

Curriculum Vitae

Date Prepared: September 10, 2017
Name: Qianqian Fang
Office Address: ISEC 223
Mail Address: 360 Huntington Ave, ISEC 206, Boston, MA 02115, USA
Home Phone: (617) 407-5769
Work Phone: (617) 373-3829
Work Email: q.fang@neu.edu
Work FAX: Not yet available (TBD)
Place of Birth: Anyang, Henan, China

Education

1999	B.Eng.	Electrical Engineering	University of Electronic Science and Technology of China (Chengdu, Sichuan, China)
2005	Ph.D.	Biomedical Engineering	Thayer School of Engineering, Dartmouth College (Hanover, NH, USA)

Postdoctoral Training

2005-2009	Research Fellow in Radiology	Optics Division (Lab Supervisor: David Boas)	Martinos Center for Biomedical Imaging, Massachusetts General Hospital
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Faculty Academic Appointments

2009-2012	Instructor of Radiology	Department of Radiology	Harvard Medical School
2012-2015	Assistant Professor of Radiology	Department of Radiology	Harvard Medical School
2015-present	Assistant Professor	Dept. of Bioengineering	Northeastern University
2015-present	Affiliated faculty	Dept. of ECE	Northeastern University

Appointments at Hospitals/Affiliated Institutions

2005-2009	Research Fellow	Department of Radiology	Massachusetts General Hospital
2009-2016	Assistant in Biomedical Engineering	Department of Radiology	Massachusetts General Hospital

Other Professional Positions

2009-2010	Tomosynthesis Consultant	Surgical Tools LLC, AZ
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Committee Service

National and International

2009	Multimodal Biomedical Imaging IV January 24 - 29, 2009	SPIE Photonics West 2009, Session Co-Chair
2011	Multimodal Biomedical Imaging VI January 22 - 27, 2011	SPIE Photonics West 2011, Session Co-Chair
2013	Conference organizing committee April 19 – 21, 2013	IEEE Int. Conf. on Comp. Photography (ICCP'13) Organizer, Poster & Demo session co-chair
2013-present	Multimodal Biomedical Imaging February 1 - 6, 2014	SPIE Photonics West Conference organizing committee member
2014	Organizing committee April 25 - 27, 2014	40th Annual Northeast Bioengineering Conference Organizer, session co-chair
2014	Organizing committee July 13 – 17, 2014	OSA Signal Recovery & Synthesis (SRS) meeting Organizer, reviewer
2017	Chair, Organizing committee	The 1st Workshop on Monte Carlo eXtreme for Biomedical Optics Research (MCX'17)

Professional Societies

2004-2010	IEEE, Engineering in Medicine and Biology Society (IEEE-EMBS)	Member
2007-2011	SPIE, The International Society for Optical Engineering	Member
2008-present	OSA, The Optical Society of America	Member

Grant Review Activities

2009	Panel # 23 May 15 – July 15, 2009	National Institutes of Health (USA) Grant Reviewer
2010	Discovery Grant Review Committee Dec. 16 – Jan. 14, 2010	Natural Sciences and Engineering Research Council of Canada (Canada) Ad hoc Grant Reviewer
2010	Grants Management Department Apr. 28 – May 24, 2010	The Wellcome Trust (UK) Ad hoc Grant Reviewer
2011, 2012	“Ideas” Research Program Nov. 20 2011 – Jan. 24, 2012	Romanian National Council for Scientific Research Invited Grant Reviewer
2015	ZRG1 SBIB-Z (03) M Study Section Mar. 24, 2015	National Institutes of Health (USA) Special Emphasis Study Section Grant Reviewer

Editorial Activities

- IEEE Transactions on Medical Imaging (TMI)
- IEEE Transactions on Biomedical Engineering (TBME)
- IEEE Transactions on Microwave Theory and Techniques (TMTT)
- IEEE Transactions on Antenna and Propagation (TAP)
- IEEE Antennas and Wireless Propagation Letters
- IEEE Transactions on Evolutionary Computation (TEC)
- IET Microwaves, Antennas & Propagation (IEE Proc. – Microwave, Ant. and Prop.)
- Journal of Optics A: Pure and Applied Optics (JOPA)

- Journal of Biomedical Optics (JBO)
- Journal of Biomedical Optics Letters
- Optics Letters
- Optics Express (OE)
- Biomedical Optics Express (BOE)
- Journal of Applied Physics (JAP)
- Physics in Medicine and Biology (PMB)
- Philosophical Transactions A
- IEEE International Symposium on Biomedical Imaging 2009-2012
- Medical Image Analysis
- Journal of Digital Imaging
- BioMedical Engineering OnLine
- Optics Communications
- International Journal of Biomedical Imaging
- Lasers in Medical Science
- Review of Scientific Instruments
- Applied Sciences
- Medical & Biological Eng & Computing (MBEC)
- Current Molecular Imaging
- Journal of Applied Remote Sensing
- Computer Methods and Programs in Biomedicine
- Biomed. Phys. Eng. Express
- PLOS ONE

Other Editorial Roles

2008-present	Associate Editor	Medical Physics
2010-present	Associate Editor	Int. Journal of Microwave Science and Tech.
2012-present	Associate Editor	ISRN Biomedical Imaging
2015-present	Associate Editor	Journal of Biomed. Optics Letters

Honors and Prizes

1996,1997	Motorola Scholarship	Univ. Elec. Sci&Tech of China
1998	Shanghai Bell Scholarship	Univ. Elec. Sci&Tech of China
1998	Outstanding Award of UESTC	Univ. Elec. Sci&Tech of China
1999	Excellent Thesis Award of UESTC	Univ. Elec. Sci&Tech of China
1999	Honored Graduate of China Ministry of Electronics Industry	China Ministry of Electronics Industry
2000	Herbert Darling Fellowship	Thayer School of Eng., Dartmouth College
2004	IEEE EMBS Travel Award	IEEE EMBS
2015	Selected for Innovation Countdown 2030	Innovation Countdown 2030 initiative (http://ic2030.org)

Report of Funded and Unfunded Projects

Funding Information

Past

- 2009-2010 Imaging breast tumors with diffuse optical imaging and harmonic compression
Harvard Catalyst Pilot Grant
Principal Investigator (\$50,000)
This study aims to uncover robust and high-contrast tissue optical biomarkers for breast cancer diagnosis by exploring the hemodynamic responses enhanced by a harmonic compression
- 2009-2009 Intra-operative specimen tomosynthesis for margin assessment in breast surgery (PI: Emre Toker)
NIH R43-CA139635
Consultant
This research study targets the development of the first portable intra-operative digital specimen tomosynthesis system for rapid and accurate 3D radiographic margin assessment of surgically excised breast tissue specimens during breast-conserving surgery (BCS)
- 2009-2013 Tomographic optical breast imaging (TOBI) to monitor response to neoadjuvant therapy in breast cancer (PI: Steve Isakoff)
Komen Foundation KG090591
Collaborator
In this project, we use tomographic optical breast imaging to detect early responses in neoadjuvant therapy treatment of breast tumors.
- 2011-2013 Cell phone-based near-infrared camera for high-risk neonates
Bill & Melinda Gates Foundation Grand Challenges Explorations OPP1035992
Principle Investigator (\$100,000)
We propose to develop a portable, low-cost mobile-phone-based near-infrared camera for monitoring brain injury in neonates. If successful, it could help identify and monitor high-risk newborns in resource-limited regions.
- 2012-2013 Hybrid optical x-ray CT for head and neck cancer diagnosis and surveillance (PI: Anand Kumar)
Harvard Catalyst Pilot Grant
Co-Investigator
We propose to build a new Hybrid Optical X-ray CT (HOX-CT) for primary diagnosis, intra-operative tumor margin detection, and post-treatment surveillance of head and neck cancers.
- 2013-2014 Real-time breast cancer diagnosis using GPU-accelerated diffuse optical imaging
MGH ECOR Bridge Funding
Principal Investigator (\$50,000)
The goal in this project is to develop the next generation optical modeling algorithms, including Monte Carlo method, RTE solvers and FEM solvers, designed for modern many-core processors and heterogeneous computing platforms.

- 2008-2014 3D optical imaging and digital x-ray of breast lesions (PI: David Boas)
NIH R01-CA097305
Co-Investigator
This study aims to improve the accuracy and effectiveness of mammographic screening techniques by combining functional optical imaging with structural x-ray mammography.
- 2010-2015 Integrated 3D x-ray and dynamic tomographic optical breast imaging system (PI: David Boas)
NIH R01-CA142575
Co-Investigator
This study aims to develop an integrated diffuse optical imaging and X-ray mammography system using fast optical instrument and radiolucent optical probes for improved breast cancer diagnosis
- 2011-2015 Combined optical and mammographic imaging of breast function and structure for early cancer detection
Massachusetts Life Sciences Center, Cooperative Research Matching Grants
Principle Investigator (\$714,613 direct cost)
We will collaborate with medical equipment provider, Philips Healthcare (Andover, MA), to develop a combined optical and mammographic imaging device that can make multi-modality breast imaging readily available for over 9,000 x-ray systems in the US.
- 2013-2014 Using mobile phones for thermal imaging of the lungs to save lives of children with severe pneumonia (PI: Linda Wang)
Consortium for Affordable Medical Technologies (CAMTech) - Innovation Award
Co-Principle Investigator (\$100,000)
The goal of this proposal is to accelerate the development and scale-up of a low-cost mobile phone-based thermal imaging camera for healthcare workers to use as a simple tool to screen for severe pneumonia in resource limited settings.
- 2014-2015 A high-resolution optical breast imager for accelerated clinical translation
MGH ECOR Interim Bridge Funding
Principal Investigator (\$75,000)
The goal in this project is to develop a multi-modal capable optical breast imaging system that can bring functional breast tumor diagnosis to any installed x-ray digital mammography system.
- 2014-2015 Dynamic optical imaging biomarkers of tumor response to therapy (PI: Carp)
Massachusetts General Hospital/NCI - Proton Beam Program Income Federal Share
Co-Investigator
The objective of this study is to obtain pilot data on the use of combined dynamic optical tomography and x-ray tomosynthesis for breast cancer diagnosis and chemotherapy monitoring.

Current



- 2015-2017 Non-contact Mobile Oximeter for Rapid Birth Asphyxia and Childhood Pneumonia Assessment
US Agency for International Development (USAID) – AID-OAA-F-15-00009
Principal Investigator (\$212,500 direct cost)
We aim to develop a non-invasive infrared-based oximeter attachment for a mobile phone to enable non-contact and rapid assessment of a newborn and mother’s blood oxygen level and respiratory rate (RR) during or after the childbirth.
- 2015-2017 Thermal images on smartphones to diagnose bacterial neonatal pneumonia in Pakistan (PI: Hibberd)
US Agency for International Development (USAID) – AID-OAA-F-15-00018
Co-Investigator
We will clinically validate a mobile phone thermal imaging attachment prototype for detecting childhood pneumonia in Pakistan.
- 2015-2019 GPU-Accelerated Monte Carlo Photon Transport Simulation Platform
NIH/NIGMS R01-GM114365
Principal Investigator (\$1,000,000 direct cost)
By further extending, solidifying and disseminating our widely distributed GPU-accelerated Monte Carlo light transport modeling platform, we aim to make a broad impact and set a new standard in our community for developing innovative biophotonics techniques, exploring complex biological systems, facilitating reproducible research and promoting efficient collaboration among the research community.
- 2016-2021 A versatile high-performance optical mammography co-imager
NIH/NCI R01- CA204443
Principal Investigator (\$1,320,000 direct cost)
The proposed study aims to develop a versatile high-performance optical mammography co-imager (OMCI) that can bring functional breast tumor diagnosis to any existing (and future) 2D or 3D x-ray digital mammography system worldwide.
- 2015-2019 Dynamic optical Imaging biomarkers of tumor response to therapy
NIH/NCI R01-CA187595
Co-investigator
The goal of this study is to validate that the variation in tissue total hemoglobin concentration (HbT) and hemoglobin oxygen saturation (SO₂) following a change in breast compression are prognostic and are predictive biomarkers for breast cancer neoadjuvant chemotherapy monitoring.

Current Unfunded Projects

- 2007-present **Principle investigator** / Accurate and efficient 3D medical image-based mesh generation
We extend our previous works on image-based mesh generation to develop anatomically accurate and computational efficient 3D meshing algorithms and open-source software (iso2mesh).

Report of Local Teaching and Training

Teaching of Students in Courses

Full course:

2016	BIOE 5810 Design of Biomedical Instrumentation	A 4 credit class offered in both Spring, Fall 2016 and Spring 2017
2016	EECS 5648 Biomedical Optics	A 4 credit class offered in Spring 2017, co-taught with 3 other faculty members
2017	BIOE 5235 Biomedical Imaging	A 4 credit class offered in Fall 2017

Invited lectures

2007	Optical imaging workshop Northeastern ECE students (invited by Dr. Dana Brooks)	1-hour presentation and questions Dana Center, Northeastern Univ., Boston
2008	HST.563 Optical Imaging/Breast Cancer Monitoring Lab MIT/HST graduate students	Bldg. 149, Charlestown Navy Yard 2-hour session (lecture and demo)
2009	2009 HST Summer Biomedical Optics Lecture Series HST summer students (undergraduate)	I 1, Wellman Center, Boston 1-hour lecture and discussions
2010	HST.563 Optical Imaging/Breast Cancer Monitoring Lab MIT/HST graduate students	Bldg. 149, Charlestown Navy Yard 2-hour session (lecture and demo)
2012	MAS 131/531 Computational Camera and Photography MIT/HST graduate students and faculties	MIT Media Lab, Room E14-493 invited talk as part of a 3-hr session
2016	MATH7203 Northeastern University students	Invited guest lecture on 3D mesh generation

Formally Supervised Trainees

2009	Brad Hartl / PhD student, UC Davis I guided Brad on optical imaging systems and data analysis as his supervisor during the HST summer program.
2012-2013	Matthias Hofmann, PhD / Senior R&D Engineer EyeNetra LLC, Cambridge I guided Matthias on low-cost mobile-phone based optical imaging platforms which later on led to his first industry job.
2013-2015	Bin Deng, PhD / Postdoctoral Fellow Bin had been working with me on developing novel multi-modality imaging systems as part of the collaboration with Philips Healthcare. I guided her on clinical data processing and image reconstruction techniques. She has received a Poster of Merit award in 2014 from MGH ORCD.
2014-2015	Dora Inacio / Master student, University of Lisbon (Portugal)

- Dora worked under my mentorship on systematically analyzing a large clinical dataset including over 450 patients. She has investigated all aspects of the multi-modal data analysis pipeline and identify the sensitivity and specificity of optical breast imaging.
- 2015-2017 Fanny Nina Paravecino / PhD student, Northeastern Univ. (co-mentored with David Kaeli)
Fanny had been working on optimizing the GPU kernel computational efficiency using auto-tuning techniques
- 2015-present Leiming Yu / PhD student, Northeastern Univ. (co-mentored with David Kaeli)
Leiming is working on efficient Monte Carlo photon transport simulation algorithms for the heterogeneous computing platforms using OpenCL.
- 2014-present Ruoyang Yao / PhD student, RPI (co-mentored with Xavier Intes)
Ruoyang has been working on developing innovative mesh-based Monte Carlo algorithms for wide-field optical imaging.
- 2016-present Anh Phong Tran / PhD student, (ChemE), Northeastern University
- 2016-present Xin Sun / PhD student, (BioE) Northeastern University
- 2016-present Morris Vanegas / PhD student (BioE), Northeastern University
- 2016-present Yaoshen Yuan / PhD student (ECE), Northeastern University
- 2016-present Yu Shi / MS student (BioE), Northeastern University
- 2016-present Edward Xu / MS student (BioE), Northeastern University
- 2017-present Shijie Yan / PhD student (ECE), Northeastern University

Local Invited Presentations

- 2008 Combined diffuse optical tomography with tomosynthesis for breast cancer imaging (Invited Talk)
Department of Radiation Oncology, Dana Farber/ Brigham and Women's Cancer Center
- 2009 Multi-modal Breast Imaging Using Tomosynthesis and Diffuse optical tomography (Multidisciplinary Breast Rounds)
Gillette Center for Breast Cancer
- 2012 Functional Breast Imaging – A multi-modality approach (Nuclear Medicine and Molecular Imaging Division research seminar series)
Nuclear Medicine and Molecular Imaging Division, MGH
- 2013 Towards "true" multi-modality breast imaging combining functions with structures (Molecular Imaging Seminar series)
Martinos Center, MGH
- 2013 Hybrid Optical and X-ray Mammography of Human Breast
Avon Breast Imaging Research Meeting, MGH

Report of Regional, National and International Invited Teaching and Presentations

Invited Presentations and Courses

(No talks listed were sponsored by outside entities)

Regional

- Oct. 2009 “Massively parallel Monte Carlo simulation with graphics processing units (GPU)”

/ Invited talk
UCSD Radiation Oncology Academic Seminar Series
May, 2013 “Functional Breast Imaging - A Multi-modality Perspective” / Invited talk
Portsmouth, NH (New England Chapter of the AAPM)

National

Oct. 2009 “Multimodal breast cancer imaging” / Invited talk
Boston, MA, Gordon-CenSSIS Research and Industrial Collaboration Conf. RICC’09
Sep. 2010 “Voxel- and mesh-based Monte Carlo software - MCX and MMC” / Invited talk
Irvine, CA (Virtual Photonics Workshop 2010)

International

Apr. 2010 “Imaging benign and malignant breast lesions with combined optical imaging and tomosynthesis” / Invited talk
Miami, FL, Biomedical Optics Topical Meeting (BIOMED) 2010, OSA
Jul. 2010 “Iso2mesh – a one-liner 3D mesh generator” / Invited talk
Hanover, NH, Image Guided Spectroscopy Symposium
Oct. 2011 “Using compositional-priors in optical tomography improves breast tumor diagnosis” / Invited talk
Troy, NY, IPRPI Workshop on Diffuse Optical Imaging
Nov. 2011 “Use of structural priors in multi-modal optical breast imaging” / Invited talk
Boston, MA, ADSA6: 6th workshop on algorithm development for security applications
Dec. 2012 “Cellphone based near-infrared imaging” / Invited talk
Ottawa, Canada (GCGH meeting, invited by Bill&Melinda Gates Foundation)
Aug. 2014 “Non-contact Mobile Oximeter for Rapid Birth Asphyxia and Childhood Pneumonia Assessment”, Washington DC (annual Saving Lives at Birth DevelopmentXChange Forum, invited by USAID)

Report of Technological and Other Scientific Innovations

US Patent 7825667, (Nov.2,2010)

Fang Q, Meaney PM, Paulsen KD,

“Microwave imaging system and processes, and associated software products”

My PhD advisors and I had developed a microwave breast imaging system, including the hardware and efficient image reconstruction algorithms. With this system, we were able to demonstrate, for the first time, the clinical utility of microwave imaging for breast cancer detection. The computational efficiency of the algorithms outperforms the traditional methods significantly. The proposed methods related to this patent are now adopted in multiple labs across the world.

U.S. Provisional Patent Application,
No. 61/637,641, filed on April 24,

Fang Q, “Functional near-infrared brain imaging assisted by a low-cost mobile phone camera”

2012.

International Patent Application, No. **Fang Q**, “Method and system for non-invasive quantification of biological sample physiology using a series of images”
PCT/US2013/37834, filed on April 23, 2013.

U.S. Provisional Patent Application, Hofmann M, **Fang Q** “Three-Dimensional Shape Acquisition With A Camera And A Deformable Rail”
filed on Apr. 18, 2013

U.S. Provisional Patent Application, **Fang Q**, “Mobile-device Based Pulse Oximeter”
No. 61/858,777, filed on Aug. 5, 2013

International Patent Application No. Boas DA, Carp S, Martino M, **Fang Q** “Optical fiber probe for Use with x-ray mammography”
14/517,398, filed on Oct 17, 2014.

Patent Application PCT/US14/44125 Cleveland, R, **Fang Q**, Hibberd PL, Wang, LT, Zimmermann B,
filed on 10/17/2014 Zwerdling R, “HIGH-RESOLUTION THERMAL IMAGING SYSTEMS AND METHODS”

Report of Scholarship

Publications

Peer reviewed publications in print or other media

- Research investigations (28)
 1. Meaney PM, Paulsen KD, Fanning MW, Li D, **Fang Q**, “Image accuracy improvements in microwave tomographic thermometry: phantom experience”, International Journal of Hyperthermia, vol. 19, pp. 534-550, 2003.
 2. Meaney PM, Fanning MW, Paulsen KD, Li D, Pendergrass SA, **Fang Q**, Moodie KL, “Microwave thermal imaging: Initial in vivo experience with a single heating zone”, International Journal of Hyperthermia, vol. 19, pp. 617-641, 2003.
 3. **Fang Q**, Meaney PM, Geimer SD, Streltsov AV, Paulsen KD, “Microwave image reconstruction from 3D fields coupled to 2D parameter estimation,” IEEE Transactions on Medical Imaging, vol. 23, pp. 475-484, Apr. 2004.
 4. **Fang Q**, Meaney PM, Paulsen KD, “Microwave image reconstruction of tissue property dispersion characteristics utilizing multiple frequency information”, IEEE Transactions on Microwave Theory and Techniques, vol. 52, No. 8, pp. 1866-1875, Aug. 2004.
 5. **Fang Q**, Meaney PM, Paulsen KD, “Singular value analysis of the Jacobian matrix in microwave image reconstruction,” IEEE Transactions on Antenna and Propagation, vol. 54, No. 8, pp.2371-2380, Aug. 2006.
 6. **Fang Q**, Meaney PM, Paulsen KD, “The multi-dimensional phase unwrapping integral and applications to microwave tomographical image reconstruction,” IEEE Transaction on Image Processing, vol 15, No. 11, pp. 3311-3324, Nov. 2006.
 7. Carp SA, Kauffman T, **Fang Q**, Rafferty E, Moore R, Kopans D, Boas D, “Compression-induced

- changes in the physiological state of the breast as observed through frequency domain photon migration measurements,” *Journal of Biomedical Optics*, vol. 11, issue 6, Nov./Dec. 2006.
8. Meaney PM, **Fang Q**, Rubaek T, Paulsen KD, “Log transformation benefits parameter estimation in microwave tomographic imaging,” *Medical Physics*, 34 (6):2014-23, Jun 2007
 9. Meaney PM, Fanning MW, Raynolds T, Fox CJ, **Fang Q**, Kogel CA, Poplack SP, Paulsen KD, "Initial Clinical Experience with Microwave Breast Imaging in Women with Normal Mammography," *Acad Radiol.*, vol. 14, pp. 207-218, 2007.
 10. Boverman G, **Fang Q**, Carp SA, Miller EL, Brooks DH, Selb J, Moore RH, Kopans DB, Boas DA, "Spatio-Temporal Imaging of the Hemoglobin in the Compressed Breast With Diffuse Optical Tomography," *Phys. Med. Biol.* 52 3619-3641, 2007.
 11. Boverman G, Miller EL, Brooks DH, **Fang Q**, Boas DA, "Estimation and Statistical Bounds for Three-Dimensional Polar Shapes in Diffuse Optical Tomography," *IEEE Transactions on Medical Imaging*, vol. 27, issue 6, pp.752 – 765, Jun 2008.
 12. Carp SA, Selb J, **Fang Q**, Moore R, Kopans DB, Rafferty E, Boas DA, “Dynamic functional and mechanical response of breast tissue to compression,” *Optical Express*, vol. 16, Issue 20, pp. 16064-16078, 2008.
 13. **Fang Q**, Sakadžić S, Ruvinskaya L, Devor A, Dale AM, Boas DA, "Oxygen advection and diffusion in a three dimensional vascular anatomical network," *Optical Express*, featured article, vol. 16, Issue 22, pp. 17530-17541, 2008.
 14. **Fang Q**, Carp SA, Selb J, Boverman G, Zhang Q, Kopans DB, Moore RH, Brooks DH, Miller EL, Boas DA, “Combined optical Imaging and mammography of the healthy breast: optical contrast derives from breast structure and compression,” *IEEE Trans. Medical Imaging*, vol. 28, issue 1, pp. 30 – 42, Jan. 2009.
 15. Zhu G, Popovic M, **Fang Q**, “Microwave-induced thermoacoustics: assisting microwave tomography,” *IEEE Trans. on Magnetics*, vol. 45, issue 3, pp. 1654-1657, 2009.
 16. **Fang Q** and Boas D, “Monte Carlo simulation of photon migration in 3D turbid media accelerated by graphics processing units,” *Optics Express*, featured article, vol. 17, issue 22, pp. 20178-20190, 2009.
 17. **Fang Q**, Meaney PM, Paulsen KD, “Viable three-dimensional microwave imaging, theory and experiments,” *IEEE Trans. on Antennas and Propagation*, vol. 58, No. 2, pp. 449– 458, 2010.
 18. **Fang Q**, Moore RH, Kopans DB, Boas DA, “Compositional-prior-guided image reconstruction algorithm for multi-modality imaging,” *Biomedical Optics Express*, vol. 1, issue 1, pp. 223-235, 2010.
 19. **Fang Q**, “Mesh-based Monte Carlo method using fast ray-tracing in Plücker coordinates,” *Biomedical Optics Express*, vol. 1, issue 1, pp. 165-175, 2010.
 20. **Fang Q**, Selb J, Carp SA, Kopans DB, Moore RH, Brooks DH, Miller EL, Boas DA, “Combined optical and tomosynthesis breast imaging,” *Radiology*, (cover article) vol. 258, No. 1, pp. 89-97, 2011.
 21. **Fang Q**, “Comment on ‘A study on tetrahedron-based inhomogeneous Monte-Carlo optical simulation’,” *Biomed. Opt. Express*, vol. 2, issue 5, pp. 1258-1264, 2011.
 22. Baraghis E, Devor A, **Fang Q**, Srinivasan VJ, Wu W, Boas D and Sakadžić S, "Two-photon microscopy of cortical NADH fluorescence intensity changes: correcting contamination from the hemodynamic response," *J Biomed Opt* 16, 106003 2011.
 23. Perdue KL, **Fang Q**, Diamond, SG, “Quantitative assessment of diffuse optical tomography sensitivity to the cerebral cortex using a whole-head probe”, *Phys. Med. Biol.* 57, 2857-2872, 2012.
 24. Cooper RJ, Caffini M, Dubb J, **Fang Q**, Custo A, Tsuzuki D, Fischl B, Wells W 3rd, Dan I, Boas DA, "Validating atlas-guided DOT: A comparison of diffuse optical tomography informed by atlas

and subject-specific anatomies," *NeuroImage*. 62(3), 1999-2006, 2012

25. Chen J, **Fang Q**, Intes X, "Mesh-based Monte Carlo method in time-domain widefield fluorescence molecular tomography," *Journal of Biomedical Optics*, 17(10), 106009 2012
26. **Fang Q** and Kaeli D, "Accelerating mesh-based Monte Carlo method on modern CPU architectures," *Biomed. Opt. Express*, 3(12), 3223-3230, 2012
27. Carp SA, Sajjadi AY, Wanyo CM, **Fang Q**, Specht M, Schapira L, Moy B, Bardia A, Boas DA, Isakoff SJ, "Hemodynamic signature of breast cancer under fractional mammographic compression using a dynamic diffuse optical tomography system," *Biomed. Opt. Express*, 4(12) 2911-2924, 2013
28. Selb J, Ogden TM, Dubb J, **Fang Q**, and Boas DA, "Comparison of a layered slab and an atlas head model for Monte Carlo fitting of time-domain NIRS data of the adult head," *Journal of Biomedical Optics*, 19(1), pp. 16010, 2014
29. Gagnon L, Sakadžić S, Lesage F, Musacchia JJ, Lefebvre J, **Fang Q**, et al., "Quantifying the microvascular origin of BOLD-fMRI from first principles with two-photon microscopy and an oxygen-sensitive nanoprobe," *J Neurosci*.35(8):3663-75, 2015
30. Deng B, Brooks DH, Boas DA, Lundqvist M, and **Fang Q**, "Characterization of structural-prior guided optical tomography using realistic breast models derived from dual-energy x-ray mammography," *Biomed. Opt. Express* 6(7), 2366-2379, 2015
31. Deng B, Fradkin M, Rouet JM, Moore RH, Kopans DB, Boas DA, Lundqvist M, and **Fang Q**, "Characterizing breast lesions through robust multi-modal data fusion using independent diffuse optical and x-ray breast imaging," *Journal of Biomed. Optics Letters*, 20(8), 080502, 2015
32. Yao R, Intes X, **Fang Q*** (2016), "Generalized mesh-based Monte Carlo for wide-field illumination and detection via mesh retessellation," *Biomed. Optics Express*, 7(1), 171-184, (online 18 Dec 2015)
33. Zimmermann B, **Fang Q**, Boas D, Carp S*, (2016) "Frequency domain near-infrared multiwavelength imager design using high-speed, direct analog-to-digital conversion," *J. Biomed. Opt.* 21(1), 016010 (Jan 26, 2016)

▪ Peer-reviewed conference papers (9)

1. **Fang Q**, Meaney PM, Paulsen KD, "Phase unwrapping in the presence of scattering nulls and applications to microwave imaging," *Proceeding (425) Antennas, Radar, and Wave Propagation*, Jul. 2004
2. **Fang Q**, Carp SA, Selb J, Moore RH, Kopans DB, Miller EL, Brooks DH, Boas DA, "Spectrally Constrained Optical Breast Imaging with Co-registered X-Ray Tomosynthesis," *OSA Biomedical Optics (BIOMED) conference*, 2008.
3. **Fang Q**, Carp SA, Selb J, Moore RH, Kopans DB, Miller EL, Brooks DH, Boas DA, "A multi-modality image reconstruction platform for diffuse optical tomography," *OSA Biomedical Optics (BIOMED) conference*, 2008.
4. Zhu G, Popovic M, **Fang Q**, "Microwave-Induced Thermoacoustics: Assisting Microwave Tomography," *13th Biennial IEEE Conference on Electromagnetic Field Computation*, OB2-1, Athens, May 2008
5. **Fang Q** and Boas D, "Tetrahedral mesh generation from volumetric binary and gray-scale images", *IEEE International Symposium on Biomedical Imaging (ISBI'09)*, 1142-1145, 2009.
6. **Fang Q**, Carp SA, Moore RH, Kopans DB, Boas DA, "Imaging Benign and Malignant Breast Lesions with Combined Optical Imaging and Tomosynthesis," *OSA Biomedical Optics (BIOMED) conference (invited)*, Apr. 2010.

7. **Fang Q** and Boas D, "GPU accelerated Monte Carlo simulation for 3D photon migration", OSA Biomedical Optics (BIOMED) conference, Apr. 2010.
8. **Fang Q**, Carp SA, Martino M, Moore RH, Kopans DB, and Boas DA, "Joint image reconstruction for breast tumor diagnosis using both structural and functional information," OSA Biomedical Optics (BIOMED) conference, Apr. 2012.
9. **Fang Q**, "Quantitative diffuse optical tomography using a mobile phone camera and automatic 3D photo stitching," OSA Biomedical Optics (BIOMED) conference, Apr. 2012.
10. Paravecino F, Yu L, Kaeli D, **Fang Q***, "Portable performance for Monte Carlo simulations of photon migration in 3D turbid media for single and multiple GPUs", GTC2016, Paper#S6635, 2016, CA
11. Deng B, Brooks, DH, Boas DA, Lundqvist M, **Fang Q*** "Characterization of Breast Lesions Using Structural Prior Guided Optical Tomography on the Realistic Breast Model – DigiBreast," OSA BIOMED 2016, Paper#2458069, FL
12. Yao R, Intes X, **Fang Q***, "Enabling wide-field illumination and detection in mesh-based Monte Carlo simulations ," OSA BIOMED 2016, Paper#2459052, FL
13. Inacio D, Deng B, Kopans D, Boas D, **Fang Q***, (2016) "Automatically finding tumors using structural-prior guided optical tomography," OSA BIOMED 2016, Paper#2468528, FL
14. Inacio D, Deng B, Kopans D, Boas D, **Fang Q***, (2016) "Automatically finding tumors using structural-prior guided optical tomography," OSA BIOMED 2016, Paper#2468528, FL
15. Deng B, **Fang Q**, Boas DA, Carp S*, "Impact of Experimental Parameter Errors on Reconstructed Breast Images Using Diffuse Optical Tomography," OSA BIOMED 2016, Paper#2455560, FL

[Non-peer reviewed scientific or medical publications/materials in print or other media](#)

- Proceedings of meetings or other non-peer reviewed research publications (20)
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Thesis Committee: Paul M. Meaney, Keith D. Paulsen, William Lotko, Eric L. Miller

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[Narrative Report](#)

I am a researcher working in the field of biomedical optics with specific interests in multi-modality imaging, computational imaging methods and low-cost diagnostic tools for resource-poor settings. Over the past years, I have received highly competitive research grants from the NIH, Massachusetts Life Sciences Center, Gates Foundation and US Agency for International Development, and have published over 30 journal papers with an h-index of 23. Specifically, I have led the development of a multi-modal breast imaging system for early detection of breast cancer. With my collaborations with Philips Healthcare and strong preliminary data including over 470 patients, I recently received an NIH R01 grant to further develop this technique, making us well position towards the clinical translation of this technology. Furthermore, I have published one of the first papers on GPU-accelerated Monte Carlo (MC) simulation algorithm for 3D photon transport simulations. My paper has received over 320 citations; the associated software was widely disseminated among the biophotonics community across the world, driving the development of novel optical imaging systems and enabling exploration of complex biological systems. My paper on a new MC algorithm – mesh-based MC – had also topped the most-downloaded papers in a premier journal for 5 consecutive months in 2013. In 2015, my USAID-funded project on developing non-contact mobile-phone based pulse oximeter was named as one of the 30 leading innovations in the Innovation Countdown 2030 (<http://ic2030.org/>) Initiative’s inaugural report.