, Cheng Sun, and Hao F Zhang, "Spectroscopic Super-Resolution Microscopy," provisional patent filed (2015)
2. Jay Patel, Kieren Patel, Rushi Talati, Cheng Sun, and Hao F. Zhang, "Three-dimensional printing of a customizable accommodating intraocular lens," provisional patent filed, No. 62/103,416 (2015)
3. Wenzhong Liu and Hao F. Zhang, "Systems and methods for functional optical coherence tomography," provisional patent filed, 62/202,617 (2015)
4. Ji Yi, Siyu Chen, and Hao F. Zhang, "Method of retinal vascular imaging," provisional patent filed (2015)
5. Hao Li, Wenzhong Liu, Biqin Dong, Amani Fawzi, and Hao F. Zhang, "High-speed spectroscopic functional imaging," provisional patent filed, No. 62/216,079 (2015)
6. Ben Urban, Biqin Dong, Cheng Sun, and Hao F. Zhang, "Intrinsic-contrast super-resolution optical microscope," patent filed, No. 62/055,398 (2014)
7. Cheng Sun and Hao F. Zhang, "Method, system, and apparatus of all-optics ultrasound sensor," patent filed, 14/299,807 (2014)
8. Ji Yi, Wenzhong Liu, Vadim Backman, and Hao F. Zhang, "Methods, systems, and apparatus of functional optical coherence tomography," US patent, No. 14/698,641
9. Ji Yi, Qing Wei, Vadim Backman, and Hao F. Zhang, "Methods and apparatus for laser scanning structured illumination microscopy and tomography," US patent, No. 13/902,288
10. Hao F. Zhang and Shuliang Jiao, "Method, system, and apparatus of photoacoustic ophthalmoscope," US patent No. 8016419
11. Hao F. Zhang and Shuliang Jiao, "Method, system, and apparatus of optical coherence tomography guided optical scanning photoacoustic microscopy," US patent No. 8025406

NEWS REPORTS

1. "Feature of Week 10/16/2016," www.OCTNews.org
2. Editor's highlight and cover image, *Journal of Applied Physics*, October 2014
3. "*Combining sound and light for retinal imaging*," SPIE Newsroom, February 2013
4. "*Watching while listening to the interaction of photons with bio-tissues*," SPIE Newsroom, January 2013
5. Featured article, *Journal of Biomedical Optics* 2012
6. Lynn Savage, "Sound and light, signifying improved imaging," *Biophotonics International Magazine* 9, 21–25 (2010)
7. Cover story, *Milwaukee Engineer*, Spring 2010
8. Research highlight, University of Wisconsin Research 2010
9. "Feature Image," Optical Society of America, Virtual Journal of Biomedical Optics Vol. 5, Issue 6, 03/15/2010
10. "Feature of the Week 03/14/2010," www.OCTNews.org
11. Radio interview, Milwaukee Public Radio (National Public Radio), June 25th, 2009
12. Laura L. Hunt, news coverage in *UWM Today* and *The Business Journal of Milwaukee*, May 15th, 2009
13. Kathleen Gallagher, news coverage in *Milwaukee Journal Sentinel*, Jan. 5th, 2009
14. K. Robinson, "Scientists harness photoacoustic effect for imaging," *Biophotonics International Magazine* 13, 55−56 (2006)
15. Research highlights, *Nature Reviews Drug Discovery* 5, 634 (2006)
16. Research highlights, *Nature Reviews Molecular Cell Biology* 7, 554 (2006)
17. K. P. Herlihy, "Virtual-detector-based photoacoustic microscopy improves *in vivo* imaging," *Material Research Society Bulletin* 31, 366−367 (2006)

HONORS AND AWARDS

2016	2016 SPIE Translational Research Award
2013	Young Investigator Award, Georgia Tech Frontiers in Bioengineering Workshop
2012–2013	Fellow, Searle Center for Teaching Excellence, Northwestern University
2011	National Eye Institute Travel Grant to attend the A*ssociation for Research in Vision and Ophthalmology Annual Conference*, Fort Lauderdale, FL
2011	National Science Foundation CAREER award

2011	Best Abstract Award Runner-up, *Physics of Quantum Electronics*, Snowbird, UT
2010	Juvenile Diabetes Research Foundation Travel Grant to attend the *Association for Research in Vision and Ophthalmology Diabetic Retinopathy Summer Conference*, Bethesda, MD
2009–2011	NIH K-30 Clinical Research Scholar
2009–2014	Shaw Scientist Award, The Greater Milwaukee Foundation (two awards per year to junior faculty members in Wisconsin to advance research in biochemistry, biological science, and cancer research; the first engineer awardee since the program was created in 1982)

TEACHING

Quarter-long courses at Northwestern University

1. Fall 2011-2015, *BME 305 Introduction to Biomedical Signals and Electrical Circuits*
2. Fall 2011-2015, *BME 333 Modern Optical Microscopy and Imaging*
3. Spring 2011, *EDC1 Engineering Design and Communication*

Semester-long course at University of Wisconsin-Milwaukee

4. Fall 2009 and Spring 2010, *EE301 Electronic Circuits I*
5. Spring 2009, *EE539 Introduction to Nuclear Magnetic Resonance Imaging*
6. Fall 2008, *EE490/890 Introduction to Bio-optical Imaging*
7. Spring 2008 and Fall 2010, *EE490/890 Introduction to Biomedical Optics*
8. Fall 2007, *EE537 Fundamental of Neuroimaging Techniques*

REVIEWING SERVICE

1. *Ad hoc* roster member, NIH ZRG1 AARR-D 51, August 2016
2. *Ad hoc* roster member, NIH NOIT, June 2016
3. *Ad hoc* roster member, NIH ZEY1 VSN(01), June 2016
4. *Ad hoc* roster member, NIH ZHL1 CSR-P (M1), February 2016
5. *Ad hoc* roster member, NIH ZCA1 TCRB-9 (J1) S, December 2015
6. *Ad hoc* roster member, NIH ZEY1 VSN (01), July 2015
7. *Ad hoc* roster member, NIH ETTN-12, February and November 2015
8. *Ad hoc* roster member, NIH BMIT-B, October 2014
9. Grant reviewer, Austrian Science Fund, Austrian, September 2014
10. Grant reviewer, Strategic Awards Program, Wellcome Trust, UK, September 2014
11. Grant reviewer, Catalyst Grant Program, University of Wisconsin Milwaukee Research Foundation, May 2014
12. Panelist, NSF CBET Major Research Instrument Program, May 2014
13. *Ad hoc* roster member, NIH ETTN-12, February 2014
14. Grant reviewer, The Hercules Foundation, Brussel, Belgium, December 2013
15. Grant reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC), December 2013
16. *Ad hoc* roster member, NIH ETTN-12, November 2013
17. *Ad hoc* roster member, NIH ZRG1 DTCS-A (81) S, September 2013
18. Grant reviewer, North Carolina Biotechnology Center, February, 2013
19. Panelist, NSF Biophotonics Program, December 2012
20. Grant reviewer, Agency for Science, Research & Technology in Singapore, October, 2012
21. Panelist, NSF SBIR/STTR Phase I Virtual Panel-Ophthalmology, September 2012
22. *Ad hoc* roster member, NIH ZRG1 DTCS-A (81) S, June and September 2012
23. Grant reviewer for Hong Kong Research Grants Council, May 2012
24. Mail reviewer for NSF Instrumentation Development Program, May 2012
25. Grant reviewer for the University of Wisconsin-Milwaukee, January 2012
26. Grant reviewer for Foundation for Polish Science, December 2011
27. *Ad hoc* roster member, NIH ZRG1 ETTN-E (12) B, June 2011
28. Reviewer of book proposals for Taylor & Francis, March 2011
29. *Ad hoc* roster member, NIH NIDDK ZDK1 GRB-7 M1 S, March 2011
30. Grant reviewer for the Clinical and Translational Science Institute of Southeast Wisconsin, The Medical College of Wisconsin, 2010
31. Grant reviewer for the Juvenile Diabetes Research Foundation, 2010
32. Reviewer of book proposals for Wiley-Blackwell, 2010

33. *Ad hoc* roster member, NIH NIBIB ZRG1 SBIB-V (58) R, May, 2009
34. *Ad hoc* reviewer for *Journal of Biomedical Optics*, *Applied Optics*, *Inverse Problems*, *Medical Physics*, *Physics in Medicine and Biology*, *IEEE Journal of Selected Topics in Quantum Electronics*, *Microscopy and Microanalysis*, *Optics Letters*, *Optics Express*, *Biomedical Optics Express*, *Archives of Ophthalmology*, and *Circulation: Cardiovascular Imaging*, *PLOS One*, *Journal of Acoustical Society of America*, *Light: Science & Applications, Scientific Reports, and Nature Photonics.*

EDITORIAL SERVICE

2016-present	Associate Editor, *Biomedical Optics Express*
2015–present	Editorial board member, *Scientific Reports*
2012–present	Editorial board member, *Current Eye Research*

PROFESSIONAL SERVICE

2016	Organization Committee member, 2016 *International Society on Oxygen Transport to Tissue* (ISOTT2016), Chicago, IL
2015	Organization Committee member, 4th International Symposium on Laser Ultrasonics & Advanced Sensing (LU2015), Evanston, IL
2014	Organization Committee member, 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'14), Chicago, IL
2014	Co-chair, 2014 Association for Ocular Circulation Conference, Chicago, IL
2014	Guest editor, *Biomedical Optics Express*
2014	Session organizer, *Innovations in Imaging Animal Models of Disease*, 2014 *International Society for Eye Research Biennial Meeting*, San Francisco, CA
2014	Program co-chair, *Photoacoustic Imaging and Spectroscopy*, 2014 *Optical Society of America BIOMED Topical Conference*, Miami, FL
2011	*Ad hoc* associate editor, *Medical Physics*
2011	Session moderator, *Retinal imaging: new approaches/new targets*, A*ssociation for Research in Vision and Ophthalmology Annual Conference*, Fort Lauderdale, FL
2011	Session co-chair, *Ultrasound Imaging*, *IEEE International Symposium on Biomedical Imaging*, Chicago, IL
2011	Guest editor, *Biomedical Optics Express*
2009	Track Co-chair, 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Minneapolis, MN

UNIVERSITY SERVICE

2016–present	Faculty Senate, Northwestern University
2014–present	Advisory Committee, Medical Scientist Training Program (MSTP), Feinberg School of Medicine, Northwestern University
2013–2016	Director of Graduate Study (DGS), Department of Biomedical Engineering, Northwestern University
2013–present	Advisory Committee, Center for Advanced Molecular Imaging, Northwestern University
2012–2015	Laser Safety Committee, Northwestern University
2011–2014	Undergraduate Curriculum Committee, Department of Biomedical Engineering, Northwestern University
2011–present	Advisory Committee, Biological Imaging Facility, Northwestern University
2011–2013	Graduate Admission Committee, Department of Biomedical Engineering, Northwestern University
2008–2010	Institutional Animal Care and Use Committee, University of Wisconsin-Milwaukee
2008–2010	Animal Resource Center Policy Committee, University of Wisconsin-Milwaukee
2007	Biomedical Cluster Hire Group, University of Wisconsin-Milwaukee

CURRENT GROUP MEMBERS

Postdoctoral fellow: Hao Li, Ben Urban, Biqin Dong, Lian Duan
Ph.D. student: Siyu Chen, Xiao Shu, Brain Soetikno (M.D./Ph.D.), Janel Davis, Lisa Beckmann, Ki-Hee Song

Visiting pre-doctoral fellow: Qi Liu, Jianmin Hu
Undergraduate student: Jennifer Ryu

PAST GROUP MEMBERS

Postdoctoral fellow/research associate/research assistant professor

Name	Dates	Last known position
Ji Yi	2012-2015	Assistant Professor, Department of Medicine, Boston University, Boston, MA
Qing Wei	2009-2012	Professor, Section Director, China Automation Research Institute, Xi'an, China.
Fengli Gao	2010-2012	Associate Professor, School of Electronic Engineering, Jilin University, Jilin, China.
Zhixing Xie	2008-2010	Research Assistant Professor, Department of Radiology, University of Michigan, Ann Arbor, MI

Graduate student

Name	Degree	Dates	Thesis and last known position
Wenzhong Liu	Ph.D.	2011-2016	Thesis: Development of functional imaging modalities to investigate complications of retinal oxygen metabolism in early diabetes Chief Technology Officer, Opticent Inc.
Kevin Zhang	M.S.	2012-2014	Thesis: Photoacoustic imaging of corneal angiogenesis MSTP student at University of Cincinnati
Tan Liu	Ph.D.	2008-2012	Thesis: *Multimodal imaging based on photoacoustic microscopy* Optoelectronics Engineer, Automated Precision Inc.
Wei Song	Visiting Ph.D.	2010-2012	Thesis: *Multimodal retinal imaging in rodent* Host University: Harbin Institute of Technology, China
Jing Wang	Visiting Ph.D.	2008-2010	Thesis: *Optical functional imaging of the retina: technical development* Host University: Jilin University, China Investigator, Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences, Su Zhou, Jiang Su, China
Joanna Pylvanainen	Visiting M.S.	2011	Host University: University of Turku, Turku, Finland. Ph.D. student, University of Turku
Santhosh Yegnaraman	M.S.	2010-2011	Thesis: *Ghost flowmetry: numerical simulation* Application Engineer, Elutions Inc., Waukesha, WI.
Daniel D. Zirbel	M.S.	2008-2011	Thesis: *Monte Carlo study of retinal oximetry*

Undergraduate student

Name	Dates	Last known position
Christina Chan	2015	
Eric Y. Yang	2015	
Andre Childs	2014	Undergraduate student, University of Texas, San Antonio
Chintan Pathak	2012-2014	Medical School, Northwestern University
Ben Williams	2013	Undergraduate Student, Trinity College
David Qiu	2011-2013	Ph.D. student, Department of Electrical and Computer Engineering, University of Illinois Urbana-Champaign
Steffi Perkins	2012-2013	Ph.D. student, Department of Bioengineering, Stanford University
Edward Jen	2010-2011	
Ryan Frazier	2010	Ph.D. student, Stanford University
Tilman Schmidt	2009	Fulbright undergraduate scholar from Germany
Karanvir S. Kaleka	2009-2010	Electrical Engineer at The Dow Chemical Company, Midland, MI

Alana M. Soehartono	2009-2010	Graduate student, Department of Electrical Engineering and Computer Science, University of Wisconsin-Milwaukee, Milwaukee, WI

Summer high-school student

Name	Dates	Last known position
Jennifer Ryu	2015	Undergraduate student (class of 2020), Northwestern University
Eric Ren	2015	Adlai E. Stevenson High School, Lincolnshire IL
Sophia Liu	2014	Undergraduate student (class of 2019), California Institute of Technology
Daniella Lewittes	2014	Undergraduate student (class of 2019), Northwestern University
Garima Gupta	2012	Undergraduate student (class of 2016), University of Michigan
David Kuai	2011	Undergraduate student (Class of 2015), University of Wisconsin, Madison
Matthew Volpe	2011	Ph.D. student, Harvard University

GROUPMEMBER AWARDS

2016–2021	Brain Soetikno, NIH F30 pre-doctoral fellowship
2016	Wenzhong Liu, Northwestern University Biomedical Engineering Dissertation award
2015	Brain Soetikno, SPIE Optics and Photonics Education Scholarship
2015	Brain Soetikno, Siyu Chen, ARVO Annual Conference Travel Grant
2014	Eric Yang, Northwestern University McCormick Undergraduate Student Summer Research Opportunities Award
2014	Christina Chan, Northwestern University Biomedical Engineering Undergraduate Student Summer Research Award
2014–2016	Ji Yi, Juvenile Diabetes Research Foundation (JDRF) postdoctoral fellow award.
2013–2016	Wenzhong Liu, Howard Hughes Medical Institute (HHMI) International Fellowship, one of 42 in the U.S.A.
2013–2014	Ji Yi, "Non-invasively quantifying retinal oxygen saturation by visible-light optical coherence tomography," Research Seed Grant, Illinois Society for Prevention of Blindness
2013	Chintan Pathak, Northwestern University Biomedical Engineering Undergraduate Student Summer Research Award
2013	Kevin Zhang, Overall Oral Presentation Award, 2013 Chicago Area Undergraduate Research Symposium
2012	Kevin Zhang, Northwestern University Undergraduate Research Grant
2012	David Qiu and Kevin Zhang, *Fifty for the Future* award, Illinois Technology Foundation
2012–2013	Qing Wei, "High-definition choroidal vascular imaging," Research Seed Grant, Illinois Society for Prevention of Blindness
2010	Karanvir S. Kaleka, Outstanding Undergraduate Student Award, College of Engineering & Applied Science, University of Wisconsin-Milwaukee
2010	Tan Liu, 1st Place Grand Award, graduate student poster competition, College of Engineering & Applied Science, University of Wisconsin-Milwaukee