

Puxiang Lai, Ph.D.

Assistant Professor
Interdisciplinary Division of Biomedical Engineering
The Hong Kong Polytechnic University, Hong Kong
Office: ST410
Tel: (+852) 3400 8900
Fax: (+852) 2334 2429
Email: puxiang.lai@polyu.edu.hk



Research Interests

Interactions of sound-light-matter as well as its applications in biomedicine, including

- Optical focusing at depths in biological tissue
- Deep-penetrating optical imaging, sensing, therapy, stimulation, and control
- Photoacoustic/optoacoustic imaging
- Ultrasound-modulated optical tomography (also called acousto-optic imaging)
- Biomedical optical imaging
- Biomedical ultrasound for diagnostics and therapy

Education and Training

- **NIH Postdoctoral training** (major in Biomedical Optics) Jul. 2010 – Aug. 2015
Department of Biomedical Engineering, Washington University in St. Louis, USA
Mentor: Professor Lihong V. Wang
- **Doctor of Philosophy** (major in Biomedical Ultrasound and Optics) Sep. 2005 – Jan. 2011
Department of Mechanical Engineering, Boston University, USA
Co-advisors: Professor Ronald A. Roy and Professor Todd W. Murray
- **Master of Science** (major in Physical Acoustics) Sep. 2002 – Jul. 2005
Institute of Acoustics, Chinese Academy of Sciences, China
Co-advisors: Professor Bixing Zhang and Professor Chenghao Wang (Academician)
- **Bachelor of Engineering** (major in Biomedical Engineering) Sep. 1998 – Jul. 2002
Department of Biomedical Engineering, Tsinghua University, China
Co-advisors: Professor Guangzhi Wang and Professor Haishu Ding

Working Experience

- **Assistant Professor (tenure-track)** Sep. 2015 – Present
Biophotonics Lab, Interdisciplinary Division of Biomedical Engineering, Hong Kong Polytechnic University, Hong Kong SAR, China
- **Postdoctoral Research Associate** Jul. 2010 – Aug. 2015

Optical Imaging Laboratory, Department of Biomedical Engineering, Washington University in St. Louis, USA

- **Graduate Research Assistant (Ph.D.)** Sep. 2005 – Jun. 2010
Physical Acoustics Lab, Dept. of Mechanical Engineering, Boston University, USA
- **Graduate Research Assistant (M.S.)** Sep. 2002 – Jul. 2005
Acoustic MEMS Lab, Institute of Acoustics, Chinese Academy of Sciences, China

Research Grants

- Major Equipment and Startup Fund (2015-2018, **PI**), 1,950,000 HKD, "Deep-Tissue Optical Focusing and its Applications in Biomedicine", Hong Kong Polytechnic University, Hong Kong, 2015
- Early Career Scheme (2017-2019, **PI**), 782,164 HKD, "Deep-Tissue Optical Focusing towards in vivo by Fast Photoacoustically guided Wavefront Shaping (PAWS)", No. PolyU 252044/16E, Hong Kong Research Grant Council (RGC), Hong Kong, July 2016
- General Scheme (2017-2020, **PI**), 580,000 RMB, "Noninvasive high-resolution optical focusing in deep living biological tissue and its applications", No. 81671726, National Science Foundation of China, China, July 2016
- Key Instrumentation Development Scheme (2017-2021, **Co-PI**), 6,350,000 RMB (1/3 allocated to me), "Development and application of small-animal whole-body high-speed photoacoustic molecular imaging instrument", National Science Foundation of China, China, July 2016
- Research Fellowship Scheme (2016-2018, **Co-I**), 755,898.20 HKD, "Photoacoustic Molecular Imaging of Osteoarthritic Pain - A Proof-of-Concept Study", Health and Medical Research Fund (HMRF), Hong Kong, 2016

Selected Awards and Honors

- Hong Kong RGC Early Career Award, October 2016
- 12th National 1000 Talent Plan Youth Scholar (第12批中国国家千人计划青年学者), January 2016
- Seno Medical Best (Oral) Paper Award, Photons Plus Ultrasound: Imaging and Sensing Conference (part of SPIE Photonics West), 2014
- Seno Medical Best (Poster) Paper Award, Photons Plus Ultrasound: Imaging and Sensing Conference (part of SPIE Photonics West), 2014
- Best Poster, 2010 Meeting of the Ultrasonic Industry Association, 2010
- Best Poster, Research and Industrial Collaboration Conference hosted by the NSF Bernard M. Gordon Center of Subsurface Sensing and Imaging Systems, 2007
- Graduate Research Fellowship, Boston University, 2006 – 2010
- Dean's Fellowship, Boston University, 2005 – 2006
- Graduate Research Fellowship, Chinese Academy of Sciences, 2002 – 2005

Professional Activities

Teaching:

- Fundamentals of Biomedical Instrumentation II (PolyU BME31121), 2015-2016 Semester 2, 2016-2017 Semester 2
- Biomedical Instrumentation and Sensors (PolyU BME31114), 2016-2017 Semester 1
- Biosignal Processing (PolyU BME31116), 2017-2018 Semester 2

Academic advising

- PhD students: Huanhao LI, Fei CAO, Yingying ZHOU
- Research assistants: Xiazi HUANG, Zhipeng YU, Tianting ZHONG
- Undergraduate research helpers: Zihao LI, Siu Ho WONG, Xiqian LIN

Professional service:

- Symposium Chair, 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Minisymposium: Frontiers in Wavefront Shaping Techniques, July 2017
- Associate Editor for the IEEE EMBS Conference Editorial Board (CEB), 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, July 2017
- Symposium Chair, the 8th WACBE World Congress on Bioengineering, Special Symposium 3: Light-sound Synergy and Its Applications in Biomedicine, July 2017
- Scientific Program Committee, the 8th WACBE World Congress on Bioengineering, July 2017
- Proposal reviewer for NWO (Netherlands Organization for Scientific Research) and NSFC (National Natural Science Foundation of China), 2017
- Editorial board member of Biomedical Imaging and Bioengineering journal, January 2017-
- Judge, IEEE EMBS HK-Macau Chapter Student Paper Competition, August 2016
- Session chair, the 8th International Conference on Information Optics and Photonics, Shanghai, China, July 17-20, 2016
- Overseas editorial board member and topic editor, China Medical Devices, 2015-
- Session chair, the East Lake International Forum for Outstanding Overseas Young Scholars, Sub-session of Life Science and Technology, Wuhan, China, May 2015

Journal referee (alphabetically):

- Analyst
- Applied Physics Letters
- Applied Optics
- Biomedical Optics Express
- Chinese Journal of Acoustics
- Frontiers of Optoelectronics
- IEEE Transactions on Biomedical Engineering
- Journal of Acoustical Society of America (JASA)
- Journal of Biomedical Optics
- Journal of Innovative Optical Health Sciences
- Journal of the Optical Society of America A (JOSA A)
- Journal of Physics D: Applied Physics
- Measurement Science and Technology
- Nature Photonics
- Optica
- Optical Engineering

- Optics Express
- Optics Letters
- Physica Scripta
- Physics in Medicine and Biology
- Review of Scientific Instruments
- Sensors
- Scientific Reports
- Ultrasonics
- Ultrasound in Medicine and Biology

Membership:

- IEEE Engineering in Medicine and Biology Society
- The Acoustical Society of America (ASA)
- The American Society of Mechanical Engineering (ASME)
- The International Society for Optics and Photonics (SPIE)
- The Optical Society of America (OSA)

Peer-reviewed Publications

[] represents equal contribution

1. [**P. Lai**, L. Wang, J. W. Tay], and L. V. Wang, "Photoacoustically guided wavefront shaping (PAWS) for enhanced optical focusing in scattering media," *Nature Photonics* 9, 126-132 (2015).
2. [Y. Liu, **P. Lai**], C. Ma, X. Xu, A. Grabar, and L. V. Wang, "Optical focusing deep inside dynamic scattering media with near-infrared time-reversed ultrasonically encoded (TRUE) light," *Nature Communications* 6:5904 (2015).
3. [**P. Lai**, X. Xu], and L. V. Wang, "Dependence of optical scattering from Intralipid in gelatin-gel based tissue-mimicking phantoms on mixing temperature and time," *Journal of Biomedical Optics* 19(3), 035002 (2014).
4. [J. W. Tay, **P. Lai**], Y. Suzuki, and L. V. Wang, "Ultrasonically encoded wavefront shaping for focusing into random media," *Scientific Reports* 4, 3918 (2014).
5. Q. Yang, X. Xu, **P. Lai**, D. Xu and L. V. Wang, "Time-reversed ultrasonically encoded optical focusing using two ultrasonic transducers for improved ultrasonic axial resolution," *Journal of Biomedical Optics* 18(11), 110502-110502 (2013).
6. [**P. Lai**, Y. Suzuki, X. Xu], and L. V. Wang, "Focused fluorescence excitation with time-reversed ultrasonically encoded light and imaging in thick scattering media," *Laser Physics Letters*, 10(7), 075604 (2013).
7. [Y. Suzuki, **P. Lai**], X. Xu, and L. V. Wang, "High-sensitivity ultrasound-modulated optical tomography with a large area photorefractive polymer," *Optics Letters*, 38(6), 899-901 (2013).

8. Y. Suzuki, X. Xu, **P. Lai**, and L. V. Wang, "Energy enhancement in time-reversed ultrasonically encode optical focusing using a photorefractive polymer," *Journal of Biomedical Optics*, 17(8), 080507 (2012).
9. **P. Lai**, X. Xu, and L. V. Wang, "Ultrasound-modulated optical tomography at new depth," *Journal of Biomedical Optics* 17(6), 066006 (2012).
10. **P. Lai**, X. Xu, H. Liu, and L. V. Wang, "Time-reversed ultrasonically encoded optical focusing in biological tissue," *Journal of Biomedical Optics* 17(3), 036001 (2012).
11. T. W. Murray, **P. Lai**, and R. A. Roy, "Measuring tissue properties and monitoring therapeutic responses using acousto-optic imaging," *Annals of Biomedical Engineering* 40(2), 474-485 (2012).
12. **P. Lai**, X. Xu, H. Liu, Y. Suzuki, and L. V. Wang, "Reflection-mode time-reversed ultrasonically encoded optical focusing into turbid media," *Journal of Biomedical Optics* 16(8), 080505 (2011).
13. H. Liu, X. Xu, **P. Lai**, and L. V. Wang, "Time-reversed ultrasonically encoded optical focusing into tissue-mimicking media with thickness up to 70 mean free paths," *Journal of Biomedical Optics* 16(8), 086009 (2011).
14. **P. Lai**, J. R. McLaughlan, A. B. Draudt, T. W. Murray, R. O. Cleveland, and R. A. Roy, "Real time monitoring of high intensity focused ultrasound lesion formation using acousto-optic sensing," *Ultrasound in Medicine and Biology* 37(2), 239-252 (2011).
15. **P. Lai**, R. A. Roy, and T. W. Murray, "Quantitative characterization of turbid medium using pressure contrast acousto-optic imaging," *Optics Letters* 34(18), 2850-2852 (2009).
16. **P. Lai**, B. Zhang, and C. Wang, "Radiation and reflection acoustical fields of an annular phased array," *Chinese Journal of Acoustics* 26(3), 246-260 (2007).
17. 赖溥祥, 张碧星, 汪承灏, "环形相控阵换能器辐射和反射声场", *声学学报* 32(3), 212-220 (2007) (in Chinese).
18. B. Zhang, C. Wang, and **P. Lai**, "Theoretical and experimental investigation of ultrasonic focusing with annular phased array," *Chinese Physics Letters* 23(4), 875-878 (2006).

Non Peer-reviewed Articles

1. X. Xu, **P. Lai**, and L. V. Wang, "Focusing light into tissue," *SPIE Newsroom*, August 28, (2013), DOI: 10.1117/2.1201308.004937.

Patents

1. L. V. Wang, L. Wang, C. Zhang, **P. Lai**, and J. W. Tay, "Systems and Methods of Grueneisen-Relaxation Photoacoustic Microscopy and Photoacoustic Wavefront Shaping", International Patent Number WO 2015/077355 A1/US Patent No. US20160305914 2015.

Book Chapters

1. X. Xu, C. Ma, **P. Lai**, and L. V. Wang, "Wavefront-engineered optical focusing into scattering media using ultrasound- or perturbation-based guide stars: TRUE, TRAP, SEWS, and PAWS", in "Wavefront Shaping for Biomedical Imaging", Cambridge University Press (*in press*).

Invited Seminars/Talks

1. "Focused and Controllable Optical Delivery in Complex Media", in the 14th International Conference on Photonics and Imaging in Biology and Medicine (PIBM), Suzhou, China, 2017 (*invited talk*)
2. "Deep-Tissue Optical Focusing and Control in Action", Institute of Automation, Chinese Academy of Sciences, Beijing, China, 2017 (*invited seminar*)
3. "Reshaping light in deep tissue with ultrasonically guided optical focusing", the 1st International Conference on Optics, Photonics, and Materials, Nice, France, 2016 (*keynote talk*)
4. "Wavefront Engineering-Enabled Optical Focusing at Depths in Scattering Media", Frontiers in Optical Bioimaging Technologies, University of Hong Kong, Hong Kong, 2016 (*invited talk*)
5. "Ultrasonically Guided Optical Focusing: Shining Focused Light into Deep Tissue", the 8th International Conference on Information Optics and Photonics, Shanghai, China, 2016 (*invited talk*)
6. "Ultrasonically Guided Deep-Tissue Optical Focusing in Action", School of Biological Science and Medical Engineering, Beihang University, Beijing, China, 2015 (*invited seminar*)
7. "Focusing Light Deep in Tissue with Ultrasound Guidestars", in Optical Society of America (OSA) Frontiers in Optics & Laser Science 2015, San Jose, CA (USA), 2015 (*invited talk*)
8. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Interdisciplinary Division of Biomedical Engineering, Hong Kong Polytechnic University (Hong Kong), 2015 (*invited seminar*)
9. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Institute of Biomedical Engineering, Graduate School at Shenzhen, Tsinghua University (China), 2015 (*invited seminar*)
10. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences (China), May 21, 2015 (*invited seminar*)
11. "Photoacoustically guided wavefront shaping (PAWS) for optical focusing beyond the diffusion limit in scattering media", College of Life Science and Technology, Huazhong University of Science and Technology (China), 2015 (*invited talk and session co-chair*)

12. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Department of Biology, South University of Science and Technology of China (China), May 15, 2015 (*invited seminar*)
13. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", College of Optical Science and Engineering, Zhejiang University (China), 2015 (*invited seminar*)
14. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Department of Precision Instrument, Tsinghua University (China), 2015 (*invited seminar*)
15. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Department of Biomedical Engineering, Peking University (China), 2015 (*invited seminar*)
16. "Breaking the Optical Diffusion Limit in Biological Tissue: Ultrasonically Guided Optical Focusing", Department of Biomedical Engineering, Duke University, 2015 (*invited seminar*)
17. "Ultrasound-guided optical wavefront control for focusing in scattering media," in Optical Society of America (OSA) Controlled Light Propagation through Complex Media Incubator, Washington DC (USA), 2014. (*invited talk*)
18. "Interaction of light and sound, and its application in biomedical imaging and nondestructive evaluation," Institute of Acoustics, Chinese Academy of Sciences, Beijing, China, 2013. (*invited seminar*)
19. "Acousto-optic imaging using the photorefractive effect and its applications," Institute of Acoustics, Chinese Academy of Sciences, Beijing, China, 2009. (*invited seminar*)

Editor-referred Conference Proceedings and Abstracts

Conference proceedings:

1. T. Zhong, Z. Yu, and **P. Lai**[#], "Multimode Fiber Specklegram Twist Sensor", in the 2017 Asia Communications and Photonics Conference, Guangzhou, China (2017)
2. F. Cao, Z. Qiu, **P. Lai**[#], and L. Sun[#], "Nonlinear photoacoustic imaging by pump-probe excitation", in the 14th International Conference on Photonics and Imaging in Biology and Medicine (PIBM), Suzhou, China (2017)
3. [**P. Lai**, L. Wang, J. W. Tay], and L. V. Wang, "Optical Focusing in Scattering Media with Photoacoustic Wavefront Shaping (PAWS)," in *Biomedical Optics 2014*, p. BS3A.57, Optical Society of America, Miami, Florida (2014).
4. [J. W. Tay, **P. Lai**], Y. Suzuki, and L. V. Wang, "Focusing light in scattering media by ultrasonically-encoded wavefront shaping (SEWS)," in *Biomedical Optics 2014*, p. BS3A.58, Optical Society of America, Miami, Florida (2014).

5. [Y. Liu, **P. Lai**], C. Ma, X. Xu, A. A. Grabar, and L. V. Wang, "High-Speed Time-Reversed Ultrasonically Encoded (TRUE) Optical Focusing in Dynamic Scattering Media at 793 nm," in *Biomedical Optics 2014*, p. BS3A.70, Optical Society of America, Miami, Florida (2014).
6. [**P. Lai**, J. W. Tay, L. Wang], and L. V. Wang, "Optical focusing in scattering media with photoacoustic wavefront shaping (PAWS)," Proc. SPIE 8943, 894318 (2014).
7. [Y. Liu, **P. Lai**], C. Ma, X. Xu, Y. Suzuki, A. A. Grabar, and L. V. Wang, "High-Speed Time-Reversed Ultrasonically Encoded (TRUE) Optical Focusing inside Dynamic Scattering Media at 793 nm," Proc. SPIE 8943, 894339 (2014).
8. [J. W. Tay, **P. Lai**], Y. Suzuki, and L. V. Wang, "Focusing light in scattering media by ultrasonically-encoded wavefront shaping (SEWS)," Proc. SPIE 8943, 89434P (2014).
9. [Y. Suzuki, **P. Lai**, X. Xu], and L. V. Wang, "Localized fluorescence excitation in opaque media by time-reversed ultrasonically encoded (TRUE) optical focusing," Proc. SPIE 8943, 894358 (2014).
10. Q. Yang, X. Xu, **P. Lai**, X. Sang, and L. V. Wang, "Improving the axial resolution in time-reversed ultrasonically encoded (TRUE) optical focusing with dual ultrasonic waves," Proc. SPIE 8943, 894338 (2014).
11. **P. Lai**, Y. Suzuki, X. Xu, and L. V. Wang, "Exploring ultrasound-modulated optical tomography at clinically useful depths using the photorefractive effect," Proc. SPIE 8581, 85812X (2013).
12. Y. Suzuki, **P. Lai**, X. Xu, and L. V. Wang, "High-efficiency time-reversed ultrasonically encoded optical focusing using a large area photorefractive polymer," Proc. SPIE 8581, 85811G (2013)
13. X. Xu, **P. Lai**, H. Liu and L. V. Wang, "Time-Reversed Ultrasonically Encoded (TRUE) Optical Focusing into Soft Biological Tissue", *Biomedical Optics and 3-D Imaging*, Optical Society of America BW1A.1 (2012).
14. **P. Lai**, X. Xu, H. Liu, Y. Suzuki, and L. V. Wang, "Time-reversed ultrasonically encoded (TRUE) optical focusing in reflection mode: demonstration in tissue mimicking phantoms and *ex vivo* tissue," Proc. SPIE 8223, 82231B (2012).
15. X. Xu, **P. Lai**, H. Liu, and L. V. Wang, "Ultrasonic encoding of diffused light: from optical imaging to light focusing in turbid media," Proc. SPIE 8223, 822324 (2012).
16. **P. Lai**, J. R. McLaughlan, A. B. Draudt, T. W. Murray, R. O. Cleveland, and R. A. Roy, "Monitoring and guidance of high intensity focused ultrasound exposures in real time using acousto-optic imaging: feasibility and demonstration *ex vivo*," Proc. SPIE 7564, 75642B (2010).
17. **P. Lai**, R. A. Roy, and T. W. Murray, "Sensing the optical properties of diffusive media by acousto-optic pressure contrast imaging," Proc. SPIE 7177, 71771G (2009).

18. A. Draudt, **P. Lai**, R. A. Roy, T. W. Murray, and R. O. Cleveland, "Detection of HIFU lesions in excised tissue using acousto-optic imaging," AIP Conf. Proc. 1113, 270-274 (2009).
19. **赖溥祥**, 张碧星, 汪承灏, “超声环形相控声场分析”, 中国声学学会 2005 年青年学术会议[CYCA'05]论文集 (2005) (*in Chinese*).
20. 樊文, **赖溥祥**, 乔东海, “超声环形相控阵列的电路设计”, 中国声学学会 2005 年青年学术会议[CYCA'05]论文集 (2005) (*in Chinese*).

Conference abstracts:

1. R. A. Roy, **P. Lai**, J. R. McLaughlan, A. B. Draudt, R. O. Cleveland, T. W. Murray, "Imaging and monitoring non-cavitating focused ultrasound lesions using light and sound", Journal of the Acoustical Society of America 129, 2439 (2011) .
2. R. A. Roy, **P. Lai**, J. R. McLaughlan, A. B. Draudt, R. O. Cleveland, and T. W. Murray, "Acousto-optic sensing for the real-time monitoring and feedback control of non-cavitating high-intensity focused ultrasound lesion formation in optically diffuse tissues", Journal of the Acoustical Society of America 128, 2416 (2010) .
3. **P. Lai**, J. R. McLaughlan, A. B. Draudt, T. W. Murray, R. O. Cleveland, and R. A. Roy, "Acousto-optic monitoring of high-intensity focused ultrasound lesion formation in optically diffuse tissue," Journal of the Acoustical Society of America 127, 2039 (2010).
4. A. Draudt, **P. Lai**, T. W. Murray, R. O. Cleveland, and R. A. Roy, "Acousto-optic detection of high-intensity focused ultrasound lesions in real time," Journal of the Acoustical Society of America 126, 2039 (2009).
5. **P. Lai**, R. A. Roy, and T. W. Murray, "Quantitative sensing of optical properties of diffusive media by pressure contrast acousto-optic imaging," Journal of the Acoustical Society of America 126, 2039 (2009).
6. **P. Lai**, R. A. Roy, and T. W. Murray, "Acousto-optic imaging in the near-infrared using the photorefractive effect", in 2007 IEEE International Ultrasonics Symposium, New York, NY, 2007.

Conference Presentations

Oral presentations:

1. T. Zhong, Z. Yu, and **P. Lai**[#], "Multimode Fiber Specklegram Twist Sensor", in the 2017 Asia Communications and Photonics Conference, Guangzhou, China, 2017
2. **P. Lai**, X. Xu, and L. V. Wang, "Dependence of optical scattering on mixing temperature and time in Intralipid-gelatin-water based hydrogel phantoms," in Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII (part of Photonics West 2015), San Francisco, CA, 2015.

3. L. V. Wang, **P. Lai**, L. Wang, and J. W. Tay, "Speckle-scale optical focusing in turbid media with photoacoustically guided wavefront shaping (PAWS)," in Adaptive Optics and Wavefront Control for Biological Systems (Part of Photonics West 2015), San Francisco, CA, 2015. (*invited talk*)
4. **P. Lai**, Y. Liu, C. Ma, X. Xu, and L. V. Wang, "Time-reversed ultrasonically encoded (TRUE) optical focusing *in vivo*," in Adaptive Optics and Wavefront Control for Biological Systems (Part of Photonics West 2015), San Francisco, CA, 2015.
5. [**P. Lai**, J. W. Tay, L. Wang], and L. V. Wang, "Optical focusing in scattering media with photoacoustic wavefront shaping (PAWS)," in Photons Plus Ultrasound: Imaging and Sensing 2014 (part of Photonics West 2014), San Francisco, CA, 2014. (**best paper award**)
6. Y. Suzuki, **P. Lai**, X. Xu, and L. V. Wang, "High-efficiency time-reversed ultrasonically encoded optical focusing using a large area photorefractive polymer," in Photons Plus Ultrasound: Imaging and Sensing 2013 (part of Photonics West 2013), San Francisco, CA, 2013.
7. R. A. Roy, **P. Lai**, and T. W. Murray, "Real time monitoring of HIFU lesion formation using the interaction of light and sound", in 37th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, 2012. (*invited talk*)
8. X. Xu, **P. Lai**, H. Liu, and L. V. Wang, "Time-reversed ultrasonically encoded (TRUE) optical into soft biological tissue," in Biomedical Optics (BIOMED) 2012, Miami, FL, 2012.
9. **P. Lai**, X. Xu, H. Liu, Y. Suzuki, and L. V. Wang, "Time-reversed ultrasonically encoded (TRUE) optical focusing in reflection mode: demonstration in tissue mimicking phantoms and *ex vivo* tissue," in Photons Plus Ultrasound: Imaging and Sensing 2012 (part of Photonics West 2012), San Francisco, CA, 2012.
10. X. Xu, **P. Lai**, H. Lin, and L. V. Wang, "Ultrasonic encoding of diffuse light: from optical imaging to light focusing in turbid media," in Photons Plus Ultrasound: Imaging and Sensing 2012 (part of Photonics West 2012), San Francisco, CA, 2012. (*invited talk*)
11. R. A. Roy, **P. Lai**, J. R. McLaughlan, A. B. Draudt, R. O. Cleveland, T. W. Murray, "Imaging and monitoring non-cavitating focused ultrasound lesions using light and sound," in 161th Meeting of Acoustical Society of America, Seattle, WA, 2011. (*invited talk*)
12. R. O. Cleveland, R. A. Roy, **P. Lai**, J. R. McLaughlan, A. B. Draudt, T. W. Murray, "Acousto-optic (AO) sensing of HIFU lesion formation in real-time," in 11th International Symposium on Therapeutic Ultrasound (ISTU), New York, NY, 2011.
13. R. A. Roy, **P. Lai**, J. R. McLaughlan, A. B. Draudt, R. O. Cleveland, T. W. Murray, "Acousto-optic sensing for the real-time monitoring and feedback control of non-cavitating HIFU lesion formation in optically diffuse tissue," in 160th Meeting of Acoustical Society of America, Cancun, Mexico, 2010. (*invited talk*)

14. T. W. Murray, **P. Lai**, and R. A. Roy, "Acousto-optic measurement of local optical properties in diffuse media," in 2nd International Symposium on Laser-Ultrasonics, Talence, France, 2010. (*invited talk*)
15. R. A. Roy, **P. Lai**, J. R. McLaughlan, and T. W. Murray, "Monitoring focused ultrasound therapy using light and sound," in 7th Meeting of the UK Therapy Ultrasound Group, Sutton, United Kingdom, 2010. (*invited talk*)
16. R. A. Roy, R. O. Cleveland, R. G. Holt, C. H. Farny, J. R. McLaughlan, **P. Lai**, and J. A. Ketterling, "Apfel's laws and sound science: how physical measurements impact physical and medical acoustics research at Boston University", in Advance Metrology for Ultrasound in Medicine (AMUM), London, United Kingdom, 2010. (*plenary lecture*)
17. **P. Lai**, J. R. McLaughlan, A. B. Draudt, T. W. Murray, R. O. Cleveland, and R. A. Roy, "Acousto-optic monitoring of high-intensity focused ultrasound lesion formation in optically diffuse tissue," in the 159th Meeting of Acoustical Society of America, Baltimore, MD, 2010.
18. **P. Lai**, J. R. McLaughlan, A. B. Draudt, T. W. Murray, R. O. Cleveland, and R. A. Roy, "Real-time monitoring of high intensity focused ultrasound therapy using acousto-optic imaging," in Photons Plus Ultrasound: Imaging and Sensing 2010 (part of Photonics West 2010), San Francisco, CA, 2010.
19. **P. Lai**, R. A. Roy, and T. W. Murray, "Quantitative sensing of optical properties of diffuse media by pressure contrast acousto-optic imaging", in 158th Meeting of Acoustical Society of America, San Antonio, TX, 2009.
20. A. Draudt, **P. Lai**, R. A. Roy, T. W. Murray, and R. O. Cleveland, "Acousto-optic detection of high-intensity focused ultrasound lesions in real time", in 158th Meeting of Acoustical Society of America, San Antonio, TX, 2009.
21. T. W. Murray, **P. Lai**, and R. A. Roy, "Optical property measurement in diffuse media using acousto-optic pressure contrast imaging", in 34th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, 2009. (*invited talk*)
22. **P. Lai**, R. A. Roy, and T. W. Murray, "Sensing the optical properties of diffusive media by acousto-optic pressure contrast imaging", in Photons Plus Ultrasound: Imaging and Sensing 2009 (part of Photonics West 2009), San Jose, CA, 2009.
23. **P. Lai**, R. A. Roy, and T. W. Murray, "Photorefractive crystal based acousto-optic imaging system in the near infrared optical wavelength", in 2008 ASME International Mechanical Engineering Congress and Exposition, Boston, MA, 2008.
24. A. Draudt, **P. Lai**, R. A. Roy, T. W. Murray, and R. O. Cleveland, "Multi-modal approach to imaging and monitoring HIFU lesions", in 2008 ASME International Mechanical Engineering Congress and Exposition, Boston, MA, 2008.

25. A. Draudt, **P. Lai**, R. A. Roy, T. W. Murray, and R. O. Cleveland, "Detection of HIFU lesions in excised tissue using acousto-optic imaging," in 8th International Symposium on Therapeutic Ultrasound, Minneapolis, MN, 2008.
26. R. A. Roy, **P. Lai**, and T. W. Murray, "Multi-mode tissue imaging using acousto-optic sensing and B-Mode ultrasound," in 8th International Symposium on Therapeutic Ultrasound, Minneapolis, MN, 2008.
27. **P. Lai**, R. A. Roy, and T. W. Murray, "Acousto-optic imaging in the near-infrared using the photorefractive effect", in 2007 IEEE International Ultrasonics Symposium, New York, NY, 2007.

Poster presentations:

1. F. Cao, Z. Qiu, **P. Lai**[#], and L. Sun[#], "Nonlinear photoacoustic imaging by pump-probe excitation", in the 14th International Conference on Photonics and Imaging in Biology and Medicine (PIBM), Suzhou, China (2017)
2. [**P. Lai**, L. Wang, J. W. Tay], and L. V. Wang, "Optical Focusing in Scattering Media with Photoacoustic Wavefront Shaping (PAWS)," in *Biomedical Optics 2014*, Optical Society of America, Miami, Florida, 2014.
3. [J. W. Tay, **P. Lai**], Y. Suzuki, and L. V. Wang, "Focusing light in scattering media by ultrasonically-encoded wavefront shaping (SEWS)," in *Biomedical Optics 2014*, Optical Society of America, Miami, Florida, 2014.
4. [Y. Liu, **P. Lai**], C. Ma, X. Xu, A. A. Grabar, and L. V. Wang, "High-Speed Time-Reversed Ultrasonically Encoded (TRUE) Optical Focusing in Dynamic Scattering Media at 793 nm," in *Biomedical Optics 2014*, Optical Society of America, Miami, Florida, 2014.
5. [Y. Liu, **P. Lai**], C. Ma, X. Xu, Y. Suzuki, A. A. Grabar, and L. V. Wang, "High-Speed Time-Reversed Ultrasonically Encoded (TRUE) Optical Focusing inside Dynamic Scattering Media at 793 nm," in Photons Plus Ultrasound: Imaging and Sensing 2014 (part of Photonics West 2014), San Francisco, CA, 2014. **(best poster award)**
6. [J. W. Tay, **P. Lai**], Y. Suzuki, and L. V. Wang, "Focusing light in scattering media by ultrasonically-encoded wavefront shaping (SEWS)," in Photons Plus Ultrasound: Imaging and Sensing 2014 (part of Photonics West 2014), San Francisco, CA, 2014.
7. [Y. Suzuki, **P. Lai**, X. Xu], and L. V. Wang, "Localized fluorescence excitation in opaque media by time-reversed ultrasonically encoded (TRUE) optical focusing," in Photons Plus Ultrasound: Imaging and Sensing 2014 (part of Photonics West 2014), San Francisco, CA, 2014.
8. Q. Yang, X. Xu, **P. Lai**, X. Sang, and L. V. Wang, "Improving the axial resolution in time-reversed ultrasonically encoded (TRUE) optical focusing with dual ultrasonic waves," in Photons Plus Ultrasound: Imaging and Sensing 2014 (part of Photonics West 2014), San Francisco, CA, 2014.

9. **P. Lai**, Y. Suzuki, X. Xu, and L. V. Wang, "Exploring ultrasound-modulated optical tomography at clinically useful depths using the photorefractive effect," in Photons Plus Ultrasound: Imaging and Sensing 2013 (part of Photonics West 2013), San Francisco, CA, 2013.
10. **P. Lai**, J. R. McLaughlan, A. Draudt, R. A. Roy, T. W. Murray, and R. O. Cleveland, "High intensity focused ultrasound (HIFU) treatment monitoring and guidance in real time using light and sound", in the 2010 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2010.
11. A. Draudt, **P. Lai**, R. A. Roy, T. W. Murray, and R. O. Cleveland, "Real-time monitoring of high intensity focused ultrasound lesion formation with combined acoustic force elastography and acousto-optic imaging", in the 2010 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2010.
12. **P. Lai**, J. R. McLaughlan, A. Draudt, R. A. Roy, T. W. Murray, and R. O. Cleveland, "High intensity focused ultrasound (HIFU) treatment monitoring and guidance in real time using light and sound", in the 2010 Annual Meeting of the Ultrasound Industry and Association, Boston, MA, 2010.
13. A. Draudt, **P. Lai**, R. A. Roy, T. W. Murray, and R. O. Cleveland, "Real-time monitoring of high intensity focused ultrasound lesion formation with combined acoustic force elastography and acousto-optic imaging", in the 2010 Annual Meeting of the Ultrasound Industry and Association, Boston, MA, 2010. **(best poster award)**
14. **P. Lai**, R. A. Roy, and T. W. Murray, "Quantitative optical characterization of tissue-like media using light and sound", in the 2009 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2009.
15. **P. Lai**, R. A. Roy, and T. W. Murray, "Pressure contrast imaging: A new approach to acousto-optic detection of optical scattering inhomogeneities at depth in diffuse media", in the 2008 Research and Industrial Collaboration Conference of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2008.
16. **P. Lai**, R. A. Roy, and T. W. Murray, "Detecting optical inhomogeneities at depth in diffuse media using acousto-optic imaging in the near infrared", in the 2008 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2008.
17. A. Draudt, **P. Lai**, R. A. Roy, and R. O. Cleveland, "Characterizing the dynamic response of HIFU lesions", in the 2008 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2008.
18. **P. Lai**, T. W. Murray, and R. A. Roy, "Acousto-optic imaging in the near-infrared using the photorefractive effect", in the 2007 Research and Industrial Collaboration Conference of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2007. **(best poster award)**

19. **P. Lai**, T. W. Murray, and R. A. Roy, "Acousto-optic imaging in the near-infrared: Optimization and quantitative characterization of the system", in the 2007 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2007.
20. **P. Lai**, T. W. Murray, and R. A. Roy, "Acousto-optic imaging in the near-infrared: some preliminary results", in the 2006 Research and Industrial Collaboration Conference of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2006.
21. **P. Lai**, L. Sui, T. W. Murray, and R. A. Roy, "Pulsed acousto-optic imaging (AOI) and its fusion with conventional diagnosis ultrasound", in the 2006 NSF Site Visit of the Center for Subsurface Sensing and Imaging Systems, Boston, MA, 2006.