

# CURRICULUM VITAE

## QIFA ZHOU, PhD,

### PERSONAL INFORMATION:

#### **Work**

##### **Professor**

Biomedical Engineering and Ophthalmology,  
Director, Medical Ultrasound Imaging Lab  
Director, Clinical Translational Study in Ginsburg Institute  
for Biomedical Therapeutics  
University of Southern California,  
Los Angeles, CA 90089  
Phone: 213-740 4307  
Fax: 213-821 3897  
Work Email: qifazhou@usc.edu

### EDUCATION AND PROFESSIONAL APPOINTMENTS

#### **EDUCATION:**

1983	BS, Applied Physics, Hubei University, Wuhan
1986	MS, Applied Physics, Wuhan University, Wuhan
1993	PhD, Electronic Engineering, Xi'an Jiaotong University, Xi'an

#### **POST-GRADUATE TRAINING:**

2000-2002	Postdoctoral Fellowship, Materials Research Institute, Penn State University, University Park
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#### **HONORS, AWARDS:**

1993	First place for research	Xi'an Jiaotong University, Xi'an
1995	Second place for research	Department of Education in China, Beijing
1998	Croucher Fellowship	Croucher Foundation in Hong Kong, HongKong
2010	Student paper competition Award	IEEE UFFC, New York
2014	AIBME Fellow	American Institute for Medical and Biological Engineering, Washington, DC.
2014	SPIE Fellow	The international society for optics and photonics, Bellingham, WA
2015	Robert Newcomb Interdisciplinary Team Science Award	The UC Irvine ICTS, Irvine
2015	Seno Medical Best Poster Awards	SPIE Photonics west, BIOS, San Francisco
2018	Best Student paper award	IEEE UFFC, Kobe, Japan
2018	IEEE Fellow	IEEE
2018	Seno Medical Best Paper Awards	SPIE Photonics west, BIOS, San Francisco
2019	Innovation Technology Transfer Award	USC Steven Institute
2019	Senior member National Academy of Inventor	NAI
2020	Final list	IEEE Ferroelectric Recognition Award

#### **ACADEMIC APPOINTMENTS:**

1993-1994	Research Associate	Materials Lab, Sun Yat-sen University, Guangzhou, China
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1994-1999	Associate Professor and Director	Materials Lab, Sun Yat-sen University, Guangzhou, China
1996-1999	Research Associate	Department of Applied Physics, The Hong Kong Polytechnic University, Hong Kong, China
2002-2007-2011	Research Assistant/associate Professor	Department of Biomedical Engineering, University of Southern California, Los Angeles, USA
2011-2016	Research Professor	Department of Biomedical Engineering, University of Southern California, Los Angeles, USA
July, 2016/ Tenured Full Prof. April, 2017	Department of Ophthalmology and Department of Biomedical Engineering	Keck School of Medicine and Viterbi School of Engineering, University of Southern California, Los Angeles, USA

#### ADMINISTRATIVE APPOINTMENTS:

1995-1998	Director	Materials Lab, Sun Yat-sen University, Guangzhou, China
2013-2014	Oversea Director for education	Biomimetic Microelectronic Systems Engineering Research Center
2016-	Director	Biomedical Ultrasound Lab
2020-	Director	Translational Study in Ginsburg Institute for Biomedical Therapeutics

#### TEACHING

##### DIDACTIC TEACHING:

<i>Institution</i>	<i>Department of Biomedical Engineering at USC</i>		
<i>Year-Year</i>	<i>Course Name</i>	<i>Units/Hrs</i>	<i>Role</i>
2010-2011	Topic of Biomedical Engineering, BME 501	2 Hrs	Guest lecture
2010-2014	Ultrasound transducer BME 536	2 Hrs	Guest Lecture
2012-2013	Biomedical Optical imaging, BME 599	3 Units/4hrs	Core
2013-2014	Biomedical Optical imaging, BME 599	3 Units/4hrs	Core
2014-2015	Introduction to BioMEMS and Bionanotechnology BME 551	2 Hrs	Guest lecture
2015-2016	Introduction to Biomimetic Neural Engineering BME 452	2 Hrs	Guest lecture
2016-2017	Ultrasound transducer BME 536	4 Hrs	Guest lecture
2017-Spring	Introduction to BioMEMS and Bionanotechnology 551	3 units/4hrs	Core
2017-Spring	BME graduate seminar 533	1 unit/hr	Core
2018-Spring	Introduction to BioMEMS and Bionanotechnology 551	3 units/4hrs	Core
2018-Fall	BME graduate seminar 533	1 unit/hr	Core
2019-Spring	Introduction to BioMEMS and Bionanotechnology 551	3 units/4hrs	Core
2019-Fall	BME graduate seminar 533	1 unit/hr	Core

2020-Spring	Introduction to BioMEMS and Bionanotechnology 551	3 units	core
2020-fall	BME graduate seminar 533	1 unit/hr	core

<i>Institution</i>	<i>Sun Yat-sen University, Guangzhou, China</i>		
<i>Year-Year</i>	<i>Course Name</i>	<i>Units/Hrs</i>	<i>Role</i>
1994-1995	Scientific English in Material Science, Undergraduate	4 Hrs/ week	Core
1995-1996	Scientific English in Material Science, Undergraduate	4 Hrs/week	Core

#### UNDERGRADUATE, GRADUATE AND MEDICAL STUDENT (OR OTHER) MENTORSHIP:

<i>Year-Year</i>	<i>Trainee Name</i>	<i>Trainee Type</i>	<i>Dissertation/Thesis/Project Title</i>
2011-2011	Yi Zheng	Undergraduate	Ultrasound
2011-2011	Xingyun Tong	Undergraduate	Ultrasound
2016-2017	Wanda Takabayashi	Undergraduate	Ultrasound

#### GRADUATE STUDENT THESIS, EXAM AND DISSERTATION COMMITTEES:

<i>Year-Year</i>	<i>Trainee Name</i>	<i>Committee Type</i>	<i>Student Department</i>
2020	Jie JUN	Ph. D Committee	ISE, USC
2020	Robert Wodnicki	Ph. D Committee	Biomedical Engineering
2019	Xuejun Qian	Ph.D Advisor	Biomedical Engineering
2019	Zeyu Chen	Ph.D Advisor	Biomedical Engineering
2019	Christopher Ceroici	Ph. D Committee	ECE, University of Alberta
2019	Xiangjia Li	Ph. D Committee	ISE, USC
2019	Eugene Yoon	Ph. D Committee	Biomedical Engineering
2019	Sneha Ve	Ph. D Committee	Biomedical Engineering
2018	Yangkui Tang	Ph. D committee	Electrical Engineering
2018	Robert Wodnicki	Ph. D Advisor	Biomedical Engineering
2018	Hsiao-Chuan Liu	Ph. D committee	Biomedical Engineering
2018	Hayong Jung	Ph. D committee	Biomedical Engineering
2018	Chi Woo Yoon	Ph. D committee	Biomedical Engineering
2018	Xiangjia Li	Ph. D committee	Industry Engineering
2018	Yang Lou	Ph. D committee	Biomedical Engineering
2017	Xuejun Qian	Ph. D Advisor	Biomedical Engineering
2017	Hae Lim	Ph. D committee	Biomedical Engineering
2017	Zeyu Chen	Ph. D Advisor	Biomedical Engineering
2017	Mingyue Yu	Ph. D Advisor	Biomedical Engineering
2016	Yu-Ryan Chen	PhD Committee	Biomedical Engineering
2016	Chi Tat Chiu	PhD Committee	Biomedical Engineering
2012-2016	Yang Li	PhD Advisor	Biomedical Engineering
2011-2015	Teng Ma	PhD Advisor	Biomedical Engineering
2009-2013	Hsiu-sheng Hsu	PhD Advisor	Biomedical Engineering
2008-2012	Xiang Li	PhD Advisor	Biomedical Engineering
2005-2009	Dawei Wu	PhD Advisor	Biomedical Engineering
2013-	Zeyu Chen	PhD Advisor	Biomedical Engineering
2013-	Mingyue Yu	PhD Advisor	Biomedical Engineering
2013-	Xuejun Qian	PhD Advisor	Biomedical Engineering
2013-	Robert Wodnicki	Co-PhD Advisor	Biomedical Engineering

2013-	Yunze Li	MS Advisor	Biomedical Engineering
2013-	Xiaoyang Chen	Co-PhD Advisor	Materials Science and Engineering
2015	Lawrence Yu	PhD Committee	Biomedical Engineering
2015	Xuan Song	PhD Committee	Industrial and Systems Engineering
2015	Yu-Ryan Chen	PhD Committee	Biomedical Engineering
2014	Teng Ma	PhD Committee	Biomedical Engineering
2014	Brian Kim	PhD Committee	Biomedical Engineering
2013	Ruimin Chen	PhD Committee	Biomedical Engineering
2013	Junseob Shin	PhD Committee	Biomedical Engineering
2013	Hsiusheng Hsu	PhD Committee	Biomedical Engineering
2013	Fan Zheng	PhD Committee	Biomedical Engineering
2013	Yuling Chen	PhD Committee	Biomedical Engineering
2013	Man M, Nguyen	PhD Committee	Biomedical Engineering
2012	Heidi Marie Gensler	PhD Committee	Biomedical Engineering
2012	Johan Kuo	PhD Committee	Biomedical Engineering

### POSTGRADUATE MENTORSHIP:

1995-1997	Lisong Yun	Full Professor, Wuyi University, China
1995-1998	Xinggui Tang	Full Professor, Guangdong University of Technology, China
2004-2006	J. H. Cha	Principle Engineer Alpinion Medical Systems, Korea
2004-2006	Chales Sharp	Senior Engineer, Company in USA
2009-2013	Dawei Wu	Full Professor, Nanjing University of Aeronautics and Astronautics, China
2009-2013	Hsiusheng Hsu	Senior Engineer, A start-up company, Taiwan
2010-2012	Benpeng Zhu	Full Professor, Huazhong University of Science and Technology, China
2009-2013	Ruimin Chen	Lab Manager, NIH Transducer Resource Center, USC
2009-2010	Mutsuo Ishikawa	Associate Professor, Toin University of Yokohama, Japan
2006-2012	Changgeng Liu	Senior engineer, R&D manager, MEMS company, California
2008-2012	Xiang Li	Chief Scientist, Life Science Company, Shanghai
2012-2016	Teng Ma	Full Professor, SIAT, China
2012-2017	Yang Yang	Engineer in Appl Inc
2013-2017	Mingyue Yu	Engineer in Siemens Inc
2014-2016	Chonglong Fei	Faculty in Xian Dian University, China
2014-2019	Zeyu Chen	Professor in Center University, China
2015-2020	Xuejun Qian	Postdoc in BME at USC
2015-2020	Robert Wodniki	Postdoc in BME at USC
2017-present	Runze Li	Ph. D student
2017-	Gengxi Lu	Ph. D student
2017-	Haochen Kang	Ph. D student
2018-	Yizhe Sun	Ph. D student
2019-	Yushen Zeng	M. S. student
2020-	Junhang Zhang	Ph. D student
Adnan	Rayas	Ph. D student

### MENTORSHIP OF FACULTY:

2018-2019	Xuyuan Chen	BME visiting faculty from Norway
2017-2018	Lixiang Wu	BME visiting faculty from China
2017-2018	Di Li	BME visiting faculty from China
2013-2016	Benpeng Zhu	BME visiting faculty from China
2009-2010	Mutsuo Ishikawa	BME visiting faculty from Japan

## SERVICE

### DEPARTMENT SERVICE:

2000	Director for translational study	IBT, Roski Eye Institute
2000	BME Space Committee (Vice Chair)	Department of Biomedical Engineering
2000	BME tenured faculty promotion committee	Department of Biomedical Engineering
2000	BME faculty hiring committee	Department of Biomedical Engineering
2019-2020	Faculty search committee	Department of Biomedical Engineering
2016-2017	Ph. D Admission Committee	Department of Biomedical Engineering
2012-2015	Graduate Admission Committee	Department of Biomedical Engineering
2019-2020	Faculty Search Committee	Department of Biomedical Engineering
2020	Vice Chair for Space Committee	Department of Biomedical Engineering

### SCHOOL SERVICE:

2017-2018	Special committee for repealing credit of students	USC Viterbi School of Engineering
2016-2018	Gender Task Force Evaluating the C-Change Survey Results	USC Keck School of Medicine
2014-2016	Engineering Faculty Committee	USC Viterbi School of Engineering
2019-2020	Engineering Faculty Committee	USC Viterbi School of Engineering

### UNIVERSITY SERVICE:

2015-2016	NTT Faculty Promotion Committee	University of Southern California
2010-2011	Academic Senate	University of Southern California

### ISSUED AND PENDING PATENTS:

1. Qifa Zhou, Mark Humanyun, Xuejun Qian, Biju Thomas, Gengxi Lu, Kirk K Shung, "Ultrasound stimulation on the retina", Disclosure at Steven Institute, USC. Oct. 2020.

2. WO/2017/143307 Modular piezoelectric sensor array with co-integrated electronics and beamforming channels.

3. Wodnicki, Robert G.; **Zhou, Qifa**; Cummins, Thomas; Stephens, Douglas N.; Ferrara, Katherine W.; "Modular piezoelectric sensor array with co-integrated electronics and beamforming channels", WO 2017143307, Aug. 24, 2017.

4. Chiang, Hui-Hua; Lin, Shih-Pin; Ting, Chien-Kun; **Zhou, Qifa**; Shung, K. Kirk; "Ultrasonic positioning device for epidural space and method using the same", U.S. Patent No. 9480458, Nov. 1, 2016.

5. **Zhou, Qifa**; Li, Xiang; Van Dam, Jacques; Shung, K. Kirk; Cummins, Thomas; Chen, Zhongping; "Integrated Ultrasound, OCT, PA and/or Florescence Imaging Endoscope for Diagnosing Cancers in Gastrointestinal, Respiratory, and Urogenital Tracts", U.S. Patent No. 20160242737, Aug. 25, 2016.

6. Humayun, Mark S.; Xu, Xiaochen; **Zhou, Qifa**; Shung, K. Kirk; Ameri, Hossein; Chader, Gerald; "Thrombolysis in retinal vessels with ultrasound", U.S. Patent No. 20140243712, Aug. 28, 2014.

7. Chen, Zhongping; Yin, Jiechen; **Zhou, Qifa**; Hu, Changhong; Yang, Hao-Chung; Chiang, Huihua Kenny; Shung, Kirk K.; "Ultrasound guided optical coherence tomography, photoacoustic probe for biomedical imaging", U.S. Patent No. 8764666, Jul. 1, 2014.

8. Humayun, Mark S.; Xu, Xiaochen; **Zhou, Qifa**; Shung, K. Kirk; Ameri, Hossein; Chader, Gerald; "Intraocular ultrasound doppler techniques", U.S. Patent No. 8684935, Apr. 1, 2014.
9. Chiang, Hui-Hua; Lin, Shih-Pin; Ting, Chien-Kun; **Zhou, Qifa**; Shung, K. Kirk; "Ultrasonic positioning device for epidural space and method using the same", U.S. Patent No. 20110106052, May 5, 2011.
10. Chen, Zhongping; Yin, Jiechen; **Zhou, Qifa**; Hu, Changhong; Yang, Hao-Chung; Chiang, Huihua Kenny; Shung, Kirk K.; "Ultrasound guided optical coherence tomography, photoacoustic probe for biomedical imaging", U.S. Patent No. 20110098572, Apr. 28, 2011.
11. Humayun, Mark S.; Xu, Xiaochen; **Zhou, Qifa**; Shung, K. Kirk; Ameri, Hossein; Chader, Gerald; "Intraocular ultrasound doppler techniques", U.S. Patent No. 20080319319, Dec. 25, 2008.
12. Humayun, Mark S.; Xu, Xiaochen; **Zhou, Qifa**; Shung, K. Kirk; Ameri, Hossein; Chader, Gerald; "Thrombolysis in retinal vessels with ultrasound", U.S. Patent No. 20080262512, Oct. 23, 2008.
13. Humayun, Mark S.; Xu, Xiaochen; **Zhou, Qifa**; Shung, K. Kirk; Ameri, Hossein; Chader, Gerald; "Intraocular ultrasound doppler technique", WO 2008128168, Oct. 23, 2008.
14. **Q. F. Zhou**, K. K. Shung, "A New Process to Fabricate the High Frequency Ultrasonic Transducers", US patent Application No. 60/508,546, 2003.
15. **Q. F. Zhou**, Q. Zhang, C. L. Choy, H. L. W. Chen, "A New Method to Increase the Piezoelectric Properties of 0-3 PZT/Copolymer Composites", Chinese Patent No. 98 1 17223.6, 1998.
16. **Q. F. Zhou**, "Thermal Composite Thin Film of SnO<sub>2</sub> System Derived by Sol-gel Method", Chinese Patent No. 95 2 09858.x, 1995.
17. **Q. F. Zhou**, S. Zhang-Nunes, G. X. Lu, M. Humayun, "Ultrasound stimulation on the dry eye", 2019, USC Steven Institute for patent disclosure application.

## PROFESSIONAL SERVICE

2020	Vice Chair for IEEE UFFC Fellow Committee	2020-
2020	TPC Group 5 Chair	2020 IEEE ISAF in Colorado.
2020	IEEE International Ultrasound Symposium Technique committee	Las Vegas, Sep., 2020
2020	IEEE UFFC Transaction Associate editor	2020
2019	Organizing Committee	2019 ISAF in Switzerland
2019	Organizing Committee	2019 IEEE IUS in UK
2018	Organizing Committee	SPIE Photonics West - Photons Plus Ultrasound, San Francisco, California
2018	Organizing Committee	2018 IEEE ISAF in Japan
2018	Session Chair	2018 IEEE IUS in Japan
2017	Session Chair	2017 39th IEEE EMBC, Jesu Island, Korean.
2017	Organizing Committee and Invited Talk	2017 SUSTech Biomedical Engineering Summit Symposium, July 28-29, 2017, Shenzhen.
2017	Session Chair and TPC Memeber	2017 IEEE International Ultrasound Symposium, Washington, DC.
2017	Organizing Committee	SPIE Photonics West - Photons Plus

2016	Organizing Committee	Ultrasound, San Francisco, California SPIE Photonics West - Photons Plus Ultrasound, San Francisco, California
2016	Session Chair and TPC Memeber	IEEE International Ultrasound Symposium, Tours, France
2016	Organizing Committee Chair	13th Annual Ultrasonic Transducer Engineering Conference, Los Angeles, California
2015	Session Chair	IEEE International Ultrasound Symposium, Taipei, Taiwan
2015	Session Chair	IEEE International Symposium on Applications of Ferroelectric, Singapore
2015	Session Chair	SPIE Photonics West - Photons Plus Ultrasound, San Francisco, California
2014	Chapter Chair	IEEE Ultrasonics, Ferroelectrics and Frequency Control Society
2014	Session Chair	IEEE International Ultrasound Symposium, Chicago, Illinois
2014	Session Chair	IEEE International Symposium on Applications of Ferroelectric, State College, Pennsylvania
2013	Chair	International Workshop on Lead-free Piezoelectric Materials and Their Applications
2014	Organizing Committee Member	12th Annual Ultrasonic Transducer Engineering Conference, Los Angeles, California
2013	Organizing Committee Member	11th Annual Ultrasonic Transducer Engineering Conference, Los Angeles, California
2012-2015	Organizing Committee Member, Session Chair	SPIE Photonics West - Photons Plus Ultrasound, San Francisco, California
2010-2011	Academic Senate	University of Southern California, Los Angeles, California
2010	Organizing Committee Member	10th Annual Ultrasonic Transducer Engineering Conference, Los Angeles, California
2008	Committee Member, Session Chair	IEEE UFFC International Ferroelectric Committee
2008	Technique Program Member, Session Chair	IEEE International Ultrasound Symposium, Beijing, China

**PROFESSIONAL SERVICE (CONT'D)**

2008	Organizing Committee Member	6th International Conference on Ultrasonic Biomedical Microscanning, Malibu, California
2007	Program Committee	SPIE Defense & Security Symposium, Micro (MEMS) and Nanotechnologies for Space Applications, Orlando, Florida

**CONSULTANTSHIPS AND ADVISORY BOARDS:**

2013-2015	Viterbi Faculty Council Panel	USC Viterbi School of Engineering
2011-2013	Council Member	Chinese American Faculty Association of Southern California

**PROFESSIONAL SOCIETY MEMBERSHIPS:**

2002-Present	Institute of Electrical and Electronics Engineers (IEEE) from 2018, Fellow
2005-Present	International Society for Optics and Photonics (SPIE), fellow
2006-Present	American Institute for Medical and Biological Engineering (AIMBE), fellow

## **RESEARCH AND SCHOLARSHIP**

### **EDITORSHIPS AND EDITORIAL BOARDS:**

2017-	Editorial Board	The Ophthalmologist: Clinical and Therapeutic Journal
2016-2017	Guest Editor	BioMed Research International
2016-Present	Executive Editor	Journal of Ophthalmology and Ophthalmic Surgery
2011-Present	Editorial Board of Journal	Piezoelectric and Acoustics
2008-Present	Associate Editor	IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control
2008-Present	Editorial Board of Journal	Nanotechnology, Science and Applications

### **MANUSCRIPT REVIEW:**

Scientific Report  
 Journal of Applied Physics, Applied Physics Letters,  
 IEEE Transactions on Ultrasonics, Ferroelectric and Frequency Control  
 Journal of Materials Research  
 Journal of American Ceramic Society  
 Ultrasonics  
 Materials Research Symposium (MRS) Proceeding  
 Materials Research Bulletin  
 Journal of Biomedical Materials Research  
 Applied Physics Letters  
 Journal of Nanotechnology, Science and Applications  
 Nano Letters  
 Journal of Biomedical Optics  
 Sensor and Actuator  
 Optical Letters

### **GRANT REVIEWS:**

2020	NIH VIBT study session	National Institutes of Health
2020	NIH NEI K grant	National Institutes of Health
2020	NIH ETTN-12	National Institutes of Health
2019	NIH ETTN-12	National Institutes of Health
2019	NIH NIBIB P41	National Institutes of Health
2019	NIH NEI K grant	National Institutes of Health
2018	NIHZDK1 GRB-K	National Institutes of Health
2018	Dean Pilot Grant	USC Keck School of Medicine, Los Angeles, California
2018	NIH	NOIT study session
2017	NIH	NOIT study session
2017	NIH	NIBIB Trailblazer R21 study session
2016	Dean Pilot Grant	USC Keck School of Medicine, Los Angeles, California
2016	Collaboration Program	National Institute of Biomedical Imaging and Bioengineering
2016	Radiology	Wright Foundation Research Grant Application Review, Los Angeles, California
2015	Vision Program	United States Department of Defense
2014	NIH Study Session in MEDI	National Institutes of Health
2013	NIH BMIT B	National Institutes of Health



2012	NIH BMIT A	National Institutes of Health
2010	NIH BMIT B	National Institutes of Health

## MAJOR AREAS OF RESEARCH INTEREST

### Research Areas

1. Multimodal imaging of ultrasound and photoacoustic for cancer study(Colon cancer, breast cancer and Barretts esophagus cancer).
2. Piezoelectric thin film, Nano materials, Composites, Single crystal. MEMS and 3D printing technology.
3. Biomedical functional image, photoacoustic sensor and imaging for intravascular .
4. Multi-modalities imaging such as ultrasound combined with OCT for retinal and cornea elastography and Biomechanical properties.
5. Micro-mechanical properties of cancer cells and tissue, oxygen metabolism in the brain by using photoacoustic imaging.
6. Integrated Optical Coherence Tomography (OCT) and Raman endoscope for diagnosing cholangiocarcinoma and cystic neoplasms of the pancreas.
7. Therapeutic ultrasound for small vein occlusion in the eye.
8. Ultrasound stimulated retina, brain and cancer cell.

## GRANT SUPPORT - CURRENT:

1. Grant No. (PI): 1R01EY026091-01 (Q. Zhou)

Dates of Award: 12/01/2015-11/30/2021

Agency: NIH/NEI

Percent Effort: 15%

Title: High Resolution Elastography of Retina Under Prosthetic Electrical Stimulation

Description: The goal of this study is imaging of the elastic properties of the retina under prosthetic electrical stimulation.

Role: PI (contact)

Total Direct Costs: \$1,572,476; Indirect cost: \$464,416

2. Grant No. (PI): R01 HL127271 (Q. Zhou)

Dates of Award: 4/1/15-3/30/21

Agency: NIH/NIHL

Percent Effort: 20%

Title: Combined OCT/US/PAT system for intravascular Imaging

Description: The focus of this proposal is to develop an integrated multimodal intravascular imaging system that combines intravascular ultrasound (IVUS), optical coherence tomography (OCT), and photoacoustic tomography (PAT).

Role: Multi-PI

Total Direct Costs: \$1,991,241, Indirect cost: \$363,082

3. Grant No. (PI): 1R01CA211602-01A1

Dates of Award: 04/01/2017-03/31/2022

Agency: NIH/NCI

Percent Effort: 20%

Title: Large aperture and wideband modular ultrasound arrays for the diagnosis of liver cancer

Description: The applicants proposed to develop an integrated large aperture ultrasound array for liver cancer application.

Role: Multi-PI

Total Direct Costs: \$2,480,000

4. Grant No. (PI): 1 R01 EY028662-01 (Q. Zhou)

Dates of Award: 07/2018-06/2023

Percent Effort: 20%

Agency: NIH/NEI R01

Title: High-resolution Elastographic Assessment of the Optic Nerve Head

we aim to use phase-resolved OCT to detect small displacements in the optic nerve head (ONH) induced by acoustic radiation force (ARF). We further propose to build a novel single crystal 2D array operating in the 4~10MHz range to generate the ARF pushing force. The combined system will enable us to generate images depicting local displacements of the ONH with a level of detail that cannot be obtained with the current imaging methods, and that can potentially be used as a clinical tool.

**Total Direct Costs: \$ 2,306,742**

**5. Grant No. 1P30EY029220-01 (Center Core Grant for Vision Research)**

**Dates of Award: 10/2018-09/2023**

**Co-Director for core of Ophthalmic Vision Engineering**

**Agency: NIH/NEI**

**Percent Effort: 1.5%**

**Role: Co-I** The aim is to set-up a center for ophthalmology study. There are four cores: as Co-Director of ophthalmic therapeutics engineering core director, it will be to set-up biomedical device core at Roski Eye Institute.

**Total Direct Costs: \$2.0 Million**

**6. GRANT No.: 1 R01 EY030126-01 (PI. Q. ZHOU)**

**DATES OF AWARD: 02/2019-01/2024**

**PERCENT EFFORT: 10%**

**AGENCY: NIH/NEI R01**

**TITLE: NON-INVASIVE ULTRASOUND STIMULATED RETINAL PROSTHESIS**

**ROLE: PI**

**7. GRANT AGENCY: NIH/1 R01 NS111039-01A1 (PI Sub\_contract)**

**PERCENT EFFORT: 10%**

**09/01/2019 – 08/01/2024**

**TITLE: High-resolution High-Speed Photoacoustic and Ultrasound Imaging of Small Vessel Functions in Ischemic Stroke**

**ROLE: CO-I**

**8. Grant Agency: NIH/1 R01HL125084**

**Dates of Award: 07/01/2020 – 06/30/2024**

**Agency: NIH/NHL**

**Percent Effort: 15%**

**TITLE: Phase resolved ARF optical coherence elastography for intravascular imaging**

**Role: Multi-PI** The aim is to study elastography for intravascular imaging by OCE method.

**Total Direct Costs: \$2.6 Million**

#### **GRANT SUPPORT -RECENT FINISHED :**

**1. Grant No. (PI): P41 EB2182 (K. K. Shung)**

**Dates of Award: 09/01/2012-07/31/2018**

**Agency: NIH/NBIB**

**Percent Effort: 20%**

**Title: A Resource on Medical Ultrasonic Transducer Technology**

*Description:* The goal of this project is focused on the development of novel high frequency acoustic transducers and arrays for micro-beam and stimulation of cells.

*Role:* Response Investigator for Project 1

*Total Direct Costs:* \$360,142; *Indirect cost:* \$ 140,543

2 .*Grant No. (PI):* Innovation Pilot Fund(Q. Zhou)

*Dates of Award:* 07/2016-06/2017

*Agency:* USC Steven Institute

*Percent Effort:* 0%

*Role:* PI The aim is to develop a portable and non-invasive ultrasound device for drug delivery to the posterior ocular segment. In particular, we will conduct a systematic study of the influence of ultrasound parameters on the permeability of specific ophthalmic drugs across the sclera barrier, yielding optimized dosing of the drugs in a variety of clinical application.

*Total Direct Costs:* \$50,000; *Indirect cost:* 0

3.*Grant No. (PI):* R01 EB010090-01 (Z. Chen)

*Dates of Award:* 09/01/2009-08/31/2014

*Agency:* NIH/NBIB

*Percent Effort:* 30%

*Title:* Integrated Multi-modality Intravascular US/OCT Imaging System

*Description:* The applicants proposed to develop an integrated multimodal intravascular imaging system that combines ultra high-resolution intravascular optical coherence tomography (OCT) and intravascular ultrasound. We'll use ultrasound for deep penetration and OCT for high resolution to acquire ex-vivo and in-vivo vascular imaging.

*Role:* Co-PI

*Total Direct Costs:* \$620,000; *Indirect cost:* \$385,150

4.*Grant No. :* 1 R01EB015508 (Jiang)

*Dates of Award:* 08/01/14-06/31/18

*Agency:* NIH/NIBIB

*Percent Effort:* 10%

*Title:* Dual-Frequency Intravascular Arrays for Functional Imaging of Atherosclerosis

*Description:* The objective of this research is to develop contrast enhanced high frequency IVUS using a dual frequency array. The goal of this proposal is to develop and test new high frequency circular array and imaging system to push current ultrasound technology to obtain high resolution ultrasound imaging to reduce motion distortion caused by mechanical scanning.

*Role:* Co-investigator

*Total Direct Costs:* \$399,945; *Indirect cost:* \$219,320

5.*Grant No. (PI):* Pilot (Q. Zhou)

*Dates of Award:* 07/01/2013-12/30/2017

*Agency:* Coulter Foundation

*Percent Effort:* 0%

*Title:* Ultrasound/OCT-based Endoscopy for Site-directed Biopsy for Cholangiocarcinoma

*Description:* This aim is to improve the diagnosis of cholangiocarcinoma (CCA) and reduce unnecessary diagnostic procedures by developing an imaging catheter that combines OCT and high-frequency ultrasound modalities to provide image guidance of the tissue sampling during a standard ERCP endoscopic procedure (ERCP).

*Role:* PI

*Total Direct Costs:* \$200,000; *Indirect cost:* 0

6. *Grant No. (PI):* R01CA157277-01

*Dates of Award:* 9/01/2010-08/31/2016

*Agency:* NIH/NCI

*Percent Effort:* 20%

*Title:* Photoacoustic endoscopy of Barretts esophagus

*Description:* This project will develop novel photoacoustic endoscopy of Barretts esophagus using a miniaturized photoacoustic ultrasound probe. The primary motivation is to overcome the depth limitation of existing endoscopic imaging technologies and to provide functional information sensitive to disease states. We'll acquire 3D both ultrasound and Photoacoustic imaging for internal cancer tissue.

*Role:* Multi-PI

Total Direct Costs: \$1,996,718; Indirect cost: \$703,503

7. Grant No. (PI): CMMI - 1335476 (Y. Chen)

Dates of Award: 09/01/2013-08/31/06

Agency: NSF

Percent Effort: 5%

Title: Novel Piezoelectric Device Fabrication Using Digital Projection based Additive Manufacturing

Description: The aim is to fabricate the ultrasound device by 3D printing technology.

Role: Co-PI

Total Direct Cost: \$91,667; Indirect cost: \$39,285

8. Grant No. (PI): 1R01EY021529-01 (Q. Zhou)

Dates of Award: 03/01/2012-02/29/2017

Agency: NIH/NEI

Percent Effort: 5%

Title: Elastographic Imaging of the Retina/Choroid in Age-Related Macular Degeneration

Description: The goal of this study is imaging of the elastic properties of the retina and choroid in age-related macular degeneration (AMD) using ultrasound combined with OCT probe. To address this goal, we propose to use phase resolved optical coherence tomography (OCT) to detect minute displacements induced by acoustic radiation force in these tissue layers, and to then generate images depicting local displacements and obtain the mechanical properties of the retina.

Role: Multi-PI

Total Direct Costs: \$ 1,192,980, Indirect cost: \$251,697

#### INVITED LECTURES, SYMPOSIA, KEYNOTE ADDRESSES

2020	Virtual invited Talk	IEEE ISAF, Ultrasound for acoustic energy application, July, 2020
2020	Invited talk	Florida International University, 2020
2019	Invited talk	IEEE ISAF, Ultrasound for biomedical energy application, Switzerland, July 215-18, 2019
2019	Invited talk	IEEE Nano, 3D printing for ultrasound application, Mauca, July 25, 2019
2018	Invited talk	Multimodal Imaging for biomedical applications, Ceders-Sinai Medical Center, Los Angeles, Dec. 13, 2018.
2018	Invited talk	3-D printing ultrasound transducer for ophthalmic application, IEEE ISAF Oct., Kone, Japan.
2018	Invited talk	MUT high frequency transducer and applications, 2018 MUT conference in France, May 8-10, 2018.
2018	Invited talk	High frequency ultrasound up to 500 MHz for ophthalmology application, 2018 ultrasound conference in Lisbon, Portugal, June 12-15, 2018.
2018	Invited lecture	Piezoelectric high frequency ultrasound and applications, Guilin Dianzhi University of China, May 15, 2018
2018	Invited talk	3-D printing high frequency ultrasound transducer for biomedical imaging applications, IEEE ISAF joint conference, Japan, May 24-27, 2018.
2017	Invited talk	High Resolution Elastography for Ophthalmology and Biomedical Application, 2017 SUSTech Biomedical Engineering Summit Symposium, July 28-29, 2017, Shenzhen.
2017	Invited talk	High Resolution Elastography for Ophthalmology Application, 39th IEEE EMBC, Jeju Island, Korean.
2017	Invited talk	High Resolution Elastography for Ophthalmology Application, Sidian University, Xian, China, May, 2017.
2017	Invited talk	High Resolution Elastography for intravascular and Ophthalmology Application, Nov.28, UTA.
2016	Tutorial Lecture	Micro-Ultrasound and Application, 2016 IEEE International Ultrasound Symposium, France.
2016	Invited talk	High Resolution Elastography for Ophthalmology Application, ICBMU 2016, NanJing, China.
2016	Invited talk	High Resolution Elastography, 2016 National Conference on Biomedical Ultrasound, Shenzhen, China.
2015	Tutorial Lecture	High frequency Ultrasound and Application, 2015 IEEE International

		Ultrasound Symposium, Taipei.
2015	Keynote Speaker	The medical ultrasound symposium and applications, Shanghai, China.
2015	Invited Talk	Piezoelectric high frequency ultrasound for elastography imaging, IEEE International Symposium on Applications of Ferroelectrics, Singapore.
2014	Tutorial Lecture	IEEE International Symposium on Applications of Ferroelectrics, State College, PA.
2014.	Keynote Speaker	International Conference on Biomedical and Ultrasound, Shenzhen, China.
2014	Invited Talk	Piezoelectric High Frequency Ultrasound and Applications, IEEE International Symposium on Applications of Ferroelectrics, State College, PA.
2013	Invited Talk	High Frequency Ultrasound for PA Imaging Application, IEEE International Ultrasound Symposium, Prague, Czech Republic.
2013	Invited Talk	PA Imaging with Nano Contrast, World Congress on Nano Medicine, China.
2013	Invited Talk	11th Annual Ultrasonic Transducer Engineering Conference, Los Angeles, CA.
2013	Invited Talk	High Frequency Piezoelectric thin films Micromachined Ultrasonic Transducers for Imaging Applications, SPIE structure and medical Symposium, San Diego, CA.
2012	Invited Talk	Piezoelectric High Frequency Transducer/Array, World Congress on Medical Physics and Biomedical Engineering, Beijing, China.
2012	Talk	Ultrasound Combined Optical for Biomedical Imaging Application, USC Industry & System Engineering Seminar, Los Angeles, CA.
2011	Talk	Multi Modalities Ultrasound Combined Optical Imaging, USC BME-533 Seminar, Los Angeles, CA.
2011	Keynote Speaker	Multimodalities OCT/Photoacoustic IVUS Imaging, National Piezoelectric and Acoustic Conference, Shenzhen, China.
2011	Talk	Intravascular OCT/PA Imaging Application, The 5th World Congress on Bioengineering, Taiwan.
2011	Invited Talk	Piezoelectric PMN-PT Films for IVUS Application, IEEE ISAF and PFM, Canada.
2010	Invited Talk	High-resolution Co-Registered Intravascular Imaging with Ultrasound (US)/OCT Probe, 4th International Photonics and OptoElectronics Meetings (POEM 2010), Wuhan, China.
2010	Invited Talk	Piezoelectric Thick Films High Frequency Ultrasound Transducer, 10th Ultrasonic Transducer Conference, Los Angeles, CA.
2009	Invited Talk	High Frequency Piezoelectric Micromachined Ultrasound Transducers with Integrated Circuit for Biomedical Application, IEEE ISAF and IMF, Xi'an, China.
2008	Talk	MEMS Transducer and Energy Harvesting, Peiking University, Beijing, China.
2008	Talk	High Frequency Piezoelectric Micromachined Ultrasound Transducers for Biomedical Imaging Application, University of California, Irvine, CA.
2008	Invited Talk	pMUT High Frequency Transducer, 6th International Conference on Ultrasonic Biomedical Microscanning, Malibu, CA.
2007	Invited Talk	High Frequency Piezoelectric Films Ultrasound Transducer, 7th Annual Ultrasonic Transducer Conference, Los Angeles, CA.
2006	Talk	High Frequency Piezoelectric Micromachined Ultrasound Transducers for Biomedical Imaging Application, BME Seminar, University of Southern California, Los Angeles, CA.
2006	Invited Talk	High Frequency Piezoelectric Micromachined Ultrasonic Transducers for Imaging Applications, SPIE Defense & Security Symposium, Micro (MEMS) and Nanotechnologies for Space Applications, Orlando, Florida.
2005	Talk	Inversion Layer High Frequency Ultrasound Transducer, Wuhan University, Wuhan, China.
2005	Talk	Thin Film MEMS High Frequency Transducer for Medical Imaging Application, Wuhan University of Technology, Wuhan, China.
2003	Talk	Ferroelectric Devices and Application, Materials Research Center and Department of mechanical Engineering, California Institute of Technology, Los Angeles, CA.

## **PUBLICATIONS:**

### **REFEREED JOURNAL ARTICLES:**

1. L. M. Jiang, Y. Yang, Y. Chen, Q. F. Zhou, "Ultrasound-Induced Wireless Energy Harvesting: From Materials Strategies to Functional Applications," *Nano Energy*, 2020 Nov;77:105131.
2. H. Kang, X. Qian; R. Chen, R. Wodnicki, Y. Sun, K. Kirk Shung, Z. P. Chen, Q. F. Zhou, "2D Ultrasonic Array-based Optical Coherence Elastography," in *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, doi: 10.1109/TUFFC.2020.3033304.
3. Y. Zeng, L. Jiang, Y. Z. Sun, Y. Yang, Y. Quan, S. Wei, G. Lu, R. Li, J. Rong, Y. Chen, Q. F. Zhou, "3D-Printing Piezoelectric Composite with Honeycomb Structure for Ultrasonic Devices," *Micromachines (Basel)*, 2020, Aug; 11(8): 713.
4. Y. Tang, X. J. Qian, D. J. Lee, Q. F. Zhou, J. J. Yao, "From Light to Sound: Photoacoustic and Ultrasound Imaging in Fundamental Research of Alzheimer's Disease," *OBM Neurobiol.*, 2020; 4(2):
5. P. Lo, K. Huang, Q. F. , M. Humayun, L. Yue., "Ultrasonic Retinal Neuromodulation and Acoustic Retinal Prosthesis," *Micromachines (Basel)*, 2020 Oct; 11(10): 929.
6. G. Lu, X. Qian, J. Castillo, R. Li, L. Jiang, H. Lu, K. K. Shung, M. S. Humayun, B. B. Thomas, and Q. Zhou, "Transcranial focused ultrasound for non-invasive neuromodulation of the visual cortex," *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, early access, Jun 2020, doi: 10.1109/TUFFC.2020.3005670.
7. T. Choi, H. Yu, S. Chang, D. Ha, D. Cho, J. Jang, C. Lee, G. Lu, J. H. Chang, Q. Zhou, and J. Park, "Visibility of bioresorbable vascular scaffold in intravascular ultrasound imaging," *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 67, no. 6, pp. 1090-1101, Jun 2020.
8. Y. Yang, H. J. Hu, Z. Y. Chen, Z. Y. Wang, L. M. Jiang, G. X. Lu, X. J. Li, R. M. Chen, J. Jin, H. C. Kang, H. X. Chen, S. Lin, S. Q. Xiao, H. Y. Zhao, R. Xiong, J. Shi, Q. F. Zhou, S. Xu, and Y. Chen, "Stretchable nanolayered thermoelectric energy harvester on complex and dynamic surfaces," *Nano Letters*, vol. 20, no. 6, pp. 4445-4453, Jun 2020.
9. X. J. Qian, B. Zhang, S. Q. Liu, Y. A. Wang, X. Q. Chen, J. Y. Liu, Y. Z. Yang, X. Chen, Y. Wei, Q. S. Xiao, J. Ma, K. K. Shung, Q. F. Zhou, L. F. Liu, and Z. Y. Chen, "A combined ultrasonic B-mode and color Doppler system for the classification of breast masses using neural network," *European Radiology*, vol. 30, no. 5, pp. 3023-3033, May 2020
10. F. H. Zhong, Y. W. Bao, R. M. Chen, Q. F. Zhou, and S. Hu, "High-speed wide-field multi-parametric photoacoustic microscopy," *Optics Letters*, vol. 45, no. 10, pp. 2756-2759, May 2020
11. D. Li, X. Qian, R. Li, C. Fei, L. Jiang, X. Chen, Y. Yang, and Q. Zhou, "High resolution ADC for ultrasound color Doppler imaging based on MASH sigma-delta modulator," *IEEE Transactions on Biomedical Engineering*, vol. 67, no. 5, pp. 1438-1449, May 2020.
12. R. Chen, Y. He, J. Shi, C. Yung, J. Hwang, L. V. Wang, and Q. Zhou, "Transparent high-frequency ultrasonic transducer for photoacoustic microscopy application," *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, early access, Apr 2020, doi: 10.1109/TUFFC.2020.2985369.
13. H. Peng, L. Mao, X. Qian, X. Lu, L. Jiang, Y. Sun, and Q. Zhou, "Acoustic energy controlled nanoparticle aggregation for nanotherapy," *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 67, no. 4, pp. 735-744, Apr 2020.
14. X. Qian, H. Kang, R. Li, G. Lu, Z. Du, K. K. Shung, M. S. Humayun, and Q. Zhou, "In vivo visualization of eye vasculature using super-resolution ultrasound microvessel imaging," *IEEE Transactions on Biomedical Engineering*, early access, Feb 2020, doi: 10.1109/TBME.2020.2972514
15. X. J. Qian, R. Z. Li, Y. Li, G. X. Lu, Y. M. He, M. S. Humayun, Z. P. Chen, and Q. F. Zhou, "In vivo evaluation of posterior eye elasticity using shaker-based optical coherence elastography," *Experimental Biology and Medicine*, vol. 245, no. 4, pp. 282-288, Feb 2020.

16. R. Wodnicki, H. Kang, R. Chen, N. E. Cabrera-Munoz, H. Jung, L. Jiang, J. Foiret, Y. Liu, V. Chiu, D. N. Stephens, Q. Zhou, and K. W. Ferrara, "Co-integrated PIN-PMN-PT 2-D array and transceiver electronics by direct assembly using a 3-D printed interposer grid frame," **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control**, vol. 67, no. 2, pp. 387-401, Feb 2020.
17. H. M. Peng, X. J. Qian, L. L. Mao, L. M. Jiang, Y. Z. Sun, and Q. F. Zhou, "Ultrafast ultrasound imaging in acoustic microbubble trapping," **Applied Physics Letters**, vol. 115, no. 20, Nov, 2019
18. Du Z, Li R, Qian X, Lu G, Li Y, He Y, Qu Y, Jiang L, Chen Z, Humayun MS, Chen Z, Zhou Q., Quantitative confocal optical coherence elastography for evaluating biomechanics of optic nerve head using Lamb wave model, **Neurophotonics**. 2019 Oct;6(4):041112.
19. B. Rao, X. D. Leng, Y. F. Zeng, Y. X. Lin, R. M. Chen, Q. F. Zhou, A. R. Hagemann, L. M. Kuroki, C. K. McCourt, D. G. Mutch, M. A. Powell, I. S. Hagemann, and Q. Zhu, "Optical Resolution Photoacoustic Microscopy of Ovary and Fallopian Tube," **Scientific Reports**, vol. 9, Oct, 2019
20. Wodnicki R, Kang H, Chen R, Cabrera-Munoz NE, Jong H, Jiang L, Foiret J, Liu Y, Chiu V, Stephens DN, Zhou Q, Ferrara KW, Co-integrated PIN-PMN-PT 2D Array and Transceiver Electronics by Direct-Assembly Using a 3D Printed Interposer Grid Frame., **IEEE Trans Ultrason Ferroelectr Freq Control**. 2019 Sep 30. doi: 10.1109.
21. Zhou Q, Zhang Y., Editorial for the Special Issue on MEMS Technology for Biomedical Imaging Applications. **Micromachines**, 2019 Sep 16;10(9).
22. Li D, Qian X, Li R, Fei C, Jiang L, Chen X, Yang Y, Zhou Q. High Resolution ADC for Ultrasound Color Doppler Imaging Based On MASH Sigma-Delta Modulator., **IEEE Trans Biomed Eng**. 2019 Aug 29. doi: 10.1109.
23. N. E. Cabrera-Munoz, P. Eliahoo, R. Wodnicki, H. Y. Jung, C. T. Chiu, J. A. Williams, H. H. Kim, Q. F. Zhou, G. Z. Yang, and K. K. Shung, "Fabrication and Characterization of a Miniaturized 15-MHz Side-Looking Phased-Array Transducer Catheter," **IEEE Transactions on Ultrasonics Ferroelectrics and Frequency Control**, vol. 66, no. 6, pp. 1079-1092, Jun, 2019.
24. R. M. Chen, L. M. Jiang, T. F. Zhang, T. Matsuok, M. Yamazaki, X. J. Qian, G. X. Lu, A. Safari, J. G. Zhu, K. K. Shung, T. Ma, and Q. F. Zhou, "Eco-Friendly Highly Sensitive Transducers Based on a New KNN-NTK-FM Lead-Free Piezoelectric Ceramic for High-Frequency Biomedical Ultrasonic Imaging Applications," **IEEE Transactions on Biomedical Engineering**, vol. 66, no. 6, pp. 1580-1587, Jun, 2019.
25. X. Y. Chen, K. H. Lam, R. M. Chen, Z. Y. Chen, X. J. Qian, J. Zhang, P. Yu, and Q. F. Zhou, "Acoustic levitation and manipulation by a high-frequency focused ring ultrasonic transducer," **Applied Physics Letters**, vol. 114, no. 5, Feb, 2019.
26. X. Y. Chen, X. J. Qian, K. H. Lam, C. T. Chiu, R. M. Chen, Z. Y. Chen, R. Shung, P. Yu, and Q. F. Zhou, "Helical-Like 3D Ultrathin Piezoelectric Element for Complicated Ultrasonic Field," **Advanced Functional Materials**, vol. 29, no. 32, Aug, 2019.
27. Z. Y. Chen, X. J. Qian, X. Song, Q. G. Jiang, R. J. Huang, Y. Yang, R. Z. Li, K. Shung, Y. Chen, and Q. F. Zhou, "Three-Dimensional Printed Piezoelectric Array for Improving Acoustic Field and Spatial Resolution in Medical Ultrasonic Imaging," **Micromachines**, vol. 10, no. 3, Feb, 2019.
28. L. M. Jiang, R. M. Chen, J. Xing, G. X. Lu, R. Z. Li, Y. Jiang, K. K. Shung, J. G. Zhu, and Q. F. Zhou, "Fabrication of a (K,Na)NbO<sub>3</sub>-based lead-free 1-3 piezocomposite for high-sensitivity ultrasonic transducers application," **Journal of Applied Physics**, vol. 125, no. 21, Jun, 2019.
29. L. M. Jiang, Y. Yang, R. M. Chen, G. X. Lu, R. Z. Li, D. Li, M. S. Humayun, K. K. Shung, J. G. Zhu, Y. Chen, and Q. F. Zhou, "Flexible piezoelectric ultrasonic energy harvester array for bio-implantable wireless generator," **Nano Energy**, vol. 56, pp. 216-224, Feb, 2019.
30. L. M. Jiang, Y. Yang, R. M. Chen, G. X. Lu, R. Z. Li, J. Xing, K. K. Shung, M. S. Humayun, J. G. Zhu, Y. Chen, and Q. F. Zhou, "Ultrasound-Induced Wireless Energy Harvesting for Potential Retinal Electrical Stimulation Application," **Advanced Functional Materials**, vol. 29, no. 33, Aug, 2019.
31. Y. Li, J. Zhu, J. J. Chen, J. X. Yu, Z. Jin, Y. S. Miao, A. W. Browne, Q. F. Zhou, and Z. P. Chen, "Simultaneously imaging and quantifying in vivo mechanical properties of crystalline lens and cornea using optical coherence elastography with acoustic radiation force excitation," **APL Photonics**, vol. 4, no. 10, Oct, 2019.
32. X. J. Qian, T. Ma, C. C. Shih, M. Heur, J. Zhang, K. K. Shung, R. Varma, M. S. Humayun, and Q. F.

- Zhou, "Ultrasonic Microelastography to Assess Biomechanical Properties of the Cornea," *IEEE Transactions on Biomedical Engineering*, vol. 66, no. 3, pp. 647-655, Mar, 2019.
33. T. X. Wang, N. D. Sun, R. M. Chen, Q. F. Zhou, and S. Hu, "Isotropic-resolution photoacoustic microscopy with multi-angle illumination," *Optics Letters*, vol. 44, no. 1, pp. 1-4, Jan, 2019.
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  35. Y. Y. Yu, Z. Q. Zhang, F. Y. Cai, M. Su, Q. J. Jiang, Q. F. Zhou, M. S. Humayun, W. B. Qiu, and H. R. Zheng, "A Novel Racing Array Transducer for Noninvasive Ultrasonic Retinal Stimulation: A Simulation Study," *Sensors*, vol. 19, no. 8, Apr, 2019.
  36. X. Chen, X. Qian, K.-H. Lam, C. T. Chiu, R. Chen, Z. Chen, K. K. Shung, P. Yu, and Q. Zhou, "Helical-Like 3D Ultrathin Piezoelectric Element for Complicated Ultrasonic Field," *Advanced Functional Materials*, pp. 1902912.
  37. Y. Li, G. Lu, J. J. Chen, J. C. Jing, T. Huo, R. Chen, L. Jiang, Q. Zhou, and Z. Chen, "PMN-PT/Epoxy 1-3 Composite Based Ultrasonic Transducer for Dual-Modality Photoacoustic and Ultrasound Endoscopy," *Photoacoustics*, pp. 100138, 2019/06/20/, 2019.
  38. L. Wu, X. Chen, G. Wang, and Q. Zhou, "Dual-frequency piezoelectric micromachined ultrasonic transducers," *Applied Physics Letters*, vol. 115, no. 2, pp. 023501, 2019.
  39. Y. Li, Z. K. Zhu, J. C. Jing, J. J. Chen, A. E. Heidari, Y. M. He, J. Zhu, T. Ma, M. Y. Yu, Q. F. Zhou, and Z. P. Chen, "High-Speed Integrated Endoscopic Photoacoustic and Ultrasound Imaging System," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 25, no. 1, Jan-Feb, 2019.
  40. Y. M. He, Y. Q. Qu, J. Zhu, Y. Zhang, A. Saidi, T. Ma, Q. F. Zhou, and Z. P. Chen, "Confocal Shear Wave Acoustic Radiation Force Optical Coherence Elastography for Imaging and Quantification of the In Vivo Posterior Eye," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 25, no. 1, Jan-Feb, 2019.
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  44. Chen R, Jiang L, Zhang T, Matsuka T, Yamazaki M, Qian X, Lu G, Safari A, Zhu J, Shung KK, Ma T, Zhou Q. Eco-friendly highly sensitive transducers based on a new KNN-NTK-FM lead-free piezoelectric ceramic for high-frequency biomedical ultrasonic imaging applications, *IEEE Trans Biomed Eng.* 2018 Nov 19, 2876063.
  45. Li D, Fei C, Zhang Q, Li Y, Yang Y, Zhou Q. Ultrahigh Frequency Ultrasonic Transducers Design with Low Noise Amplifier Integrated Circuit, *Micromachines* (Basel). 2018 Oct 12;9(10). pii: E515. doi: 10.3390/mi9100515.
  46. Lan B, Liu W, Wang YC, Shi J, Li Y, Xu S, Sheng H, Zhou Q, Zou J, Hoffmann U, Yang W, Yao J. High-speed widefield photoacoustic microscopy of small-animal hemodynamics, *Biomed Opt Express.* 2018 Sep 7;9(10):4689-4701.
  47. Zhang J, Ren W, Liu Y, Wu X, Fei C, Quan Y, Zhou Q. Fabrication and Characterization of High-Frequency Ultrasound Transducers Based on Lead-Free BNT-BT Tape-Casting Thick Film, *Sensors* (Basel). 2018 Sep 19;18(9). pii: E3166. doi: 10.3390/s18093166.



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52. Shih CC, Qian X, Ma T, Han Z, Huang CC, Zhou Q, Shung KK., Quantitative Assessment of Thin-Layer Tissue Viscoelastic Properties Using Ultrasonic Micro-Elastography With Lamb Wave Model, *IEEE Trans Med Imaging*. 2018 Aug;37(8):1887-1898.
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57. Chonghe Wang, Xiaoshi Li, Hongjie Hu, Lin Zhang, Zhenlong Huang, Zhenan Yin, Brady Huang, Hua Gong, Shubha Bhaskaran, Yue Gu, Mitsutoshi Makihata, Yuxuan Guo, Yusheng Lei, Yimu Chen, Chunfeng Wang, Yang Li<sup>1</sup>, Tianjiao Zhang<sup>1</sup>, Zeyu Chen<sup>5</sup>, Albert Pisano<sup>6</sup>, Liangfang Zhang<sup>1</sup>, Qifa Zhou<sup>5</sup> and Sheng Xu<sup>1\*</sup> Central blood pressure waveform monitoring by conformal ultrasonic devices, *Nature Biomedical Engineering*, No.2, pages687–695 (2018)
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61. C. L. Fei, X. L. Liu, B. P. Zhu, D. Li, Y. T. Yang, Q. F. Zhou, AlN Piezoelectric Thin Films for Energy Harvesting and Acoustic Devices, *Nano Energy*, 51, 146-162 (2018)
62. H. J. Hu, X. Zhu, C. H. Wang, L. Zhang, X. S. Li, S. Lee, Z. L. Huang, R. M. Chen, Z. Y. Chen, C. F. Wang, Y. Gu, Y. M. Chen, Y. S. Lei, T. J. Zhang, N. Kim, Y. X. Guo, Y. Teng, W. B. Zhou, Y. Li, A. Nomoto, S. Sternini, Q. F. Zhou, M. Pharr, F. L. di Scalea, and S. Xu, Stretchable ultrasonic transducer arrays for three-dimensional imaging on complex surfaces, *Science Advances*, vol. 4, no. 3, Mar, 2018.
63. Z. Y. Chen, Y. Wu, Y. Yang, J. P. Li, B. S. Xie, X. J. Li, S. Lei, O. Y. Jun, X. F. Yang, Q. F. Zhou, and B. P. Zhu, "Multilayered carbon nanotube yarn based optoacoustic transducer with high energy

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