

# Ji-Xin Cheng

Theodore Moustakas Chair Professor in Photonics and Optoelectronics  
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## Part I. General Information

### Education

- Postdoc Aug 2000 – Jun 2003 Department of Chemistry and Chemical Biology, Harvard University, Supervisor: Professor X. Sunney Xie.
- Postdoc Jan 1999 – Aug 2000, Department of Chemistry, University of Science and Technology of Hong Kong, Supervisor: Professor Yijing Yan.
- Ph. D. December 1998, University of Science and Technology of China, Hefei, China.  
Thesis Title: Bond-selective Chemistry: from Local Mode Vibration to Optimal Control of Molecular Dynamics by Laser, Advisor: Qingshi Zhu.
- B.S. July 1994, Department of Chemical Physics, University of Science and Technology of China, Hefei, China.

### Professional Experience

- July 2017 – Present Moustakas Chair Professor in Optoelectronics and Photonic, Departments of Electrical and Computer Engineering, Biomedical Engineering, Boston University
- Oct 2015 – June 2017 Leader, College of Engineering Preeminent Team of Label-free Imaging
- Sep 2015 – June 2017 Leader of Imaging and Diagnosis Group, Purdue Institute for Immunology, Inflammation and Infectious Disease
- Oct 2014 – June 2017 Scientific Director of Label-free Imaging, Purdue University Discovery Park
- June 2013 – May 2014 Visiting scientist at HHMI's Janelia Farm Research Campus
- Aug 2013 – June 2017 Professor, Weldon School of Biomedical Engineering and Department of Chemistry, Purdue University.
- Aug 2009 – Aug 2013 Associate Professor, Weldon School of Biomedical Engineering and Department of Chemistry, Purdue University.
- Aug 2003 – Aug 2009 Assistant Professor, Weldon School of Biomedical Engineering and Department of Chemistry, Purdue University.
- Nov 1997 – Mar 1998 Research Assistant, Department of Chemistry, University of Science and Technology of Hong Kong, Supervisor: Prof. Yijing Yan.
- Sep 1996 – Mar 1997 Research Assistant, Laboratoire de Physique et Moléculaire Applications, Université Paris-sud, Orsay, France, Supervisor: Prof. Georges Graner.

**Peer-reviewed publications:** over 240 publications, h-index 75 (google scholar)

**Research grants received:** >\$25,000,000

**Issued US patents:** 10

**PhD and MS mentored:** 26 PhDs and 4 Masters

**Current group:** 16 PhD students, 8 postdoc, 8 visiting scholars

### National & International Recognitions

- 2020: Associate Editor, Science Advances
- 2020: Pittsburgh Spectroscopy Award from Spectroscopy Society of Pittsburgh
- 2019: Ellis R. Lippincott Award from OSA, Society for Applied Spectroscopy, Coblenz Society
- 2019: Fellow, Optical Society of America
- 2018: Translational research award from International Society for Optics and Photonics (SPIE)
- 2017: Inaugural Moustakas Chair Professor in Optoelectronics and Photonics, Boston University

2016: Purdue University College of Engineering Research Excellence Award  
 2016: Translational research award from International Society for Optics and Photonics (SPIE)  
 2015: Craver Award from Coblenz Society  
 2015 to 2017: Chang-Jiang Scholar, Minister of Education, China.  
 2014-2015: Purdue University Discovery Park Research Fellow  
 2014 - : Fellow of AIMBE (American Institute of Medicine and Biological Engineering)  
 2014: Translational research award from International Society for Optics and Photonics (SPIE)  
 2012 Editor of the first book on *Coherent Raman Microscopy* (Taylor & Francis)  
 2012 – 2017: Purdue University Faculty Scholar  
 2011 Purdue University Cancer Center Research Excellence Award  
 2011 Purdue University College of Engineering Early Career Research Excellence Award  
 2010 Wallace H. Coulter Foundation Translational Research Award  
 2009 Young Scientist Award from Chinese National Academy of Sciences  
 2005 Seed of Success, Purdue University  
 1993 Guo Moruo Scholarship, USTC (highest honour for undergraduates in USTC)

### **Professional Society Association:**

Life-time member: Optical Society of America  
 Member: American Chemical Society  
 Life-time member: SPIE

## **Part II. Research Activities**

**Mission Statement:** A central theme of research in the Cheng group is focused on basic understanding of how biomolecules and/or molecular assemblies function in space and time to drive life. For example, how does the membrane respond to the action potential in neurons? How is the metabolism remodelled during cell development? What happens at molecular level inside a microorganism exposed to a treatment? To address these basic questions, we develop highly sensitive chemical imaging technologies that are able to unveil hidden signatures in various living systems. Our eventual goal is molecule-based precision diagnosis and/or treatment of human diseases. Our team further harness the unique properties of photons to modulate the behaviour of cells. Examples include photolysis of chromophores to eradicate drug-resistant bacteria, and photoacoustic modulation of neural tissues at ultrahigh spatial precision. With integrated expertise in engineering, physics, chemistry, biology, medicine and entrepreneurship, our research team is devoted to three integrated thrusts: (1) **Inventing and developing** label-free optical spectroscopic imaging and cell modulation technologies; (2) **Discovering** hidden molecular signatures that define cellular state and functions; (3) **Converting** label-free technologies and biological discoveries into molecule-based precision diagnosis and treatments.

### **A. Research Grants Received (Total > \$25 million)**

#### **National Science Foundation (NSF)**

##### Active:

CHE-1807106 (single PI), 2018 ~ 2021, volumetric chemical imaging  
 SBIR, 2019-2020, subcontract from Vibronix Inc. 4/15/2019 to 3/31/2020. \$89,666

##### Finished:

0416785-MCB (single PI)  
 0828832-Photonics (single PI)  
 I/UCRC for Biophotonic Sensors and Systems, New Site Planning Grant (2015-2016, PI)

#### **National Institutes of Health (NIH)**

##### Active:

R01HL125385 (2015 to 2019, PI) intravascular photoacoustic imaging  
 R01GM118471 (2016 to 2020, PI) SRS flow cytometry  
 R33CA223581-01A1 (2018 to 2021, PI), cancer metabolism  
 R01CA224275 (2018 to 2023, co-PI), ovarian cancer  
 R01AI141439 (2018 to 2022, PI), antimicrobial susceptibility

R01GM126049 (2018 to 2022, PI), IR chemical microscopy  
R01NS109794 (2018 to 2013, PI), neuro-stimulation  
R42CA244844 (2019 to 2021, PI), STTR phase 2, Photothermal Spec Corp

Finished:

R43EB027018 (2018 to 2019), phase I SBIR, iRaman, subcontract from Photothermal  
R41CA244844 (2017 to 2018, PI), subcontract from Photothermal  
R01HL117990 (2013 to 2016, co-investigator)  
R21GM114853 (2014 to 2016, extended to 2017, PI)  
R21CA182608 (2013 to 2016, extended to 2017, PI)  
R21GM104681 (2012 to 2015, extended to 2016, PI)  
R41CA912645 (2015 to 2016, PI for Vibronix Inc)  
R41CA200006 (2016 to 2017, PI for Vibronix Inc)  
R21EB015901 (2011 to 2014, PI)  
R21EB009459 (2009 to 2011, co-PI)  
R01EB7243 (2007-2010, PI)  
R01CA129287 (2009-2014, co-I)  
R01HL078715 (2005 – 2008, co-I)  
R21EB004966 (2005 to 2007, PI)  
R03CA128111 (co-PI)  
F32HL089074 (PI as mentor)  
STTR R43 GM099441-01A1 (co-PI)

**Department of Defence (DOD)**

Active: NA

Finished:

Prostate Cancer Program (2014-2017)  
Spinal Cord Injury Program (2012-2015)  
Breast Cancer Program (2010-2013)

**Department of Energy (DoE)**

Active:

Co-PI, “High-throughput Chemical Imaging for Optimizing Biofuel Synthesis using Synthetic Biology”, 2018 ~ 2021

**Foundations:**

Active: NA

Finished:

Keck Foundation Science & Engineering Grant (Jan 2015 to Dec 2018), PI, extended to Dec 2019  
Walther Cancer Foundation (2015 to 2018), PI  
American Heart Association National Innovation Award (Jan 2014 to Dec 2016), PI  
Showalter Foundation  
Coulter Foundation Translational Research Award (2010-2014), PI

**Industrial:**

Finished: L'Oreal, Roche

**B. Peer-reviewed Publications**

**Books:**

**Coherent Raman Scattering Microscopy**, CRC Press, Taylor & Francis Group, 2012. Editors: Ji-Xin Cheng (Purdue University) and Sunney Xie (Harvard University)

**Peer-reviewed Journal Publications: \*corresponding author, h-index 75 (Google Scholar)**  
**Year 2020**

250. Sebastian Jusuf, Jie Hui, Pu-Ting Dong, Ji-Xin Cheng, Synergistic Eradication of Methicillin-resistant *Staphylococcus aureus* by Staphyloxanthin Photolysis and Low Concentration Silver Nanoparticles, Journal of Physical Chemistry C, minor revision.
249. Yingchun Cao, Mouhamad Alloosh, Michael Sturek, Ji-Xin Cheng, "Highly Sensitive Lipid Detection and Localization in Atherosclerotic Plaque with a Dual-Frequency Intravascular Photoacoustic/Ultrasound Catheter", IEEE Transactions on Medical Imaging, 2019, minor revision.
248. Kai-Chih Huang, Junjie Li, Yuying Tan, Ji-Xin Cheng, "Multiplex stimulated Raman scattering imaging cytometry reveals cancer metabolic signatures in a spatially, temporally, and spectrally resolved manner", (Cell Press) iScience, minor revision.
247. Jie Hui, Pu-Ting Dong, Lijia Liang, Taraknath Mandal, Junjie Li, Erilinda R. Ulloa, Yuewei Zhan, Sebastian Jusuf, Cheng Zong, Mohamed N. Seleem, George Y. Liu, Qiang Cui, Ji-Xin Cheng, "Photo-Disassembly of Membrane Microdomains Revives Conventional Antibiotics against MRSA", Advanced Science, minor revision
246. Yifan Zhu, Ji-Xin Cheng\*, "Transient absorption microscopy: Technological Innovations and Applications in Materials Science and Life Science", J Chem. Phys., Perspective, accepted
245. Ying Jiang, Hyeon Jeong Lee, Lu Lan, Hua-an Tseng, Chen Yang, Heng-Ye Man, Xue Han and Ji-Xin Cheng\*. "Optoacoustic brain stimulation at sub-millimeter spatial precision", Nature Communications, accepted.

## Year 2019

244. Joon-Suh Park, Shuyan Zhang, Alan She, Wei Ting Chen, Peng Lin, Kerolos M. A. Yousef, Ji-Xin Cheng, Federico Capasso, "All-glass, large metalens at visible wavelength using deep-ultraviolet projection lithography", Nano Letters, 2019, DOI:10.1021/acs.nanolett.9b03333
243. Leon G. Leanse, Pu-Ting Dong, Xueping S. Goh, Min Lu, Ji-Xin Cheng, David C. Hooper, and Tianhong Dai, "Quinine enhances photo-inactivation of gram-negative bacteria", Journal of Infectious Diseases, online, 2019, September.
242. Delong Zhang, Lu Lan, Yeran Bai, Hassaan Majeed, Mikhail E. Kandel, Gabriel Popescu, Ji-Xin Cheng, "Bond-selective transient phase microscopy via sensing the infrared photothermal effect", Light Sci & Appl, 2019, 8:116.
241. Andy J. Chen, Kai-Chih Huang, Selina Bopp, Robert Summers, Pu-ting Dong, Yimin Huang, Cheng Zong, Dyann Wirth, Ji-Xin Cheng, "Quantitative imaging of intraerythrocytic hemozoin by transient absorption microscopy", Journal of Biomedical Photonics, 2019, 25, 014507. doi: 10.1117/1.JBO.25.1.014507
240. Cheng Zong, Ranjith Premasiri, Haonan Lin, Yimin Huang, Chi Zhang, Chen Yang, Bin Ren, Larry Ziegler, and Ji-Xin Cheng\*, "Plasmon-enhanced stimulated Raman scattering microscopy with single molecule sensitivity", Nature Communications, 2019, 10:5318.
239. Hyeon Jeong Lee, Ying Jiang, Ji-Xin Cheng, "Label-free Optical Imaging of Membrane Potential", Current Opinion in Biomedical Engineering, 2019, <https://doi.org/10.1016/j.cobme.2019.11.001>.
238. Junjie Li, Peng Lin, Yuying Tan, Ji-Xin Cheng, Volumetric Stimulated Raman Scattering Imaging of Cleared Tissues towards Three-dimensional Chemical Histopathology, Biomedical Optics Express, 2019, 10, 4329-4339.
237. Hyeon Jeong Lee, Kai-Chih Huang, Gaoxiang Mei, Cheng Zong, Natalia Mamaeva, Willem J. DeGrip, Kenneth J. Rothschild, Ji-Xin Cheng\*. "Electronic pre-resonance stimulated Raman scattering imaging of microbial rhodopsin towards quantitation of membrane potential", Journal of Physical Chemistry Letters, 2019, 10, 4347-4381.
236. Xiaojie Li, Delong Zhang, Yeran Bai, Weibiao Wang, Jingqiu Liang, Ji-Xin Cheng, Fingerprinting a Living Cell by Raman Integrated Mid-Infrared Photothermal Microscopy, Analytical Chemistry, 2019, 91, 10750-6.
235. Yi Zhang, Yingchun Cao, Ji-Xin Cheng, A high-resolution photoacoustic endoscope through beam self-cleaning in a graded index fiber, Optics Letters, 2019, 44, 3841-44.
234. Yeran Bai, Delong Zhang, Yimin Huang, Lu Lan, Kerry Maize, Ali Shakouri\*, Ji-Xin Cheng\*, Ultrafast Chemical Imaging by Widefield Photothermal Sensing of Infrared Absorption, Science Advances, 2019, 5, eaav7127
233. Pu-Ting Dong, Haonan Lin, Kai-Chih Huang, Ji-Xin Cheng\*, "Label-free Quantitation of Glycated Hemoglobin in Single Red Blood Cells by Transient Absorption Microscopy and Phasor Analysis", Science Advances, 2019, 5, eaav0561.
232. Pu-Ting Dong, Haroon Mohammad, Jie Hui, Leon G. Leanse, Junjie Li, Lijia Liang, Tianhong Dai, Mohamed N. Seleem\*, Ji-Xin Cheng\*, "Photolysis of Staphyloxanthin sensitizes methicillin-resistant *Staphylococcus aureus* to reactive oxygen species", Advanced Science, 2019, 1900030.
231. Brittani Bungart, Yingchun Cao, Tiffany Yang-Tran, Shawn Gorsky... Ji-Xin Cheng\*, "Cylindrical Illumination with Angular Coupling for Whole-Prostate Photoacoustic Tomography", Biomedical Optics Express, 2019, 10, 1405-1409.

## Year 2018

230. M. Ando\*, C.S. Liao, G.G. Eckert, J.X. Cheng, "Imaging of demineralized enamel in intact tooth by epi-detected stimulated Raman scattering microscopy", Journal of Biomedical Optics, 2018, 23(10), 105005.
229. J. Wang, M. Thomas, P. Lin, J.X. Cheng, D.E. Matei, A. Wei\*, "SiRNA delivery using dithiocarbamate-anchored oligonucleotides on gold nanorods", Bioconjugate Chemistry, 2018, DOI: [10.1021/acs.bioconjchem.8b00723](https://doi.org/10.1021/acs.bioconjchem.8b00723)
228. Rui Li, Lu Lan, Yan Xia, Pu Wang, Linda K Han, Gary L Dunnington, Samilia Obeng-Gyasi, George E Sandusky, Jennifer A Medley, Susa T Crooks, Ji-Xin Cheng\*, "High-speed Intraoperative Assessment of Breast Tumor Margins by Multimodal Ultrasound and Photoacoustic Tomography", Medical Devices & Sensors, 2018, 1: e10018.
227. Ayeeshik Kole, Yingchun Cao, Jie Hui, Islam A Bolad, Mouhamad Alloosh, Ji-Xin Cheng\*, Michael Sturek\*. "Comparative quantification of arterial lipid by intravascular photoacoustic-ultrasound imaging and near-infrared spectroscopy-intravascular ultrasound", Journal of Cardiovascular Translational Research. 2019 Jun;12(3): 211-220. doi: 10.1007/s12265-018-9849-2. Epub 2018 Nov 28.
226. Brittani Bungart, Lu Lan, Pu Wang, Rui Li, Michael O Koch, Liang Cheng, Timothy A Masterson, Murat Dundar, Ji-Xin Cheng\*. "Photoacoustic Tomography of Intact Human Prostates and Vascular Texture Analysis Identify Prostate Cancer Biopsy Targets", Photoacoustics, 2018, 11, 46-55.
225. Jing Chen, Junjie Li, Amber Jannasch, Sena Ozseker, Meng C Wang\*, Ji-Xin Cheng\*. "Fingerprint stimulated Raman scattering imaging reveals retinoid coupling lipid metabolism and survival", ChemPhysChem, 2018. DOI: 10.1002/cphc.201800545
224. Chi Zhang, Ji-Xin Cheng\*, "Coherent Raman scattering microscopy: the Future Is Bright", APL Photonics, Perspective, 2018, 3, 090901.
223. Yuyan Zhu, Chih-Yu Chen, Junjie Li, Ji-Xin Cheng, Miran Jang, and Kee-Hong Kim\*, "In vitro exploration of ACAT contributions to lipid droplet formation during adipogenesis", Journal of Lipid Research, 2018, 59: 820.
222. Yasuyo Urasaki, Chi Zhang, Ji-Xin Cheng, and Thuc Le\*, "Quantitative assessment of liver steatosis and affected pathways with molecular imaging and proteomic profiling", Scientific Reports, 2018, 8: 3606.
221. Hyeon Jeong Lee, Jie Li, Renee E Vickman, Junjie Li, Rui Liu, Abigail C Durkes, Bennett D Elzey, Shuhua Yue, Xiaoqi Liu, Timothy L Ratliff, Ji-Xin Cheng, "Cholesterol esterification inhibition suppresses prostate cancer metastasis by impairing the Wnt/ $\beta$ -catenin pathway", Molecular Cancer Research, 2018, DOI: 10.1158/1541-7786.MCR-17-0665
220. Junjie Li, Xiaochao Qu, Jie Tian, Jian-Ting Zhang, Ji-Xin Cheng\*, "Cholesterol esterification inhibition and gemcitabine synergistically suppress pancreatic ductal adenocarcinoma proliferation", PLoS ONE, 2018.
219. Yingchun Cao, Ayeeshik Koke, Jie Hui, Yi Zhang, Jieying Mai, Mouhamad Alloosh, Michael Sturek, Ji-Xin Cheng\*, Fast assessment of lipid content in arteries by *in vivo* intravascular photoacoustic tomography, Scientific Reports, 2018, 8: 2400
218. Lu Lan, Yan Xia, Rui Li, Kaiming Liu, Jieying Mai, Jennifer Anne Medley, Samilia Obeng-Gyasi, Linda K. Han\*, Pu Wang\*, Ji-Xin Cheng\*, "A fiber optoacoustic guide with augmented reality for precision breast conserving surgery", (Nature) Light Science & Applications, 2018, 7(1): 2.
217. Yimin Huang, Ying Jiang, Qiuyu Wu, Xiangbing Wu, Xingda An, Alexander Chubykin, Ji-Xin Cheng\*, Xiao-Ming Xu\*, Chen Yang\*, "Nanoladders facilitate directional axonal outgrowth and regeneration", ACS Biomaterials Science & Engineering, 2018, 4: 1037-45.
216. Weili Hong, Caroline W. Karanja, Nader S. Abutaleb, Waleed Younis, Xueyong Zhang, Mohamed N. Seleem\*, Ji-Xin Cheng\*, "Antibiotic Susceptibility Determination within One Cell Cycle at Single Bacterium Level by Stimulated Raman Metabolic Imaging", Analytical Chemistry, 2018, 90, 3737-43. C&EN news highlight
215. Jing Chen, Xiaojing Yuan, Junjie Li, Puting Dong, Iqbal Hamza, Ji-Xin Cheng\*, "Label-free imaging of heme dynamics in living organisms by transient absorption microscopy", Analytical Chemistry, 2018, 90, 5: 3395-3401. C&EN news highlight
214. Kai-Chih Huang, Jeremy McCall, Pu Wang, Chien-Sheng Liao, Gregory Eakins, Ji-Xin Cheng\*, Chen Yang\*, "High-speed spectroscopic transient absorption imaging of defects in graphene", Nano Letters, 2018, 18, 2: 1489-97.
213. Haonan Lin, Chien-Sheng Liao, Pu Wang, Nan Kong\*, Ji-Xin Cheng\*, "Spectroscopic stimulated Raman scattering imaging of highly dynamic specimens through matrix completion", (Nature) Light Science & Applications, 2018, 7: 17179.
212. Chien-Sheng Liao, Pu Wang, Chih Yu Huang, Peng Lin, Gregory Eakins, R. Timothy Bentley, Rongguang Liang Cheng, Ji-Xin Cheng\*. "In vivo and in situ Spectroscopic Imaging by a Handheld Stimulated Raman Scattering Microscope." ACS Photonics, 2018: 5: 947-954.

## Year 2017

211. Zhimin Chen, Guo-Xiao Wang, Sara L Ma, Dae Young Jung, Hyekyung Ha, Tariq Altamimi, Xu-Yun Zhao, Liang Guo, Peng Zhang, Chun-Rui Hu, **Ji-Xin Cheng**, Gary D Lopaschuk, Jason K Kim, Jiandie D Lin\*, "Nrg4



- promotes fuel oxidation and a healthy adipokine profile to ameliorate diet-induced metabolic disorders”, Molecular Metabolism 2017, 6 (8), 863-872.
210. Yeran Bai, Delong Zhang, Chen Li, Cheng Liu, **Ji-Xin Cheng\***, “Bond-selective Imaging of Cells by Mid-infrared Photothermal Microscopy in High Wavenumber Region”, Journal of Physical Chemistry B, 2017, 121 (44), 10249-55.
  209. Jiayingzi Wu, Liyan You, Lu Lan, Hyeon Jeong Lee, Saadia T. Chaudhry, Rui Li, **Ji-Xin Cheng\***, **Jianguo Mei\***, Semiconducting polymer nanoparticles for centimeters-deep photoacoustic imaging in the second near-infrared window, Advanced Materials, 2017, 29: 1703403.
  208. Caroline W. Karanja, Weili Hong, Waleed Younis, Hassan E. Eldesouky, **Mohamed N. Seleem\***, **Ji-Xin Cheng\***, Stimulated Raman Imaging Reveals Aberrant Lipogenesis as a Metabolic Marker for Azole-resistant *Candida albicans*, Analytical Chemistry, 2017, 89(18): 9822-9829.
  207. Wei Chen, Weili Hong, **Ji-Xin Cheng\***, **Han-Qing Yu\***, Evolution of membrane fouling revealed by label-free vibrational spectroscopic imaging. Environmental Science & Technology, 2017, 51(17), 9580-9587.
  206. Jung Eun Kim, Keagan Dunville, Junjie Li, Ji Xin Cheng, Travis B. Conley, Cortni S. Couture, Wayne W. Campbell, “Intermuscular adipose tissue content and intramyocellular lipid fatty acid saturation are associated with glucose homeostasis in middle-aged and older adults”, Endocrinol Metabolism, June 2017, 32(2): 257-264.
  205. Hyeon Jeong Lee, **Ji-Xin Cheng\***, “Imaging Chemistry inside Living Cells by Stimulated Raman Scattering Microscopy”, Methods, 2017, 128: 119-128.
  204. Shovik Bandyopadhyay, Junjie Li, Elie Traer, Jeffrey W. Tyner, Amy Zhou, **Stephen T. Oh\***, **Ji-Xin Cheng\***, “Cholesterol esterification inhibition and imatinib treatment synergistically inhibit growth of BCR-ABL mutation-independent resistant chronic myelogenous leukemia”, PLoS ONE, 2017, 12(7): e0179558.
  203. Delong Zhang, Wei Chen, Huan Chen, Han-Qing Yu, **Ghassan Kassab\***, **Ji-Xin Cheng\***, “Chemical imaging of fresh vascular smooth muscle cell response by epi-stimulated Raman scattering”, Journal of Biophotonics, 2017, DOI: 10.1002/jbio.201700005
  202. Yingchun Cao, Ayeeshik Kole, Lu Lan, Pu Wang, Jie Hui, Michael Sturek, **Ji-Xin Cheng\***, “Spectral analysis assisted photoacoustic imaging of lipid composition differentiation”, Photoacoustics, 2017, 7: 12-19.
  201. Hyeon Jeong Lee, Delong Zhang, Ying Jiang, Xiangbing Wu; Pei-Yu Shih, Chien-Sheng Liao; Brittani Bungart; Xiao-Ming Xu; Ryan Drenan; Edward Barlett, **Ji-Xin Cheng\***, “Label-free vibrational spectroscopic imaging of neuronal membrane potential”, Journal of Physical Chemistry Letters, 2017, 8: 1932-1936.
  200. Chen Li, Delong Zhang, Mikhail Slipchenko, **Ji-Xin Cheng\***, “Mid-infrared Photothermal Imaging of Active Pharmaceutical Ingredients at Submicrometer Spatial Resolution”, Analytical Chemistry, 2017, 89: 4863-4867.
  199. Chi Zhang, Junjie Li, Lu Lan, **Ji-Xin Cheng\***, “Quantification of Lipid Metabolism in Living Cells through the Dynamics of Lipid Droplets Measured by Stimulated Raman Scattering Imaging”, Analytical Chemistry, 2017, 89: 4502-4507.
  198. Jie Hui, Yingchun Cao, Yi Zhang, Ayeeshik Kole, Pu Wang, Guangli Yu, Gregory Eakins, Michael Sturek, Weibiao Chen, **Ji-Xin Cheng\***, “Real-time intravascular photoacoustic-ultrasound imaging of lipid-laden plaque in human coronary artery at 16 frames per second”, Scientific Reports, 2017, 7:1417.
  197. Xueli Chen, Chi Zhang, Peng Lin, Kai-Chih Huang, Jimin Liang, Jie Tian & **Ji-Xin Cheng\***, “Volumetric chemical imaging by stimulated Raman microscopy and tomography”, Nature Communication, 2017, 8: 15117.
  196. Mohammed S. ALSHAYKH, Chien-Sheng LIAO, Osscarr SANDOVAL, Daniel E. Leaird, **Ji-Xin Cheng\***, Andrew M. Weiner\*, High-speed stimulated hyperspectral Raman imaging using rapid acoustic-optic delay lines. Optics Letters, 2017, 42: 1548-1551.
  195. Chi Zhang, Kai-Chih Huang, Bartek Rajwa, Junjie Li, Shiqi Yang, Haonan Lin, Chien-sheng Liao, Gregory Eakins, Shihuan Kuang, Valery Patsekin, J. Paul Robinson, **Ji-Xin Cheng\***, “Stimulated Raman scattering flow cytometry for label-free single-particle analysis”, Optica, Jan 2017, 4: 103.
  194. Junjie Li, Salvatore Condello, Jessica Thomes-Pepin, Xiaoxiao Ma, Yu Xia, Thomas D Hurley, Daniela Matei\*, **Ji-Xin Cheng\***, “Lipid Desaturation Is a Metabolic Marker and Therapeutic Target of Ovarian Cancer Stem Cells”, Cell Stem Cell, March 2017, 20: 303-314.
  193. Pu-Ting Dong, **Ji-Xin Cheng\***, “Pump-probe microscopy”, Spectroscopy, April 2017, 32 (4): 2-11.

## Year 2016

192. Chien-Sheng Liao, Kai-Chih Huang, Weili Hong, Andy J. Chen, Caroline Karanja, Pu Wang, Gregory Eakins, **Ji-Xin Cheng\***, “Stimulated Raman spectroscopic imaging by microsecond delay-line tuning”, Optica, 2016, 3: 1377.
191. Xiaoxiao Ma, Xu Zhao, Junjie Li, Wenpeng Zhang, **Ji-Xin Cheng**, Zheng Ouyang, Yu Xia\*, “Photochemical tagging for quantitation of unsaturated fatty acids by mass spectrometry”, Analytical Chemistry, 2016, 88: 8931-35.

190. Shuhua Yue\*, **Ji-Xin Cheng\***, "Single cell metabolism by coherent Raman scattering microscopy", Current Opinion in Chemical Biology, 2016, 33: 46-57.
189. Yin-Xin Zhang, Chien-Sheng Liao, Weili Hong, Kai-Chih Huang, Huaidong Yang, Guofan Jin and **Ji-Xin Cheng\***, "Coherent anti-Stokes Raman scattering imaging under ambient light", Optics Letters, 2016, 16: 3880.
188. Delong Zhang, Chen Li, Chi Zhang, Mikhail N. Slipchenko, Gregory Eakins, **Ji-Xin Cheng\***, "Depth-resolved mid-infrared photothermal imaging of living cells and organism with sub-micron spatial resolution", Science Advances, 2016, 2: e1600521. Highlighted in OPN News, Dec 2016.
187. Chien-Sheng Liao, **Ji-Xin Cheng\***, "In situ and in vivo molecular analysis by coherent Raman scattering microscopy", Annual Review of Analytical Chemistry, 2016, 9: 69-93.
186. Weili Hong, Chien-Sheng Liao, Hansen Zhao, Waleed Younis, Yinxin Zhang, Mohamed N. Seleem\*, and **Ji-Xin Cheng\***, "In situ Detection of a Single Bacterium in Complex Environment by Hyperspectral CARS Imaging", ChemistrySelect, 2016, 3:513 – 517.
185. Junjie Li, Dongsheng Gu, Steve Seung-Young Lee, Bing Song, Shovik Bandyopadhyay, Shaoxiong Chen, Stephen F. Konieczny, Timothy L. Ratliff, Xiaoqi Liu, Jingwu Xie\*, **Ji-Xin Cheng\***, "Abrogating Cholesterol Esterification Suppresses Growth and Metastasis of Pancreatic Cancer", Oncogene, 2016. DOI: 10.1038/onc.2016.168.
184. Cao, Yingchun, Jie Hui, Ayeeshik Kole, Pu Wang, Qianhuan Yu, Weibiao Chen, Michael Sturek\*, and **Ji-Xin Cheng\***. "High-sensitivity intravascular photoacoustic imaging of lipid-laden plaque with a collinear catheter design." Scientific Reports, 2016, 6:25236.
183. Jie Hui, Rui Li, Evan H. Phillips, Craig J. Goergen, Michael Sturek, and **Ji-Xin Cheng\***, "Bond-selective Photoacoustic Imaging by Converting Molecular Vibration into Acoustic Waves", Photoacoustics, 4, 11-21 (2016).
182. Rui Li, Evan Phillips, Pu Wang, Craig J. Goergen, and **Ji-Xin Cheng\***, "Label-free in vivo imaging of peripheral nerve by multispectral photoacoustic tomography", Journal of Biophotonics, 9, No. 1–2, 124–128 (2016)

## Year 2015

181. **Ji-Xin Cheng\***, Sunney X. Xie\*, "Vibrational spectroscopic imaging of living systems: an emerging platform for biology and medicine", Science, review article, 2015, 350: 1054.
180. Jie Hui, Qianhuan Yu, Teng Ma, Pu Wang, Yingchun Cao, Rebecca S. Bruning, Yueqiao Qu, Zhongping Chen, Qifa Zhou, Michael Sturek, **Ji-Xin Cheng\***, and Weibiao Chen\*, "High-speed intravascular photoacoustic imaging at 1.7 micron with a KTP-based OPO", Biomedical Optics Express, 2015, 6:4557.
179. Bin Liu, Ping Wang, Jeong Im Kim, Delong Zhang, Yuanqin Xia, Clint Chapple\*, **Ji-Xin Cheng\***, "Vibrational fingerprint mapping reveals spatial distribution of functional groups of lignin in plant cell wall", Analytical Chemistry, 2015, 87: 9436-42.
178. Jie Hui, **Ji-Xin Cheng\***, "Converting molecular vibrations into mechanical wave for bond-selective imaging of deep tissue", Chinese Journal of Chemical Physics, 2015, 28 (4), 375-382.
177. Junjie Li, Weixia Zhang, Ting-Fung Chung, Mikhail N. Slipchenko, Yong P. Chen, **Ji-Xin Cheng\***, Chen Yang\*, Highly sensitive transient absorption imaging of graphene and graphene oxide in living cells and circulating blood, Scientific Reports, 2015, 5:12394.
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## Peer-reviewed Journal Articles during Postdoctoral and Graduate Study:

### Year 2004

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## C. Book Chapters and Feature Articles

1. Chen Li, Ji-Xin Cheng, "Absorption-based far-field label-free super-resolution microscopy", in Springer book on Label-Free Super-Resolution Microscopy, Ed. Vasily Astratov
2. Jie Hui, Ji-Xin Cheng, "Intravascular photoacoustic imaging of lipid laden plaques", in Multimodality Imaging, Ed. Qifa Zhou and Zhongping Chen
3. Yingchun Cao, Ji-Xin Cheng, "Chemical and molecular imaging of deep tissue through photoacoustic detection of chemical bond vibrations", in Deep Tissue Imaging with Linear and Non-linear Optics, Ed. Lingyan Shi and Robert R. Alfano, Pan Stanford. 2017
4. Chunrui Hu, Bing Hu, Ji-Xin Cheng, "Study of myelin sheath by CARS microscopy", in *Cellular Imaging Techniques for Neuroscience and Beyond*, Ed. Floris G. Wouterlood, Elsevier Inc. 2012
5. Mikhail N. Slipchenko, Ji-Xin Cheng, "Nonlinear Raman Spectroscopy: Coherent Anti-Stokes Raman Scattering (CARS)", in G.C.K. Roberts (ed.), *Encyclopedia of Biophysics*, DOI 10.1007/978-3-642-16712-6, Springer-Verlag Berlin Heidelberg 2012.
6. Yan Fu and Ji-Xin Cheng, "Imaging of Myelin by Coherent Anti-Stokes Raman Scattering Microscopy", in *Animal Models of Acute Neurological Injuries II*, Springer 2012.
7. Wei He, Haifeng Wang, Ji-Xin Cheng, "Multiparametric analysis of single circulating cells by intravital flow cytometry," *American Biotechnology Laboratory*, April 2008, Vol. 26, 24.
8. Yan Fu, Haifeng Wang, Riyi Shi, Ji-Xin Cheng, "Noninvasive molecular imaging of intact myelin sheath by coherent anti-Stokes Raman scattering microscopy," *American Laboratory*, feature article, April 2007, 39(8):12-14.
9. J. X. Cheng, H. Wang, T.L. Te, Y. Fu, T.B. Huff, H.W. Wang, "Chasing lipids in health and diseases by CARS microscopy," *CACS Communications*, feature article, Fall 2007.
10. X. Xie, J.X. Cheng, and E.O. Potma, "Coherent Anti-Stokes Raman Scattering Microscopy", in *Handbook of Biological Confocal Microscopy*, 3rd edition, J.B. Pawley (ed.), Springer, New York, 2006.
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12. Shanzi Li, Ji-Xin Cheng, *et al.*, *Textbook for Mathematical Competition of Modelling*, Jiang Shu Education Press, 1996.

## Full List of Grants Received

Agency & grant #	Title of Grant & PI information	Amount to Cheng	Start and end date
<b>Year 2019</b>		<b>~\$760,000</b>	
Boston University	Ignition award	\$75,000	6/1/2019~5/31/2020
Daylight solutions	Bond-selective transient phase microscope	\$195,299	10/01/2009-9/30/2020
NSF SBIR phase 2	Locating a breast tumor with submillimetre accuracy	\$89,666	4/15/2019~3/31/2020
NIH STTR Phase 2	Optical photothermal microscopy	\$350,000	09/12/2019 to 08/31/2021
<b>Year 2018</b>		<b>~\$10,000,000</b>	
Department of Energy	"High-throughput Chemical Imaging for Optimizing Biofuel Synthesis using Synthetic Biology: PI: Mary Dunlop; co-PI: Cheng, Wilson	~one third of \$1,464,754	9/1/2018 ~ 8/31/2021
NIH R01 AI141439	"Metabolic Assessment of Anti-Microbial Susceptibility within One Cell Cycle", PI: Ji-Xin Cheng	\$2,496,881	12/01/2018 – 11/30/2022
NIH R01 NS109794	"Unveiling mechanisms of ultrasound neuromodulation via spatially confined stimulation and temporally resolved recording". PIs: Ji-Xin Cheng, Xue Han	\$1,655,990 (Cheng part)	09/01/2018 ~ 08/31/2023
NIH R01 CA224275	"Targeting Lipid Unsaturation in Ovarian Cancer Stem Cells", PIs: Matei, Cheng	\$194,350 (year 1)	08/01/2018 – 07/31/2023
NIH R33 CA223581	"Quantitative SRS Imaging of Cancer Metabolism at Single Cell Level"	\$1,398,179	8/1/2018 ~ 7/31/2021

	PI: Ji-Xin Cheng		
NIH R01 GM126409	“Highly Sensitive Chemical Microscopy by Probing the Thermal Effect of Infrared Light” PI: Ji-Xin Cheng	\$2,356,852	8/1/2018 ~ 7/31/2022
NSF CMI CHE-1807106	“Volumetric Chemical Imaging” PI: Ji-Xin Cheng	\$420,000	7/1/2018 ~ 6/30/2021
NIH R43 EB027018	IRaman, subcontract from Photothermal Spec Corp	\$66,000	10/01/2018- 03/31/2019
<b>Year 2017</b>	<b>Note: transition from Purdue University to Boston University</b>	<b>Total: \$100,000</b>	
NIH R41 CA244844	Confocal photothermal IR micro-spectroscopy (CPIR), PI: Ji-Xin Cheng	\$100,000	10/1/2017 to 3/31/2018
<b>Year 2016</b>		<b>Total: \$1,754,708</b>	
NIH R41 CA200006	“High-speed intraoperative assessment of breast tumor margin using Margin PAT” PI: Ji-Xin Cheng, funded	\$102,000	09/01/2016 – 8/31/2017
NIHR01 GM118471	“High-throughput high-content single cell analysis by multichannel stimulated Raman flow cytometry” PI: Ji-Xin Cheng, funded	\$1,657,708	08/01/2016 – 4/30/2020
Venture Well	“Vibronix: Margin PAT (stage I and II)” PI: Ji-Xin Cheng	\$25,000	
Walther Foundation	Prostate cancer imaging embedding team PI: Ji-Xin Cheng	\$35,000	1/1/2017~12/31/2017
<b>Year 2015</b>		<b>Total: \$2,497,646</b>	
NIH R01 HL125385-01A1	“In vivo photoacoustic sensing of lipid laden plaque”, PI: Ji-Xin Cheng, co-I: Michael Sturek	\$2,173,187	07/01/2015 - 06/30/2019
AHA	“High-speed optical-resolution intravascular vibrational photoacoustic imaging of atherosclerotic plaque” PI: Ji-Xin Cheng (mentor for Yingchun Cao)	\$102,676	01/01/2016 – 12/31/2018
National Science Foundation	“Planning grant: I/UCRC for Biophotonic Sensors and Systems, New Site” PI: Ji-Xin Cheng (Site Director)	\$10,000	
NIH/NCI STTR phase 1 R41 CA192645	“Diagnosing aggressive prostate cancer by spectroscopic photoacoustic tomography” PI: Ji-Xin Cheng (co-founder of Vibronix)	\$211,783	07/01/2015 - 06/30/2016
<b>Year 2014</b>		<b>\$3,469,626</b>	
Keck Foundation	“Microsecond Time Scale Vibrational Spectral Imaging of Living Systems” PI: Ji-Xin Cheng Co-I: Andrew Weiner & Mingji Dai	\$1,000,000 from Keck Total fund: \$2,003,000	Jan 2015 to Dec 2017, extended to Dec 2018
Walther Cancer Foundation	“Label-free imaging of human prostate tumor by vibrational photoacoustic tomography” PI: Ji-Xin Cheng	\$150,000 (direct cost)	Jan 2015 to Dec 2016

NIH/NIGMS R21GM114853	"Microsecond Raman spectroscopy: Assessing single cell metabolism in a vital organism" PI: Ji-Xin Cheng	\$447,126	Sep 2014 to Aug 2016
Indiana CTSI CTR award	"Active delivery of methylprednisolone to injured spinal cord" PI: Ji-Xin Cheng	\$120,000	2014-2016
Ntnl Clgte Inventors & Innovators Alliance	"Vibronix: Intravascular Photoacoustic catheter for atherosclerosis diagnosis (stage I and II)" PI: Ji-Xin Cheng	\$25,000	12/01/2013 - 07/31/2014
AHA National Innovation Award	"Assessing Plaque Vulnerability by Spectral Analysis of Optically Induced Sound" PI: Ji-Xin Cheng	\$150,000	01/01/2014 - 12/31/2015
DoD CDMRP Prostate Cancer Program	"Making Aggressive Prostate Cancer Quiescent by Abrogating Cholesterol Esterification" PI: Ji-Xin Cheng; program officer: Asif Rizwan	\$577,500	10/01/2014 - 09/30/2017
NIH/NCI R01 CA129287 Year 5	"Adaptable polymer micelles for tumor targeting" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$78,913	12/01/2013 - 11/30/2014
<b>Year 2013</b>		<b>Total: \$1,425,000</b>	
NIH/NIDDK T32DK101001	Bioengineering Interdisciplinary Training for Diabetes Research PI: Alyssa Panitch. Cheng: co-investigator	\$45,411	09/04/2013 - 09/03/2014
NIH R21 CA182608	Quantitative Spectroscopic Imaging of Cancer Metabolites in Live Cells and Intact Tissues PI: Cheng	\$759,767	12/01/2013- 11/30/2016
NIH R01 HL117990	Micro-Mechanical Role of Hypertension in Intimal Hyperplasia PI: Kassab, co-PI: Cheng	\$360,000	09/01/2013 – 8/31/2017
HHMI Janelia Farm visiting scientist	Label-free imaging of membrane potential PI: Cheng	\$50,000 (direct cost)	06/01/2013- 05/31/2014
Purdue Research Foundation	TRASK: fast spectroscopic imaging by parallel detection of stimulated Raman scattering PI: Cheng	\$50,000 (direct cost)	07/01/2013- 12/31/2013
CTSI CTR award	Prevention of Pancreatic Cancer Metastasis by Targeting Altered Cholesterol Metabolism PI: Cheng	\$75,000 (direct cost)	08/01/2013- 07/31/2015
Purdue Incentive Grant	Dissecting stem cell fate by novel imaging microscopy and single cell RNA sequencing PI: Kuang, co-PI: Cheng	\$150,882 (direct cost to Cheng)	08/01/2013- 05/31/2016
NIH/NCI R01 CA129287 Year 4	"Adaptable polymer micelles for tumor targeting" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$78,913	12/01/2012 - 11/30/2013
<b>Year 2012</b>		<b>Total: \$1,306k</b>	
Coulter translational research award phase II	Nanomedicine for repair of spinal cord injury PI: Ji-Xin Cheng	\$320,000	09/01/2012 – 08/31/2014
DoD Spinal Cord Injury Program	Targeting acute spinal cord injury using polymer micelles releasing bisperoxovanadium (bpV), PI: Xiao-Ming Xu, co-PI: Ji-Xin Cheng	\$180,000	09/30/2012 - 09/29/2015
NIH/NIHMS R21 GM	Label-free multichannel spectral cytometry based on stimulated Raman scattering PI: Ji-Xin Cheng, co-investigator: Paul Robinson	\$577,500	07/01/2012 – 6/30/2015

Purdue University	University Faculty Scholar	\$50,000	2012-2017
L'Oreal USA	Multimodal nonlinear optical imaging of human skin as a function of treatment, PI: Ji-Xin Cheng	\$50,000	012/01/2011 – 05/31/2012
L'Oreal USA	Multimodal nonlinear optical imaging of human hair as a function of treatment, PI: Ji-Xin Cheng	\$50,000	012/01/2011 – 05/31/2012
NIH/NCI R01 CA129287 Year 3	"Adaptable polymer micelles for tumor targeting" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$78,913	12/01/2011 - 11/30/2012
<b>Year 2011</b>		<b>Total: \$650k</b>	
NIH R21 EB015901	Vibrational photoacoustic microscopy for bond-selective tissue analysis, PI: Ji-Xin Cheng	\$531,600	08/01/2011 – 07/31/2012
L'Oreal USA	Multimodal nonlinear optical imaging of skin reconstruct as a function of treatment, PI: Ji-Xin Cheng	\$25,000	08/01/2011 – 01/31/2012
NIH/NCI R01 CA129287 Year 2	"Adaptable polymer micelles for tumor targeting" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$82,421	12/01/2010 - 11/30/2011
Walther Foundation	"Development of Prostate Cancer Progression Markers", PI: Timothy Ratliff, Ji-Xin Cheng: co-PI	\$90,000	01/01/2011 – 12/31/2011
IU-Purdue Prostate SPORE	"Detecting circulating tumor cells in prostate cancer" PI: Timothy Ratliff	\$15,000	05/16/2011 - 05/15/2012
IU-Purdue Prostate SPORE	Repair of cavernous nerve by multifunctional micelles PI: Timothy Ratliff	\$15,000	05/16/2011 - 05/15/2012
Showalter Trust	"Role of Glycated Dietary Proteins in Lipid Dysfunction of Adipose Tissue and Muscle in Aging", PI: Kee Hong Kim	\$7,000	07/01/2011 – 06/30/2012
CTSI translational research	Dual functional nanoparticles targeting cancer stem cells for improved treatment of breast cancers	\$25,000	05/01/2011 – 04/30/2012
CTSI translational research	Perivascular adipose-derived leptin & metabolic syndrome induced coronary disease	\$30,000	05/01/2011 – 04/30/2012
Indiana State Department of Health	"A Synergistic Therapy for Early Repair of Traumatically Injured Spinal Cord" PI: Ji-Xin Cheng, co-PI: Xiao-Ming Xu	\$120,000	09/01/2011 – 08/31/2013
CPPR	"Vibrational imaging of cocrystals" PI: Rodolfo Pinal, co-PI: Ji-Xin Cheng	\$17,500	03/10/2005 – 12/31/2015
American Heart Association Predoctoral Fellowship	Vibrational Photoacoustic Imaging and Spectroscopy for Characterization of Atherosclerotic Lesions PI: Pu Wang (graduate student) Advisor: Ji-Xin Cheng	\$52,000	07/01/2011 – 06/30/2013
<b>Year 2010</b>		<b>\$512k</b>	
DOD Breast Cancer Research Program	"Highly Effective Screening of Breast Cancer Risk and Protective Factors" PI: Shuhua Yue, Mentor: Ji-Xin Cheng	\$129,600	10/01/2010 – 09/30/2013

L'Oreal	"SRS Imaging of Deuterated Compound in Skin Cells", PI: Ji-Xin Cheng	\$50,000	11/01/2010 – 05/15/2010
Coulter Foundation	"A Micelle Approach to Early Nerve Repair after Spinal Cord Injury" PI: Ji-Xin Cheng, Clinical collaborator: Xiao-Ming Xu	\$200,000	09/01/2010 – 08/31/2012
L'Oreal	"CARS, SRS, and Compound Raman on hair" PI: Ji-Xin Cheng	\$50,000	07/01/2010 – 12/31/2010
CTSI translational research	"Intravital Imaging to Assist Development of Remyelination Therapy for Traumatic Spinal Cord Injury" PI: Ji-Xin Cheng, co-PI: Xiaoming Xu	\$45,000	6/1/2010 – 5/31/2011
NIH/NCI R01 CA129287 Year 1	"Adaptable polymer micelles for tumor targeting" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$82,421	12/01/2009 - 11/30/2010
<b>Year 2009</b>		<b>Total \$890k</b>	
NSF	MRI: Acquisition of a high-pulse-energy ultrafast laser system for interdisciplinary research Ji-Xin Cheng: co-investigator	\$485,790	09/01/09 – 08/31/12
Roche Palo Alto, LLC	"Imaging liposome-mediated drug delivery by CARS/SRS microscopy", PI: Ji-Xin Cheng	\$70,000	July 1 2009 to Dec 31 2009
American Heart Association pre- doctoral fellowship	"NLO imaging to elucidate the role of adventitia inflammation and neovascularization in plaque vulnerability and in-stent restenosis" PI: Ji-Xin Cheng (mentor for Han-Wei Wang)	\$52,000	07/01/09 – 06/30/11
L'Oreal USA	"Imaging compounds in skin tissue by coherent Raman microscopy" PI: Ji-Xin Cheng	\$9,780	06/15/09 – 12/15/09
Showalter Grant	"High-throughput screening of breast cancer risk factors via real time imaging of 3D culture of phenotypically normal epithelium" PI: Ji-Xin Cheng	\$37,500	07/01/09 – 06/30/10
Showalter Grant	"Live imaging and computational analysis of bone morphogenetic proteins in drosophila embryos" PI: David Umulis, Co-PI: Ji-Xin Cheng	\$12,700	07/01/09 – 06/30/10
Showalter Grant	"Anti-obese function of curcumin" PI: Kee-Hong Kim, Co-PI: Ji-Xin Cheng	\$6,410	07/01/09 – 06/30/10
NIH/NIBIB R21 EB009459-01	"Tissue imaging using desorption electrospray ionization mass spectrometry" PI: G. Cooks. Co-PI: Ji-Xin Cheng	\$67,682	04/01/09 – 03/31/10
Purdue Research Foundation	"SiNW/Au nanoshells as a nano-bio system to probe cellular response to nanomaterials" PI: Ji-Xin Cheng	\$16,750	06/01/09 – 05/31/10
Indiana Clinical and Translational Sciences Institute	"Intravital imaging to guide development of new spinal cord injury treatments" PI: Ji-Xin Cheng	\$10,000	06/01/09 – 05/31/10
Indiana State Department of Health	"Effective repair of traumatically injured spinal cord by block co-polymer micelles" PI: Ji-Xin Cheng	\$120,000	01/01/09 – 12/31/10
<b>Year 2008</b>		<b>Total: 428k</b>	
National Science Foundation	"Selective imaging and eradication of activated macrophages using bio-conjugated plasmon-resonant gold nanorods" PI: Ji-Xin Cheng	\$331,832	01/01/09 – 12/31/11



IVDiagnostics	"Development of an intravital flow cytometer" PI: Ji-Xin Cheng	\$80,851	08/01/08 - 07/31/09
L'Oreal	"Skin imaging testing" PI: Ji-Xin Cheng	\$6,000	01/01/08 - 12/31/08
Bausch & Lomb	"Hydrogel gel imaging testing" PI: Ji-Xin Cheng	\$6,000	12/01/07 - 11/30/08
Amylin	"Peptide imaging testing" PI: Ji-Xin Cheng	\$3,000	02/01/08 - 11/14/08
<b>Year 2007</b>		<b>Total: 1383k</b>	
Ruth L. Kirschtein National Research Service Award	"Nonlinear optical imaging to evaluate obesity associated health risks" PI: Ji-Xin Cheng (mentor for postdoc Thuc Le) F32HL089074	\$147,750	05/14/07 – 05/13/10
NIH NCI R03 CA128111	"Multiphoton imaging to evaluate the influence of dietary fatty acids on mammary" PI: Ignacio G. Camarillo, Co-PI: Ji-Xin Cheng	\$152,100	04/01/07 – 03/31/09
American Heart Association, predoctoral fellowship	"Bio-conjugated gold nanorods for optical hyperthermia of macrophages in an atherosclerotic plaque" PI: Ji-Xin Cheng (mentor for Ling Tong)	\$52,000	01/01/08 – 12/31/09
NIH NIBIB R01 EB007243	"Multimodal multiphoton imaging of nervous system ex vivo and in vivo" PI: Ji-Xin Cheng, Co-PI: Riyi Shi	\$963,591	03/01/07 – 02/28/10
NIH, R01 HL078715-01A1	"Layer-by-layer assembly for making drug-eluting stents" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$52,000	09/01/07 – 08/31/08
Purdue Research Foundation, Research grant	"Photoacoustic imaging assisted photothermal cancer therapy using gold nanorods" PI: Ji-Xin Cheng	\$14,627	06/01/07 – 05/31/08
<b>Year 2006</b>		<b>Total: 366k</b>	
Showalter Trust	"Better repair of spinal cord injury with polymer micelle based nanomedicine" PI: Ji-Xin Cheng, Co-PI: Riyi Shi	\$33,682	07/01/06 - 06/30/07
NIH NIBIB R21 EB004966-01	"Coherent anti-Stokes Raman scattering microscopy" PI: Ji-Xin Cheng	\$182,338	04/01/06 – 03/31/07
NIH, R01 HL078715-01A1	"Layer-by-layer assembly for making drug-eluting stents" PI: Kinam Park, Co-PI: Ji-Xin Cheng	\$85,537	09/01/06 – 08/31/07
Purdue Oncological Sciences Center	"Live cell and in vivo imaging studies of anti-cancer drug delivery" Co-PIs: Ji-Xin Cheng, Kinam Park	\$25,000	4/1/2006 – 3/31/2007
Purdue Oncological Sciences Center	"Bioconjugated gold nanorods for in vitro and in vivo detection and hyperthermia of tumor cells" Co-PIs: Ji-Xin Cheng, Alexander Wei	\$25,000	4/1/2006 – 3/31/2007
Purdue Research Foundation, Research grant	"Two-photon imaging and hyperthermia of tumor cells with nanorods" PI: Ji-Xin Cheng	\$14,040	6/1/2006 – 5/31/2007
<b>Year 2005</b>		<b>Total:354k</b>	
Purdue Research Foundation, Research grant	"Nonlinear optical imaging of spinal cord injury" PI: Ji-Xin Cheng	\$14,040	6/1/2005 – 5/31/2006,
NIH NIBIB R21 EB004966-01	"Coherent anti-Stokes Raman scattering microscopy" PI: Ji-Xin Cheng	\$ 61,522 + \$161,470	04/01/05 – 03/31/06

NIH, R01 HL078715-01A1	"Layer-by-layer assembly for making drug-eluting stents" PI: Kinam Park, co-PI: Ji-Xin Cheng (co-PI)	\$95,441	09/01/05 to 08/31/06
Akina Inc	"Characterization of drug distribution"	\$22,500	No restriction
<b>Year 2004</b>		<b>Total: 571k</b>	
National Science Foundation Award #0416785-MCB	"Study of membrane domains with coherent Raman microscopy and microspectroscopy" PI: Ji-Xin Cheng	\$353,638 + \$125,349	08/01/04 – 07/31/07
Purdue Cancer Center's Small Grants Program	"Study of cellular uptake and intracellular pathway of folate linked anticancer therapeutic agents using advanced imaging and spectroscopy methods" PIs: Ji-Xin Cheng and Philip Low	\$25,000	07/01/04 – 06/30/06
American Chemical Society PRF # 41741-G7	"Chemical imaging of spontaneous emulsification using coherent anti-Stokes Raman scattering microscopy" PI: Ji-Xin Cheng	\$35,000	09/01/04 – 08/31/06
Charles E. Culpeper Biomedical Pilot Initiative	"Three-color coherent anti-Stokes Raman scattering microscopy for imaging specific molecules without fluorophore labeling" PI: Ji-Xin Cheng	\$25,000	07/01/04 - 06/30/05
Purdue Research Foundation	Summer Faculty Grant PI: Ji-Xin Cheng	\$7,000	2004 Summer

## Part II. Entrepreneurship

### A. Start-up companies

#### Vibronix Inc, 2014

Co-founders: Ji-Xin Cheng, Pu Wang

Vibronix Inc develops commercializes life-saving label-free imaging technologies.

Awards in business plan competitions:

- First place in BMEidea competition, sponsored by VentureWell, 2015.
- Finalist in national *InnovateHER* competition. Vibronix is the only team from State of Indiana, 2016.
- *Second place in Purdue University Burton D. Morgan Business plan competition*, 2016.
- *Finalist in Rice Business Plan Competition*. Only team from State of Indiana, 2016.
- *Second place in Carnegie Mellon University Venture Competition*, 2016.

Funds received:

**2019:** NSF SBIR "fiber optoacoustic guide for precision lumpectomy", phase 2

**2017:** NSF SBIR "fiber optoacoustic guide for precision lumpectomy", phase 1

**2016:** NIH STTR R41CA200006 "High-speed intraoperative assessment of breast tumor margin using Margin PAT", phase 1

**2016:** Vibronix Inc finished a due diligence process and received \$1.2 M convertible note from Elevated Venture and Sino-American Venture Funds.

**2015:** NIH STTR R41 CA2192645 "Diagnosing aggressive prostate cancer by spectroscopic photoacoustic tomography", phase 1

#### Resarci Therapeutics LLC, 2015

Co-founders: Ji-Xin Cheng, Junjie Li, Timothy Ratliff

Resarci Therapeutics repurposes metabolic drugs for treatment of aggressive human cancers.

**Closed in 2019**

## B. Issued US Patents (total 10)

Inventors	Title	Status
Ji-Xin Cheng Delong Zhang	Mid-infrared photothermal microscope	PCT/US2017/053407, Licensed to Photothermal Spectroscopy Corp,
Ji-Xin Cheng Mingji Dai	Raman Tag	US9,688,717 B2 Issued 6/27/2017
Ji-Xin Cheng Mikhail N. Slipchenko	System and methods for multiplex spectroscopic imaging, PRF 66798	US9,068,949 B2, Issued 06/30/2015 Licensed to Vibronix Inc
Ji-Xin Cheng	Vibrational photoacoustic tomography using Raman laser	US9357928 B2, Issued 06/07/2016 Licensed to Vibronix
Ji-Xin Cheng	Methods for determining aggressiveness of a cancer and treatment thereof	US9,164,084 B2, Issued 10/20/2015 Licensed to Resarci Therapeutics
Ji-Xin Cheng, Mikhail N. Slipchenko	Method and device for optical imaging with a resonant amplifier assembly	US9,222,878 B2, Issued 12/29/2015 Licensed to Vibronix Inc
Ji-Xin Cheng Hongtao Chen Mikhail N. Slipchenko Haifeng Wang	"Multimodal Platform for nonlinear optical microscopy and micro-spectroscopy" PRF 65234. Provisional 12/2008. PCT 12/ 2009.	US8,994,932 B2, Issued 03/31/2015 Licensed to Vibronix Inc
Philip Low Ji-Xin Cheng Wei He	Multiphoton In Vivo Flow Cytometer Method and Device	US8,795,633 B2, Issued 08/05/2014
X. S. Xie, A. Volkmer, Ji-Xin Cheng	System and Method for Epi-detected Coherent Anti-Stokes Raman Scattering Microscopy	US 6,809,814 B2, Issued 10/26/2004 Licensed to Olympus & Leica
X.S. Xie, Ji-Xin Cheng	System and Method for Polarization Coherent Anti-Stokes Raman Scattering Microscopy	US 6,798,507 B2, Issued 09/28/2004 Licensed to Olympus & Leica

## Part III. Teaching and Mentoring

### A. Courses developed and taught

Semester & Year	Course Number, Credit Hour, Type	Course Title	# of Students	Overall Course Rating	Overall Instructor Rating
Fall 2003	BME 595Z/ CHM 599Z	Biomedical Optics 3 cr. lecture	14	4.6/5.0 BME 4.8/5.0 CHM	4.2/5.0 BME 4.8/5.0 CHM
Fall 2004	BME 595Z/ CHM 599Z	Biomedical Optics 3 cr. lecture	16	3.7/5.0 BME 3.8/5.0 CHM	3.3/5.0 BME 3.6/5.0 CHM
Fall 2005	BME 595Z/ CHM 599Z	Biomedical Optics 3 cr. lecture	20	4.2/5.0 BME 4.3/5.0 CHM	3.8/5.0 BME 4.3/5.0 CHM
Fall 2006	BME 553, 3 cr. Lecture	Biomedical Optics	10	4.1/5.0	3.9/5.0
Fall 2006	BME695Y, 1 cr. Lecture	Critical Literature Review	16	3.6/5.0	3.0/5.0
Fall 2007	BME 305 2 cr. Lecture/Lab	Biomedical Instrumentation	45	3.5/5.0 (Lec) 3.7/5.0 (Lab)	2.7/5.0 (Lec) 3.1/5.0 (Lab)
Spring 2008	BME 553	Biomedical Optics	15	4.2/5.0	4.2/5.0
Spring 2008	BME 295S	Frontiers in Biomedical Engineering	55	3.2/5.0	3.9/5.0
Fall 2008	BME305 2 cr. Lecture/Lab	Biomedical Instrumentation	58	4.0/5.0 (Lec) 3.8/5.0 (Lab)	3.5/5.0 (Lec) 3.4/5.0 (Lab)
Spring 2009	BME 553	Biomedical Optics	6	4.8/5.0	4.8/5.0

Fall 2009	BME305 (3 cr.) Lecture/lab	Biomedical Instrumentation	55	3.6/5.0	3.8/5.0
Spring 2010	BME 553 (3 cr.)	Biomedical Optics	12	4.0/5.0	4.0/5.0
Fall 2010	BME 305 (3 cr.) Lecture/lab	Biomedical Instrumentation	60	3.7/5.0	3.7/5.0
Fall 2011	BME305 (3 cr.)	Biomedical Instrumentation	61	2.7/5.0	2.1/5.0
Spring 2012	BME 553 (3 cr.)	Biomedical Optics	15	4.2/5.0	4.5/5.0
Fall 2012	BME 305 (3 cr.)	Biomedical Instrumentation	65		
Fall 2012	BME695 (1 cr.)	Critical Literature Analysis	6		
Fall 2013	BME305 (3 cr.)	Biomedical Instrumentation	65		
Fall 2013	BME695 (1 cr.)	Critical Literature Analysis	7		
Spring 2014	BME 695 (3 cr.)	Frontiers of Bio- photonics	6		
Spring 2016	BME 695 / CHM676	Frontiers of Bio- photonics	20		
Spring 2017	BME299	Undergraduate research scholar program I	10		
Summer 17	Transition to BU				
Spring 2018	EC500/BE500 Boston University	Optical Spectroscopic Imaging	10	4.9/5.0	4.9/5.0
Spring 2019	EC500/BE500, BY	Optical Spectroscopic Imaging	14	4.3/5.0	4.3/5.0

## B. Ph. D. and M. S. Students, Supervision Completed (26 PhD and 4 MS)

No.	Name	Degree	Year	Major	Thesis title
1	Li Li	PhD	May 2008	Analytical Chemistry	Imaging of lipid membrane organization and internalization pathways of cell-penetrating peptides
2	Jiabin Zhu	MS	Dec 2008	Biomedical Engineering	A Dynamic, Cytoplasmic Triacylglycerol Pool in Enterocytes Revealed by ex vivo and in vivo Coherent Anti-Stokes Raman Scattering Imaging
3	Hongtao Chen	PhD	May 2009	Biomedical Engineering	Chemical imaging of nanocarriers in live cells and live animals
4	Yan Fu	PhD	Dec 2009	Biomedical Engineering	Study of Myelin Disease by Coherent anti-Stokes Raman Scattering Microscopy
5	Brandon Huff	PhD	Dec 2009	Analytical Chemistry	Ex vivo and in vivo coherent Raman imaging of the peripheral and central nervous system
6	Nan Lin	MS	May 2010	Biomedical engineering	Synthesis and optical properties of Si-Au core-shell nanowires
7	Yunzhou Shi	PhD	Dec 2010	Biomedical Engineering	Nanomedicine and chemical imaging approaches to traumatic spinal cord injury
8	Yookyung Jung	PhD	Dec 2010	Physics	Nonlinear optical imaging of nanomaterials and transient absorption microscopy
9	Ling Tong	PhD	Dec 2010	Analytical Chemistry	Imaging nanomaterials in vitro and in vivo by exploring their intrinsic nonlinear optical signals
10	Han-Wei Wang	PhD	Aug 2011	Biomedical Engineering	Label-free Bond-selective Imaging of Atherosclerosis
11	Jacqueline Y.	MS	Aug 2013	Biomedical	Treating acute spinal cord injury with methylprednisolone

	Tyler			Engineering	modified and loaded glycol chitosan nanocarriers
12	Shuhua Yue	PhD	Dec 2013	Biomedical Engineering	Altered Cholesterol Metabolism in Human Cancers Unravalled by Label-free Spectroscopic Imaging
13	Delong Zhang	PhD	Aug 2014	Analytical Chemistry	Stimulated Raman Scattering Microscopy
14	Seung Young Lee	PhD	Aug 2014	Biomedical Engineering	Nanomedicines for cancer chemotherapy
15	Pu Wang	PhD	Aug 2014	Biomedical Engineering	Intravascular photoacoustic imaging for cardiovascular disease management
16	Junjie Li	PhD	Aug 2015	Biological Science	Raman spectroscopic imaging reveals lipid metabolism as a marker and therapeutic target of cancers
17	Bin Liu	PhD	2016	Optical Engineering	High-spectral-resolution stimulated Raman spectroscopic imaging and its applications
18	Rui Li	PhD	May 2017	BME	High-speed intraoperative assessment of breast tumor margins using a multimodal vibrational photoacoustic tomography system
19	Chien-Sheng Liao	PhD	May 2017	BME	Microsecond-scale stimulated Raman spectroscopic imaging: technical innovations & biomedical applications
20	Hyeon Jeong Lee	PhD	Dec 2017	Biology / PULSe	Imaging cholesterol metabolism and trafficking by stimulated Raman scattering microscopy
21	Jie Hui	PhD	Dec 2017	Physics	Intravascular photoacoustic imaging of lipid-laden plaque: from fundamental concept towards clinical translation
22	Ayeeshik Kole	MD PhD	Feb 2018	BME	Depth-resolved assessment of atherosclerosis by intravascular photo-acoustic-ultrasound imaging
23	Andy Jing Chen	PhD	Aug 2018	Biology	Label free chemical imaging reveals novel metabolic signatures in living model organisms
24	Brittani Burgart	MD PhD	Feb 2019	BME	
25	Yeran Bai	PhD	May 2019	Optical Engineering	
26	Lu Lan	PhD	Aug 2019	BME	
27	Pu-Ting Dong	PhD	Dec 2019	Chemistry	
29	Kai-Chih Huang	PhD	Dec 2019	BME	
30	Yuewei Zhan	MS	Dec 2019	BME	

### C. Current Group

#### Current Ph.D. and M.S. Students (total 18 PhD students, 1 MS)

Name	Major	Entering Date	Projected Grad Date
Jiaze Yin	ECE	Sept 2019	
Xiaowei Ge	ECE	Sept 2019	
Hongli Ni	ECE	Sept 2019	
Jing Zhang	BME	Aug 2018	
Yuewei Zhan (MS)	BME	Aug2018	Dec 2019, BU BME
Yueming Li	ME	Aug 2018	
Haonan Zong	ECE	Aug 2018	
Yifan Zhu	Chemistry	Aug 2018	
Yuying Tan	BME	Aug 2017	
Sebastian Juruf	BME	Aug 2017	
Peng Lin	BME	Aug 2016	Dec 2021, BU ECE
Jaifyingzi Wu (Purdue)	Chemistry	Jan 2016	May 2020, Purdue chemistry
Yi Zhang	Phys	Aug 2015	Dec 2020, BU Physics
Ying Jiang	PULSe	Aug 2015	Dec 2020, BU Neuroscience
Haonan Lin	BME	Aug 2015	Dec 2020, BU BME
Pu-Ting Dong	Chemistry	Aug 2014	Dec 2019, BU Chemistry, graduated
Kai-Chih Huang	BME	Aug 2014	Dec 2019, BU BME, graduated

Lu Lan	BME	Aug 2014	Aug 2019, BU BME, graduate
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### Current postdoctoral fellows and research scientists (8 total)

Name	Period in Cheng lab	Email	Graduated from
Xu, Jiaobao	Feb 2020 to		Oxford University
Dong, Pu-Ting	Feb 2020 to July 2020		Cheng group
Zhao, Jian	Oct 2019 ~		CREOL
Zong, Cheng	Jan 2017 ~ Dec 2019		Xiamen University
Cao, Yingchun	March 2015 ~ Dec 2019		Hong Kong Chinese Univ
Lee, Hyeon Jeong	Jan 2018 ~ present		Cheng Group
Hui, Jie	Jan 2018 ~ present		Cheng Group
Zhang, Meng	March 2018 to present		Xiamen University
Ji, Ziheng	Sept 2019 to Aug 2020		Peking University

### Current visiting scholars (8):

Name	Period in Cheng lab	Email	from
Bai, Yeran	Oct 2016 to Sept 2020	<a href="mailto:byr1213@163.com">byr1213@163.com</a>	Shanghai institute of optics
Zhao, Jing, CSC	Feb 2020 to		Tianjin University
Zhuge, Minghua	Sept 2018 to Dec 2019		Zhejiang University
Chen, Zhicong	Sept 2018 to Sept 2020		Peking University
Dong, Dashan	March 2019 to May 2019		Peking University
Mavrakakis, Kostas	Sept 2019 to Mar 2020		University of Crete
Guo, Qianjin	Dec 2019 to Nov 2020		CAS Institute of Chemistry

### D. Supervision of Undergraduate Research Projects:

**Current:** Tiffany Tran-Tang (BME, 2017 to 2019, UROP awardee), Ketan Gupta (BME, 2017 to 2019, UROP awardee)

**Past:** Katherine Reny (BME, 2017-2018), Antony Perry (BME, 2017-2018), Christian Mancini (BME, 2017-2018); Chengqian Zhou (BME 2017-2019), Jason Qian (summer 2019); Yifan Zhu (2017 summer), Shuaibin Chang (2017 summer), Jieying Mai (BME, 2016-2017), Shovik (Biology, 2014-2017), Rui Liu (ABE, 2016 - 2017), Xueyong Zhang (Chem, 2016-2017), Jien Nee Tai (Chemistry 2013-2016), Clara Suh (Biochemistry, 2013-2016), Yuming Gao (BME 2014), Forrest Oberhelman (Biology 14-15), Scott Vicenzi (Biology 2014), Alan Poon (BME2013), Zhouyang Lou (HHMI summer 2013); Tzu-Hsiang Pan (Biology 2012); Elizabeth A Hudson (BME 2012); Jackie Tyler (BME, 2010-12), Ronit Patnaik (BME, 2010), Anna Sullivan (ChE, 2010, *Silicon Fellowship*), Hao Lou (Pharmacy, 2009-2010), Peter Coleman (Chemistry, 2010), Kevin Shyu (08 SURF), Cynthia Huang (08 SURF), Kevin Cheng (08), Alan Wang (08), Joshua Robinson (05-07, *Marguerum Research Award*), Kaleigh Evans (05 SURF), Amp Chandruangphen (2004, *Marguerum Research Award*), Michael Chang (04 SURF), Kathryn A. Antle (REU 04), Merrit Debartolo (REU 04), Jonathan Sutcliffe (03 CHM499).

### E. Former Postdoctoral Fellows

No.	Name	In Cheng lab	Email	Current postion
1	Haifeng WANG	2004-2007	<a href="mailto:phywh@nus.edu.sg">phywh@nus.edu.sg</a>	Faculty, National University of Singapore
2	Thuc LE	2006-2010, NIH F32 fellowship	<a href="mailto:thuc@uchicago.edu">thuc@uchicago.edu</a>	Faculty, Roseman Univ of Health Sciences, Las Vegas
3	Yuxiang LIU	2011-2012	<a href="mailto:yliu11@wpi.edu">yliu11@wpi.edu</a>	Faculty, Worcester Polytechnic Institute
4	Justin R. RAJIAN	2012-2013	NA	NA
5	Ping WANG	2012-2015	<a href="mailto:ping79.wang@gmail.com">ping79.wang@gmail.com</a>	Faculty, Huazhong Univ of Sci & Tech
6	Bing SONG	2012-2013	<a href="mailto:bsong1023@gmial.com">bsong1023@gmial.com</a>	Postdoc, Harvard MGH, back to Zhengzhou
7	Shibing DENG	2016 Feb – Nov	<a href="mailto:Deng109@purdue.edu">Deng109@purdue.edu</a>	Postdoc, Purdue Chemistry
8	Mikhail Slipchenko	2008 -	<a href="mailto:mshlpc@gmail.com">mshlpc@gmail.com</a>	Research Associate Professor, Purdue



9	Pu WANG	Sep 2014 to Dec 2016	Puwang101@gmail.com	CEO of Vibronix INC
10	Weili HONG	May 2015 ~ May 2018	<a href="mailto:Hong215@purdue.edu">Hong215@purdue.edu</a> <a href="mailto:weilihong@buaa.edu.cn">weilihong@buaa.edu.cn</a>	Faculty, Beihang University
11	Chien-Sheng Liao	July 2017 ~ Feb 2018	cksearching@gmail.com	Pendar Technologies
12	Jesse Zhang	June 2014 ~ July 2018	<a href="mailto:zhangchi@illinois.edu">zhangchi@illinois.edu</a>	UIUC postdoc
13	Delong ZHANG	Sept 2014 ~ May 2019	<a href="mailto:dlzhang@zju.edu.cn">dlzhang@zju.edu.cn</a>	Faculty, Zhejiang University
14	Max DENG	July 2018 ~ April 2019	<a href="mailto:maxd@liquidinstruments.com">maxd@liquidinstruments.com</a>	start-up <a href="https://www.liquidinstruments.com/">https://www.liquidinstruments.com/</a>
15	Junjie LI	Sept 2015~ July 2019	<a href="mailto:junjie168@gmail.com">junjie168@gmail.com</a>	Scientist at Pfizer
16	Hyeon Jeong LEE	Jan 2018 to Aug 2019	<a href="mailto:hyjglee@gmail.com">hyjglee@gmail.com</a>	Faculty at Zhejiang University

## F. Former Visiting Scholars

	Name	In Cheng lab	Email	Current position
1	Shuyi WANG	2006-2007		Professor, University of Shanghai for Science and Technology
2	Hong-Qin YANG	11 Nov – 12 Nov	<a href="mailto:hqyang@fjnu.edu.cn">hqyang@fjnu.edu.cn</a>	Professor, Fujian Normal University
3	Wei WU	2011-2012	<a href="mailto:wu99@iupui.edu">wu99@iupui.edu</a>	Postdoc, IUSM
4	Chunrui HU	2011-2013	<a href="mailto:chunrui@gmail.com">chunrui@gmail.com</a>	Postdoc, USTC
5	Bin Liu (CSC)	13 Sept-15 Sept	<a href="mailto:liu1268@foxmail.com">liu1268@foxmail.com</a>	PhD student, Harbin Institute of Technology
6	Xiaochao QU	14 Sept-15 Sept	<a href="mailto:xiachaoqu@gmail.com">xiachaoqu@gmail.com</a>	Associate professor in Xidian University
7	Yuanqin XIA	2015 Sept	<a href="mailto:xiayuanqin@hit.edu.cn">xiayuanqin@hit.edu.cn</a>	Harbin Institute of Technology
8	Huaidong YANG	2015 Aug	<a href="mailto:yanghd@mail.tsinghua.edu.cn">yanghd@mail.tsinghua.edu.cn</a>	Tsinghua University
9	Fuyou LI	2015 Feb to July	<a href="mailto:fyli@fudan.edu.cn">fyli@fudan.edu.cn</a>	Fudan University
10	Mei Shi	2015 – 2016		Fudan University
11	Yin-Xin Zhang	2015 – 2016	<a href="mailto:yinxin@tju.edu.cn">yinxin@tju.edu.cn</a>	Tianjin University
12	Wei Chen CSC	2015 – 2016	<a href="mailto:chw111@mail.ustc.edu.cn">chw111@mail.ustc.edu.cn</a>	USTC
13	Xueli Chen	March 2015 – March 2017	<a href="mailto:xuelichenmig@gmail.com">xuelichenmig@gmail.com</a>	Xidian University
14	Yiru Peng	July to Dec 2016		Fujian Norman University
15	Hao Wang	Feb 2016 to Feb 2017		Fujian Norman University
16	Chunguang Zhang	Feb 2016 to Feb 2017		Fujian Norman University
17	Yue Zhong	Sept 16 to Sept 17		Beijing
18	Frank Lloyd	2016 to 2017		MD, Indianapolis
19	Yifan Zhu	2017 10~12	<a href="mailto:Zhuf3@mail.sustic.edu.cn">Zhuf3@mail.sustic.edu.cn</a>	S-USTC, joined BU Sept 2018
20	Shuaibing Chang	2017 Summer	<a href="mailto:csb@mail.ustc.edu.cn">csb@mail.ustc.edu.cn</a>	USTC, joined BU sept 2018
21	Liang, Lijia CSC	Nov 16~May 18	<a href="mailto:lijialiang3649@163.com">lijialiang3649@163.com</a>	Faculty
22	Ni, Hongli	2018 Summer		Zhejiang University, joined BU Sept 2019
23	Chen, Shufan	Sept 18~June 19		Tianjin University, MS student
24	Li, Xiaojie (CSC)	Nov 2017 to Nov 2019	<a href="mailto:hitwhlxj@163.com">hitwhlxj@163.com</a>	Changchun Institute of Optics, Fine Mechanics and Physics
25	Sun, Jieliyue	2019 Summer		Zhejiang University
26	Xu, Jiabao	June 2019 to Nov 2019		Oxford University, to join BU as postdoc

## Part IV. Invited and Keynote Presentations (total 266)

### Invited talks in conferences and institutes (year 2018)

1. Dec 6, 2018, "Eliminating drug-resistant bacteria via photobleaching of intrinsic chromophore", OPTIC2018, Tainan, Taiwan
2. Dec 5, 2018, "Enabling precision medicine through innovations in chemical microscopy", National Tsing-Hua University
3. Dec 4, 2018, "Enabling precision medicine through innovations in chemical microscopy", Colloquium in physics department, NTU, Taipei, Taiwan
4. Dec 3, 2018, "Highly sensitive chemical microscopy using molecular fingerprints", **Keynote speech**, NTU BMI symposium, Taipei, Taiwan
5. Nov 11, 2018, "Highly sensitive chemical imaging in the mid-infrared", Label-free workshop, MPQ, Munich, Germany
6. Nov 05, 2018, "Enabling precision medicine through innovations in chemical microscopy", World Congress on Photonics, Philadelphia
7. Oct 29, 2018, "Enabling precision medicine through innovations in chemical microscopy", Seminar in Engineering Division, Oxford University, UK
8. Oct 21, 2018, "Deep learning SRS microscopy", SciX meeting, Atlanta, GA
9. Oct 08, 2018, "Elucidating rules of life through innovations in chemical microscopy", Colloquium, EPFL, Lausanne, Switzerland
10. Oct 05, 2018, "Coherent Raman scattering microscopy", MIFOBIO, Seigosse, France
11. Sept 30, 2018, "Enabling precision medicine through innovations in biophotonics", BCIC, Boston, MA
12. Sept 05, 2018, "Seeing chemistry in living cells", Colloquium, Brandeis University
13. Aug 21, 2018, "SRS imaging cytometry", ACS fall meeting, Boston, MA
14. Aug 19, 2018, "Transient absorption microscopy", ACS fall meeting, Boston, MA
15. Aug 19, 2018, "Bond-selective phase imaging", ACS fall meeting, Boston, MA
16. Aug 16, 2018, "Molecular structure elucidation and modulation in living cells", GRC, molecular structure elucidation, Jordan Hotel at Sunday River, Maine
17. July 07, 2018, "Transient absorption microscopy of heme", GRC conference on Chemistry and Biology of Tetrapyrroles, Newport, RI
18. July 09, 2018, "Label-free Chemical Microscopy", Colloquium at MPQ, Munich, Germany
19. June 17 to 22, "Laser-based label-free chemical imaging", in Gordon Conference, Lasers in nano, bio, micro-systems, Waterville Valley, NIH
20. June 6, 2018, "Chemical Microscopy: seeing the unseen", College of Physics, Peking University, Beijing, China
21. June 2 to 3, 1st Beihang International Symposium on Medical Photonics, Beihang University, Beijing, China
22. May 14 to 18, "Annihilation of Methicillin-Resistant *Staphylococcus Aureus* (MRSA) via Photobleaching of Staphyloxanthin", CLEO, San Jose, CA
23. April 24, 2018, "Chemical imaging of living systems", Wellman Center for Photomedicine, Boston, MA
24. April 9, 2018, "Seeing the unseen using molecular fingerprints", Sanofi, MA
25. April 5, 2018, "Living System Spectroscopy", Colloquium, University of Arizona, Department of Chemistry and Biochemistry.
26. March 12-13, "Label-free chemical imaging: Unveiling hidden signatures for molecule-based diagnosis and treatment", in FIP symposium, Duke University
27. 02-28-2018, "Killing superbug MRSA with photons", Photonics Forum, Boston University, Boston, MA
28. 02-24-2018, **Keynote speaker**, "Seeing the unseen in living systems through molecular fingerprints", Boston Photonics Conference, Boston, MA.
29. 02-23-2018, Seminar in Department of Biomedical Engineering, University of Virginia
30. 01-12-2018, **PQE Plenary Talk**, "Label-free spectroscopic imaging, from physics to medicine", Snowbird, Utah

### Invited talks in conferences and institutes (year 2017)

31. 10-20-2017, Seminar in Mechanical Engineering, Boston University, Boston, MA
32. 10-16-2017, Seminar in Tufts University BME Department, Boston, MA
33. 10-12-2017, SciX Innovation Award Symposium, "Probing cancer with spontaneous and stimulated Raman

scattering", Reno, Nevada

34. 10-02-2017, IEEE Photonics, "Pushing the physical limits of label-free spectroscopic imaging for biology and medicine", Orlando, FL
35. 09-22-2017, Medicine Conference, "无标记分子诊疗的技术前沿与应用", Shijiazhuang, China
36. 09-16-2017, Applied Spectroscopy Symposium, "Revisiting the little animals under a chemical microscope", Purdue University, West Lafayette, IN
37. 08-17-2017, Proteomics Center, Beijing, China
38. 08-16-2017, Peking University 1<sup>st</sup> Hospital, Beijing, China
39. 08-15-2017, 301 Hospital, Beijing, China
40. 08-03-2017, Frontiers and Challenges of Laser-based Microscopy Symposium, "Revisiting the little animals under a chemical microscope", Telluride, CO
41. 06-05-2017, Janelia Farm Conference, "Seeing deeper via PA imaging at the second window".
42. 06-02-2017, Ramanfest, "Latest advances in coherent Raman microscopy", Purdue University, West Lafayette, IN
43. 05-18-2017, CLEO, "Nonlinear Spectroscopic Imaging", San Jose, CA
44. 04-03-2017, ECONOS **Keynote Speech**, "Nonlinear Spectroscopic Imaging: a new window into the unseen world", Jena, Germany
45. 03-24-2017, Colloquium, Living System Chemistry: Analytical Innovation, Signature Discovery, & Clinical Translation, Chemistry at BU, Boston, MA
46. 03-06-2017, PITTCOON, "Seeing the invisible using spectroscopic signal", Chicago, IL
47. 01-30-2017, SPIE Spectroscopic Imaging, "Pushing the physical limits of spectroscopic imaging", San Francisco, CA
48. 01-23-2017, Seminar, "Chemical Microscopy", BU Medical Campus, Boston, MA

#### **Invited talks in conferences and institutes (year 2016)**

49. 12-07-2016, "Cancer Metabolism: from single cell biology to in vivo diagnosis", Boston University Photonics Center Annual Symposium, Boston, MA.
50. 12-01-2016, "Cancer Metabolism: from single cell biology to in vivo diagnosis", Podium talk in NCI IMAT PI meeting, Bethesda, MD
51. 09-21-2016, "Label-free diagnosis and detection using molecular fingerprint", SciX meeting, RSC & ACS Joint symposium, Minneapolis.
52. 09-20-2016, "Living system spectroscopy for diagnosis and therapy monitoring", SciX meeting, Multimodal Imaging symposium, Minneapolis.
53. 09-09-2016, "Lipid metabolism: from single cell biology to in vivo diagnosis", BTCRC Summit, Indianapolis, IN.
54. 08-21-2016, "Sparsely-sampled stimulated Raman scattering microscopy towards video-rate hyperspectral imaging", ACS National Meeting, Philadelphia, PA.
55. 07-13-2016, "Imaging metabolism inside living cells", ISOTT, Chicago, IL.
56. 07-07-2016, "Molecular spectroscopic imaging: An emerging platform for biology and medicine", Label-free Imaging Workshop, Purdue University.
57. 06-29-2016, "Molecular spectroscopic imaging towards precision medicine", Cancer Moonshot, Purdue University.
58. 06-20-2016, **Plenary Talk** "Molecular Spectroscopy of Living Systems", International Symposium of Molecular Spectroscopy, UIUC, Champaign, IL.
59. 05-27-2016, "Label-free spectroscopic imaging towards precision medicine", Beihang University, Beijing, China.
60. 05-06-2016, "Label-free spectroscopic imaging towards precision medicine", Department of Bioengineering, UCSD, San Diego, CA.
61. 04-14-2016, "Label-free spectroscopic imaging: An emerging platform for biology and medicine", IUSM Wells Center, Indianapolis, IN.
62. 04-04-2016, "Label-free spectroscopic imaging: An emerging platform for biology and medicine", Center for Biophotonics, Vanderbilt University.
63. 03-14-2016, "In vivo vibrational spectroscopic imaging: emerging platform for biology and medicine", ACS Meeting, San Diego, CA.

64. 03-10-2016, "Label-free spectroscopic imaging for molecular diagnosis", PITTCON, Lednev Symposium, New Orleans.
65. 03-06-2016, "Vibrational spectroscopic imaging of living system", PITTCON, In situ Analysis Symposium, New Orleans.
66. 02-14-2016, "Label-free vibrational imaging of membrane potential in live neurons", Photonics West, Coherent Raman Scattering Microscopy Symposium, San Francisco, CA.
67. 02-14-2016, **Keynote Speech** "Coherent Raman scattering microscopy: An emerging platform for biology and medicine", Photonics West, Multiphoton Microscopy Symposium, San Francisco, CA.
68. 02-13-2016, "In vivo vibrational imaging: An emerging platform for biology and medicine", Photonics West, Vibrational Spectroscopy Symposium, San Francisco, CA.
69. 01-29-2016, "Label-free spectroscopic imaging: An emerging platform for biology and medicine", Boston University Photonics Center, Boston, MA

#### **Invited talks in conferences and institutes (year 2015)**

70. Dec 2015, "Transforming vibrational spectroscopy into an in vivo imaging platform for biology and medicine", Pacific Chem, presented by Delong Zhang, Hawaii, USA
71. Nov 2015, Lipid Metabolism as a Cancer Therapeutic Target Revealed by Raman Spectroscopic Imagi, GTC Novel Cancer Therapeutics Summit 2015 - Cancer Metabolism, presented by Junjie Li, San Francisco, CA
72. Oct 2015, "Pushing the speed limit of label-free hyperspectral microscopy", presented by Pu Wang, Frontiers in Optics/Laser Science, San Jose, CA
73. Oct 16, 2015, "Label-free spectroscopic imaging of atherosclerosis", IUPUI Imaging Symposium, Indianapolis, IN.
74. Oct 1, 2015, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Neuroscience Program, IUSM, Indianapolis.
75. Sept 2015, "In vivo spectroscopic imaging: emerging platform for biology and medicine", sciX, Rode island.
76. Sept 2015, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Department of Nutrition, Purdue University.
77. Aug 215, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Dalian, China
78. Aug 2015, 第十四届全国化学动力学会议, "Dancing with molecules: from bond-selective chemistry to bond-selective imaging", Xi-An, China.
79. Aug 2015, "Spectroscopic imaging of living systems: emerging platform for biology and medicine", Eli Lilly, Indianapolis
80. Aug 3-7, 2015, Frontiers and Challenges of Laser-based Microscopy Symposium, "Spectroscopic imaging of living systems: emerging platform for biology and medicine", Telluride, CO
81. July 2015, Summer Workshop, "In vivo and in situ spectroscopic imaging: emerging platform for biology and medicine", Purdue University.
82. May 26-28, 2015, Targeting Cancer Metabolism Conference, "Spectroscopic imaging of cancer metabolism at single cell level", Boston, MA
83. May 2015, Zhejiang University, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Hanzhou, China
84. May 2015, Ramanfest meeting "Stimulated Raman imaging for biology and medicine", Xiamen China.
85. May 2, 2015, Xiamen University Department of Chemistry, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Xiamen, China.
86. April 2015, "In vivo spectroscopic imaging: emerging platform for biology and medicine", University of Notre Dame.
87. April 2015, Single Cell Symposium, "Single-cell metabolic imaging using molecular fingerprint". NIH, Bethesda, MD.
88. April 2, 2015, Purdue Center for Cancer Research, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Purdue University.
89. March 26, Medicinal Chemistry, "In vivo spectroscopic imaging: emerging platform for biology and medicine", Purdue University.
90. March 11, 2015, PITTCON, "Stimulated Raman spectroscopic imaging", New Orleans.
91. Feb 10, 2015, SPIE, "Spectroscopic imaging of membrane potential in living neurons", San Francisco, CA.
92. Jan 4-8, 2015, **Plenary Talk at PQE**, "In vivo spectroscopic imaging for biology and medicine", Snowbird,

Utah.

### **Invited talks in conferences and institutes (year 2014)**

93. Dec 9-10, NSF I/UCRC meeting at UC Davis, "Biophotonics at Purdue University", Sacramento, CA
94. Nov 2014, STJU, "Frontiers of Label-free Spectroscopic Imaging and its applications to Biology, Medicine and Materials Science", Shanghai, China.
95. Nov 2014, USTC, same title as above, Hefei, China.
96. Nov 2014, Tianjing University, same title as above, Tianjing, China.
97. Nov 2014, Tsinghua University, same title as above, Beijing, China.
98. Nov 12-13, NIH IMAT meeting, "Imaging cancer cell in metabolic space using molecular fingerprint", NIH campus, Bethesda, MD
99. Oct 7, Indiana University School of Medicine, "in vivo spectroscopic imaging for paradigm shifting biomedical applications", Indianapolis, IN
100. Oct 1, FACSS Meeting, "Vibrational imaging beyond the ballistic regime", Reno, NV.
101. Sept 30, FACSS Meeting, "Imaging single cell metabolism using molecular fingerprint", Reno, NV.
102. Sept 4, Drug Discovery Center Symposium, "In vivo spectroscopic imaging for biology and medicine", Purdue University.
103. Sept 16, UIUC BME seminar, "Transforming spectroscopy from in vitro to in vivo for paradigm shifting biomedical applications", Urbana-Champaign, IL
104. Sept 11, Colloquium in Chemistry Department, "Transforming spectroscopy from in vitro to in vivo for paradigm shifting biomedical applications", Purdue University.
105. Sept 2, Seminar in Department of Biochemistry, "Imaging biochemistry in living cells using molecular fingerprint", Purdue University.
106. Aug 10-15, ICORS, "microsecond-scale Raman spectral imaging for in vivo molecular analysis", Jena, Germany.
107. July 13-18, Gordon Conference on the Lasers in Biology and Medicine, "Vibrational spectroscopic imaging for biology and medicine", Holderness School, New Hampshire.
108. July 10-11, Label-free Spectroscopy Imaging Workshop, "Resolving the complex machinery of a cell by spectroscopic imaging", Purdue University.
109. July 1, Vibrational Imaging Workshop, "Deep tissue imaging by listening to molecular vibration", Marseille, France.
110. June 30, Vibrational Imaging Workshop, "Stimulated Raman scattering microscopy", Marseille, France.
111. June 26, Beihuan University, "Spectroscopic imaging: An emerging platform for biology, medicine and materials science", Beijing, China
112. June 25, Institute of Chemistry, "Spectroscopic imaging: An emerging platform for biology, medicine and materials science", Beijing, China
113. June 23, Tsinghua University, "Spectroscopic imaging: An emerging platform for biology, medicine and materials science", Beijing, China
114. June 12-13, RamanFest at Harvard, "Microsecond Raman spectral imaging", Boston, MA
115. May 28, UIUC Photonics Workshop, "Label-free visualization of the nervous system with chemical bond selectivity and cm imaging depth", Champaign, IL
116. May 15, Boston University Photonics Center, "Imaging single cell function with molecular vibrational spectroscopy", Boston, MA
117. May 7, Structural Biology Seminar, "Imaging single cell function with molecular vibrational spectroscopy", Purdue University.
118. April 10, Oregon Health & Science University, "Spectroscopic imaging for biology and medicine: pushing the limits of speed, depth, resolution", Portland, Oregon.
119. Feb 24-25, MIT, "In vivo spectroscopic imaging: analysis of molecules in their natural environment", Boston, MA.
120. Feb 1-4, 2014, SPIE Photonics West, "Spectroscopic Imaging Unveils the Essential Role of Cholesteryl Ester Accumulation in Cancer Proliferation", San Francisco, CA. Translational Research Award.
121. Jan 21, 2014, University of Chicago, "In vivo spectroscopic imaging", Chicago.
122. Jan 5-9, 2014, Planetary talk, "Spectroscopic Imaging: from physics to medicine", 44<sup>th</sup> Winter Symposium of Physics of Quantum Electronics, Snowbird, Utah. Not attend due to snow storm.

### **Invited talks in conferences and institutes (year 2013)**



123. Oct 4, 2013, Walther Cancer Foundation Symposium, "Altered cholesterol metabolism: new target for cancer diagnosis and treatment", Notre Dame, IN
124. Sept 25, 2013, Cornell University, Biophysics Program, "Spectroscopic imaging: analysing molecules in their natural states", Ithaca, NY
125. Sept 11, 2013, ACS fall meeting, "Spectroscopic imaging: analysing molecules in their natural states", Indianapolis, IN
126. Sept 5, 2013, "Altered cholesterol metabolism: new avenue to diagnosis and treatment of human prostate cancer", Cincinnati.
127. Aug 2013, SPIE Optics & Photonics Meeting, "Label-free spectroscopic imaging: seeing the hidden world of biology", San Diego, CA.
128. Aug 2013, Amgen, "Most recent advances in Raman imaging and applications to pharmaceuticals", Los Angeles, CA
129. Aug 2013, Coulter Meeting, "Functional Restoration of Traumatically Injured Spinal Cord by a Two-in-One Antioxidant", Ft Lauderdale, FL
130. Aug 2013, Huston Methodist Hospital, "Label-free spectroscopic imaging: seeing the hidden world of biology", Huston, Texas.
131. Aug 2013, Telluride Workshop, "Label-free spectroscopic imaging: seeing the hidden world of biology", Telluride, CO.
132. July 2013, Xiamen University, "Translational medicine using label-free imaging as platform", Xiamen, China.
133. July 2013, Fujian Normal University, "Translational medicine using label-free imaging as platform", Fuzhou, China.
134. May 29, 2013, Purdue—Jackson Symposium, "Label-free imaging: a new window into the unseen world", Bar Harbor, ME.
135. May 23, 2013, Purdue Imaging Workshop, "label-free spectroscopic imaging: a new window into the unseen world", Purdue University, IN
136. April 30, 2013, MGH Workshop, "Label-free spectroscopic imaging of white matter injury and repair", Boston, MA
137. April 2013, Janelia Farm, "Spectroscopic imaging: a new window into the unseen world", Virginia,
138. March 2013, NIH/NIBIB, "Spectroscopic imaging: a new window into the unseen world", Maryland.
139. March 19, 2013, Advanced Imaging Workshop in UIUC, "Spectroscopic imaging: a new window into the unseen world", Urbana-Champaign, IL
140. Feb 28 2013, Colloquium in Department of Physics, Purdue University, "Bond-selective imaging: A new window into the unseen world"
141. Feb 2013, Pancreatic Cancer Center, IU School of Medicine, Indianapolis, "Aberrant Cholesterol Metabolism in Pancreatic Cancer"
142. Feb 2013, SPIE Photonics West, "Multiplex simulated Raman scattering microscopy", San Francisco, CA.
143. Jan 2013, NIST, Gaithersburg, MD, "Seeing the unseen in cell machinery by spectroscopic imaging"
144. Jan 2013, University of Maryland, Department of Biomedical Engineering, College Park, MD, "Offering new solutions to medicine via spectroscopic imaging"
145. Jan 2013, PQE 2013, "Bond-selective imaging beyond the ballistic regime". Snowbird, Utah.

#### **Invited talks in conferences and institutes (year 2012)**

146. Dec 6, 2012, Elsevier Webinar, Sponsored by Andor Technology, "Seeing the unseen in cell machinery by label-free spectroscopic imaging".
147. Dec 5, 2012, Structure Biology Seminar, Purdue University, "Seeing the unseen in cell machinery by label-free spectroscopic imaging"
148. Oct 2012, PUCCR seminar, Purdue University, "Altered lipid metabolism in human prostate, pancreas and cervical cancer".
149. Sept 22-23, 2012, The International Neural Regeneration Symposium 2012, Shenyang, China, "Nanotechnology and imaging in CNS research".
150. Sept 21, 2012, Peking University, "Seeing the unseen in cell machinery by label-free spectroscopic imaging"
151. Sept 10, 2012, University of Maryland, Biophysics Program, College Park, MD, "Seeing the unseen in



- cell machinery by label-free spectroscopic imaging”
152. Aug 20, 2012, ACS meeting, Philadelphia, PA, “seeing the secret in life by label-free spectroscopic imaging”
  153. Aug 15, 2012, Coulter Foundation Meeting, Fort Lauderdale, FL, “Nanomedicine for repair of spinal cord injury”.
  154. July 26, 2012, The 2<sup>nd</sup> workshop on multimodal nonlinear optical microscopy, “Molecular vibration based spectroscopic imaging”
  155. July 9, 2012, Fudan University, Shanghai, China, “Seeing the Unseen by Spectroscopic Imaging”
  156. July 1, 2012, Shenzhen University, Shenzhen, China, “Seeing the Unseen by Spectroscopic Imaging”
  157. June 29, 2012, The Third Workshop on Imaging in Biology and Medicine, Chengdu, China, “Seeing the Unseen in Cell Machinery by Spectroscopic Imaging”
  158. June 8, 2012, Indiana SCBI meeting, Indianapolis, IN, “Nanomedicine for functional recovery of spinal cord injury”
  159. April 23, 2012, CRS Symposium, Exeter, UK, “Seeing the secret in cell machinery by spectroscopic imaging”
  160. April 11, 2012, Purdue Center for Cancer Research, “Seeing the secret in cell machinery by spectroscopic imaging”
  161. March 2012, University of Michigan Medical School, “Seeing the secret in life and disease by label-free spectroscopic imaging”,
  162. March 2012, Materials Today Virtual Conference, “Imaging nanomaterials in vitro and in vivo by exploring intrinsic optical signals”
  163. Feb 1, 2012, Indiana University School of Medicine, Indianapolis, IN “Spectroscopic imaging of lipid metabolism in prostate cancer: new opportunities for diagnosis and treatment”
  164. Jan 2012, SPIE Photonics West, “vibrational photoacoustic microscopy”, San Francisco, CA.
  165. Jan 2012, SPIE Photonics West, “Lock-in free SRS microscopy”, San Francisco, CA.

#### **Invited talks in conferences and institutes (year 2011)**

166. November 4, 2011, Department of Chemistry, University of Notre Dame, “Seeing the secret in life and disease by label-free spectroscopic imaging”
167. Oct 23-27, 2011, American Association of Pharmaceutical Scientists (AAPS) Annual Meeting, Washington DC, “High-speed coherent Raman imaging of pharmaceutical products”.
168. Aug 28-Sep 1, 2011, Fall ACS Meeting, Denver, “Label-free, Bond-selective Microscopy”.
169. August 1-5, 211, Workshop on Frontiers and Challenges in Laser-based Microscopy, Telluride, CO, “Label-free bond-selective imaging by listening to molecular vibration”.
170. July 17-22, 2011, **Gordon Conference** on Lipids, Waterville Valley Resort, Waterville Valley, NH, “Label-free, bond-selective microscopy to monitor lipids in cells and organisms”
171. June 20-21, 2011 **Keynote speaker** in CARS Explorer symposium, Marseille, France, “Offering new solutions to biomedicine via molecular imaging of cells and tissues”
172. June 8-10, 2011, ACS Central Region Meeting, Indianapolis, “Label-free bio-imaging through spectroscopic signals”.
173. May 18, 2011, Cancer Research Award presentation in Lafayette Loins Club, West Lafayette, “Developing new therapies based on imaging studies of nano-bio interactions”.
174. May 17, 2011, Zhejiang University School of Medicine, “Offering new solutions to Biomedicine via label-free imaging of cells and Organisms”.
175. May 13, 2011, invited talk in University of Science and Technology, School of Life Sciences, “Offering new solutions to Biomedicine via label-free imaging of cells and Organisms”.
176. May 9-13, 2011, Cold Spring Harbor Asia Conference, “Label-free imaging by listening to molecular vibration”.
177. May 2, 2011, Hot topics in CLEO conference, Baltimore, “Label-free molecular imaging by listening to molecular vibration”
178. April 3-6, 2011, Janelia Farm Research Campus, symposium on multiphoton imaging, “Advanced optical microscopy for label-free imaging”.
179. March 17, 2011, IUSM Center for Diabetes Research, “Chasing lipids in health and disease by label-free microscopy”
180. March 2, 2011, Coulter Foundation Meeting, Las Vegas, “Synergistic Therapy for Early Stage Nerve

Repair”

181. Jan 24, 2011, Photonics West Meeting, San Francisco, “Vibrational photoacoustic microscopy”

**Invited talks in conferences and workshops (2003-2010)**

182. November 2010, CARS workshop, Ottawa, Canada, “Chasing lipids in health and diseases by CARS”.

183. October 2010, UIUC Imaging Symposium, Urbana, IL, “Label-free imaging by transient absorption microscopy”.

184. August 2010, Coulter Foundation Meeting, Fort Lauderdale, FL, “A micelle approach to early nerve repair”.

185. August 2010, Coherent Raman Scattering Symposium, Boston, MA, “Pushing the limits of CRS microscopy with new laser sources”.

186. July 14, 2010, the 37<sup>th</sup> Controlled Release Society Annual Meeting, Portland, “Vibrational imaging of drug delivery systems”.

187. June 2010, CRS workshop, Harvard University, “Biological Applications of Coherent Raman Scattering Microscopy”

188. June 2010, China-US Nanomeeting, Shuzhou, China, “Nanomedicine: a fancy or fantasy?”

189. May 2010, CLEO meeting, San Jose, CA, “OPO-based multimodal NLO microscopy”.

190. May 14, 2010, Breast Cancer Discovery Retreat, Purdue University, “Raman imaging of lipids in cancer”.

191. May 11, 2010, **keynote speaker** in microCARS Workshop, Goteborg, Sweden, “Shedding new light on lipid biology by multimodal CARS microscopy”.

192. May 8, 2010, International symposium on the membrane biology of cancer, Purdue University, “CARS microscopy: seeing the invisible”.

193. Mar 2, 2010, Membrane Biophysics Workshop in Telluride, “Membrane translocation and membrane repair with amphiphilic molecules”.

194. Feb 4, 2010, Roche Nutley, “Assisting drug formulation by molecular vibration based imaging”.

195. Feb 3, 2010, IFPAC, Baltimore, Maryland, “High-speed vibrational imaging of tablets by stimulated Raman scattering microscopy”.

196. January 23, 2010, Photonic West, San Francisco, CA, “Current status and new advances of coherent Raman microscopy”.

197. November 2009, **keynote speaker** in the Opening Ceremony of CARSLab in the Steacie Institute for Molecular Sciences, Ottawa, Canada.

198. September 2009, Purdue-KIST Symposium, “A micelle approach for membrane repair after spinal cord injury.”

199. August 2009, ACS National Meeting, “Bond-selective chemical imaging by coherent Raman scattering”, Washington DC.

200. July 13, 2009, **Keynote speech** in NSF Center for Biophotonics, “Bridging nonlinear optical microscopy and nanophotonics with medicine,” UC Davis, CA.

201. June 25, 2009, Harvard University CARS Workshop, “Biological applications of coherent Raman scattering imaging,” Boston, MA.

202. June 10, 2009, UIUC Nano-Biophotonics Summer School, “Bond-selective imaging based on coherent Raman scattering,” Urbana, IL.

203. April 22, 2009, invited talk in Myelin Repair Foundation, Bay Area, CA.

204. March 2009, O’Brien Workshop on Applied Microscopy in Kidney Research, “CARS microscopy,” Indianapolis, IN.

205. January 2009, Photonics West, “Compound Raman microscopy,” San Jose, CA.

206. November 2008, The 21st Annual Meeting of The IEEE Lasers & Electro-Optics Society, “New advances in nonlinear optical microscopy,” Newport, CA.

207. October 2008, International Biomembrane Symposium, Purdue University, “Imaging membrane by CARS microscopy: from domains in supported bilayer to demyelination in multiple sclerosis,” West Lafayette, IN

208. August 2008, Microscopy & Microanalysis 2008 Meeting, “Driving CARS into biomedical field,” Albuquerque, NM.

209. August 2008, ACS Annual Meeting, “Intravital imaging of circulating nanoscale drug carriers,” Philadelphia, PA.

210. July 2008, Chinese Academy of Sciences Conference on Imaging in Biology and Medicine, "CARS microscopy: A central tool for tissue biology," Lijiang, China.
211. June 2008, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
212. May 2008, CLEO Conference, "Biomedical applications and new developments of CARS microscopy," San Jose, CA.
213. March 2008, OSA Topical Meeting, BIOMED, "Multimodality nonlinear optical imaging," St. Petersburg, FL.
214. January 2008, Photonics West, "New development and biomedical applications of CARS microscopy," San Jose, CA.
215. October 2007, FACSS Meeting, "CARS microscopy: seeing the invisible without labeling," Memphis, TN.
216. September 2007, First Purdue – KIST Symposium, "Bridging nonlinear optical microscopy and nanotechnology with medicine," West Lafayette, IN.
217. September 2007, The 3<sup>rd</sup> Annual Meeting of American Academy of Nanomedicine, "Two-photon luminescence imaging and optical hyperthermia of tumor cells and activated macrophages with bioconjugated gold nanorods," UCSD, San Diego, CA.
218. August 2007, National ACS Meeting, "Nonlinear optical imaging of obesity and related health risks," Boston, MA.
219. June 2007, ECI Conference on Advances in Optics for Biotechnology, Medicine, and Surgery, "Shedding light on diseases with coherent anti-Stokes Raman scattering," Naples, FL.
220. June 2007, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
221. May 2007, Lecture in summer workshop on nonlinear optics, Purdue University, West Lafayette, IN.
222. February 2007, 13<sup>th</sup> International Symposium on Recent Advances in Drug Delivery Systems, "Imaging drug delivery with advanced optical microscopy," Salt Lake City, UT.
223. February 2007, Pittcon 2007, "Driving CARS into the biological field," Chicago, IL.
224. January 2007, Biomedical Optics Symposium, Biophotonics West, "Driving CARS into biological field," San Jose, CA.
225. September 2006, Workshop on Biological Imaging and Engineered Biosystems, "Driving CARS into the biological field," Lehigh University, Bethlehem, PA.
226. September 2006, First Purdue-KIST Collaborative Symposium, "Biomedical photonics," Seoul, Korea.
227. June 2006, Lecture in summer workshop on CARS microscopy, Harvard University, Boston.
228. June 2006, The 6<sup>th</sup> International Meeting of the European Light Microscopy Initiative, "Ex vivo and in vivo imaging with multimodality multiphoton microscopy," Ofir, Portugal.
229. March 2006, National ACS Meeting, "In vivo molecular imaging with nonlinear optical microscopy," Atlanta, GA.
230. January 2006, Photonics West, "Biomedical applications and new developments of CARS microscopy," San Jose, CA.
231. October 2005, National APS Meeting, "Coherent anti-Stokes Raman scattering microscopy," Tucson, AZ.
232. August 2005, National ACS Meeting, "Nonlinear optical imaging of central nervous systems," Washington D.C.
233. Summer 2005, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
234. January 2005, Photonics West, "Biophysical and biomedical applications of CARS microscopy," San Jose, CA.
235. Summer 2004, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
236. October 2002, Annual Meeting of OSA, "CARS microscopy: theory, implementation, and applications," Orlando, FL.
237. 2002, 29<sup>th</sup> Annual Meeting of FACSS, "CARS microscopy and microspectroscopy," Providence, RI.
238. 2001, Advances in Optics for Biotechnology, Medicine and Surgery, "Coherent anti-Stokes Raman scattering (CARS) microscopy of living cells," Banff, Canada.
239. August 2002, 7<sup>th</sup> International Conference on Near-field Optics and Related Techniques, "Multiphoton vibrational imaging: CARS microscopy and microspectroscopy," Rochester, NY.
240. January 2002, SPIE's International Biomedical Optical Symposium, "A fresh look into cells with coherent anti-Stokes Raman scattering (CARS) microscopy," San Jose, CA.

241. January 2001, SPIE's International Biomedical Optical Symposium, "New advances in coherent anti-Stokes Raman scattering (CARS) microscopy," San Jose, CA.
242. January 2001, SPIE's International Biomedical Optical Symposium, "Epi-CARS microscopy: Vibrational imaging with high-sensitivity," San Jose, CA.

**Cheng's Invited Lectures in Institutes (2003~2010)**

243. March 2010, Phys Chem Division, Purdue University, "Vibrational Photoacoustic Microscopy".
244. January 2010, Stark Institute of Neuroscience, IU School of Medicine, "New approaches for imaging and repairing spinal cord injury".
245. February 2009, School of Pharmacy, Purdue University, "Chemically selective imaging of drug delivery systems," West Lafayette, IN.
246. February 2009, Department of Chemistry, Purdue University, "On the frontier of coherent Raman imaging: Instrumentation development and application to lipid biology," West Lafayette, IN.
247. December 2008, National Nanocenter, "Chemical microscopy and applications to biology and medicine," Beijing, China.
248. December 2008, University of Science and Technology of China, "Chemical microscopy and applications to biology and medicine," Hefei, China.
249. July 2008, Institute for Laser Medicine & Biophotonics, "Nonlinear optical microscopy and its application to bioimaging," Shanghai JiaoTong University, China.
250. July 2008, Hefei No.1 People's Hospital, "Optical imaging and nanotechnology in early diagnosis, basic understanding and new treatment of cancer," Hefei, China.
251. April 2008, Physical Chemistry Division, Purdue University, "Gold nanophotonics and its application to bio-imaging," West Lafayette, IN.
252. March 2008, Cancer Research Clinical Partnership Workshop, Purdue University, "Fighting cancer with imaging," West Lafayette, IN.
253. March 2008, IUPUI BME Departmental Seminar, "Nanomedicine: from pharmacokinetic behaviour to photothermal therapy," West Lafayette, IN.
254. September 2007, University of Pennsylvania, Physical Chemistry Seminar, "CARS microscopy: seeing the invisible without labelling," Philadelphia, PA.
255. December 2006, University of Science and Technology of China, "Bridging nonlinear optical microscopy and nanotechnology with medicine," Hefei, China.
256. December 2006, Qsingshua University, China, "Bridging nonlinear optical microscopy and nanotechnology with medicine," Hefei, China.
257. October 2006, Ohio University, Department of Chemistry, "Label-free molecular imaging with CARS microscopy," Athens, OH.
258. April 2006, Steacie Institute for Molecular Sciences, "In vivo molecular imaging with nonlinear optical microscopy," Ottawa, Canada.
259. February 2006, Physical Chemistry Division, University of Wisconsin Madison, "Nonlinear optical imaging of central and peripheral nervous system ex vivo and in vivo," Madison, WI.
260. December 2005, Physical Division, Chemistry Department, Purdue University, "Nonlinear optical imaging of central and peripheral nervous system ex vivo and in vivo," West Lafayette, IN.
261. October 2005, Department of Physics, Indiana University Purdue University at Indianapolis, "Nonlinear optical microscopy," Indianapolis, IN.
262. September 2005, Department of Electrical and Computer Engineering, University of Illinois Urbana-Champaign, "Visualizing molecules at work with nonlinear and linear optical microscopy," Urbana, IL.
263. April 2005, Department of Biomedical Engineering, Indiana University Purdue University at Indianapolis, "Seeing is believing, non-invasive chemical imaging of membranes, cells, tissues and mice," Indianapolis, IN.
264. 2004, Analytical Division, Chemistry Department, Purdue University, "Bioanalytical and biomedical imaging," West Lafayette, IN.
265. 2004, Biological Division, Chemistry Department, Purdue University, "Biophysical and biomedical imaging of living cells," West Lafayette, IN.
266. 2003, Physical Division, Chemistry Department, Purdue University, "Coherent anti-Stokes Raman scattering microscopy," West Lafayette, IN.

## Part V. Professional Service

### Editorial Board:

*Science Advances*, 2020 -  
*Applied Spectroscopy*, 2016 -  
*Scientific Reports*, 2015 -  
*Vibrational Spectroscopy*, 2005 –  
*Journal of Analytical and Bioanalytical Techniques*, 2010 -  
*Nanomaterials and Tissue Regeneration*, 2012 –  
*Journal of Innovative Optical Health Sciences*, 2013 –

### Panel Review:

NIH/IMAT study section, Oct 2017  
NIH/NIHGMS Center for Biomedical Research Excellence, July 2016  
NIH/NIBIB Quantum application, 2015  
NIH EBIT study section, 2015  
NIH Gene and Drug Delivery Study Section, Oct 2012  
NIH EBIT Study Section, Feb 2011  
NIH Gene and Drug Delivery Study Section, May 2010  
NIH SBIR Study Section, March 2010  
Purdue Cancer Center New Idea Proposal Review Panel, 2008  
Purdue Cancer Center New Idea Proposal Review Panel, 2007  
NIH Nanotechnology Study Section, February 2007  
NIH Nanotechnology Study Section, July 2006  
NIH Nanotechnology Study Section, November 2005

### Activities as Journal Referee:

ACS Biochemistry; ACS Chemical Biology; Applied Physics Letter; Biophysical Journal; Journal of American Chemical Society; Journal of Biomedical Optics; Journal of Controlled Release; Journal of Physical Chemistry; Nano Letters; Nature; Nature Cell Biology; Nature Methods; Nature Chemical Biology; Nature Communications; Nature Chemistry; New Journal of Physics; Optics Express; Optics Letters; Physical Review Letters; Science; Small

### Organizer of Symposia and Editor of Special Issues

Year	Role	Meeting	Place / journal	Title
2019 Jan	Organizer/ Session Chair	Photonics West	San Francisco, CA	Nonlinear and linear chemical Microscopy
2018 June	Organizer	International symposium	Beijing	1 <sup>st</sup> Beihang Symposium on Medical Photonics
2018 Jan	Organizer/ Session Chair	Photonics West	San Francisco, CA	Coherent Raman Scattering Microscopy
2018 Jan	Session Chair	PQE 2018	Snowbird, Utah	Frontiers of Medical Photonics
2017 Aug	Session Chair	4 <sup>th</sup> Summer Symposium	Telluride, CO	Frontiers and Challenges in Laser-Based Biological Microscopy
2017 June	Organizer	Raman Fest	Purdue University	Applied Raman spectroscopy
2017 Feb	Session Chair	Photonics West	San Francisco, CA	Coherent Raman scattering microscopy symposium
2016 July	Organizer	6 <sup>th</sup> Annual Workshop	Purdue University	Label-free Spectroscopic Imaging
2016 May	Co-editor		Current Opinion in Chemical Biology	Molecular Imaging
2016 June	Session chair	Photonics West	San Francisco, CA	Coherent Raman scattering microscopy symposium

2015 Aug	Session Chair	3 <sup>rd</sup> Summer Symposium	Telluride, CO	Frontiers and Challenges in Laser-Based Biological Microscopy
2015 July	Organizer	5th Annual Workshop	Purdue University	Label-free Spectroscopic Imaging
2015 Feb	Session chair	Photonics West	San Francisco, CA	Coherent Raman scattering microscopy symposium
2015 Jan	Session chair	PQE2015	Snowbird, Utah	Transforming spectroscopy from in vitro to in vivo for biology and medicine
2014 July	Organizer	4 <sup>th</sup> Annual Workshop	Purdue University	Label-free Spectroscopic Imaging
2014 Jan	Session chair	Photonics West	San Francisco, CA	Coherent Raman scattering microscopy symposium
2013 Aug	Organizer & Chair	2 <sup>nd</sup> Summer Symposium	Telluride, CO	Frontiers and Challenges in Laser-Based Biological Microscopy
2013 May	Organizer	3rd Annual Workshop	Purdue University	Spectroscopic Imaging: A new window into the unseen world
2013 Jan	Session chair	Photonics West	San Francisco, CA	CRS microscopy symposium
2012 Aug	Co-organizer	ACS Fall Meeting	Philadelphia, PA	Emerging quantitative applications of nonlinear optics
2012 July	Organizer	2 <sup>nd</sup> annual workshop	Purdue University	Multimodal nonlinear optical microscopy symposium & training workshop
2012 May	Co-editor	Special issue	Journal of Biophotonics	Frontiers in Multimodal Microscopy
2012 Jan	Session chair	Photonics West	San Francisco, CA	CRS microscopy symposium
2011 Aug	Organizer & Chair	1 <sup>st</sup> Summer Symposium	Telluride, CO	New Frontiers and Grand Challenges in Laser-Based Biological Microscopy
2011 July	Organizer	1 <sup>st</sup> Annual workshop	Purdue University	Multimodal nonlinear optical microscopy symposium/training workshop
2011 Jan	Session chair	Photonics West	San Francisco, CA	CRS microscopy symposium
2010 Jan	Session chair	Photonics West	San Francisco, CA	CARS Microscopy Symposium
2010	Co-editor	Special Issue	Journal of Biomedical optics	Coherent Raman Microscopy
2009	Co-editor	Special Issue	<i>Journal of Innovative Optical Health Sciences</i> (JIOHS)	Nonlinear Optical Microscopy
2009 Aug	Organizer	ACS meeting	Washington DC	Biological Applications of Nonlinear Optical Imaging and Spectroscopy
2009 Jan	Session chair	Photonics West	San Jose, CA	CARS microscopy symposium
2008	Co-chair	Biomedical Engineering Society Annual Fall Meeting	St. Louis, MO	Imaging for Quantitative Pathology
2008	Organization committee	OSA topical meeting	St Petersburg, FL	OSA Topical Meeting BIOMED 2008
2008 Jan	Session chair	Photonics West	San Jose, CA	CARS microscopy symposium
2007 Aug	Co-organizer	231 <sup>st</sup> ACS meeting	Boston, MA	Biological Applications of Nonlinear Optics
2005 Oct	Co-organizer	National American Physics Society	Tucson, AZ	Nonlinear Optical Microscopy Annual meeting of the Division of Laser Science



2005 Aug	Co-organizer: Garth Simpson	230 <sup>th</sup> ACS Meeting	Washington, DC	Analytical and Biological Applications of Nonlinear Optics
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