# **Ji-Xin Cheng**

Theodore Moustakas Chair Professor in Photonics and Optoelectronics

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#### (updated on 2023.8.13)

### 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

Sept 2021-present Director, Boston University Photonics Center Graduate Student Initiative

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

Sept 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 – July 2013 Associate Professor, Weldon School of Biomedical Engineering and Department of Chemistry, Purdue University.

Aug 2003 – July 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 Moleculaire Applications, Université Paris-sud, Orsay, France, Supervisor: Prof. George Graner.

### National & International Recognitions

2022: Boston University Innovator of the Year

2022: Guest Professor, University of Vienna, Vienna, Austria

2020: Microscopy Today Innovation Award

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, Coblentz 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 Coblentz 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

1998 National Outstanding Dissertation Award

1993 Guo Moruo Scholarship, USTC (highest honour for undergraduates in USTC)

### Professional Society Association: Optical Society of America (life-time member); American Chemical Society (member); SPIE (Life-time member); BMES (member); IEEE (member)

**At a Glance**

**Peer-reviewed publications:** >310 publications, h-index 93 (google scholar)

**Research fund received: >** $45,000,000

**Issued/licensed US patents: >30**

**Start-up companies:** Vibronix Inc 2015; Photothermal Spectroscopy Corp 2018; Pulsethera 2019

**Past trainees:** 33 PhDs, 4 Masters, 23 postdoc fellows, 32 visiting scholars

### Current group: 18 PhD students, 3 MS students, 8 postdoc fellows

### Conferences/workshop initiated: Telluride summer workshop “laser-based microscopy” from 2011, Annual Purdue summer school on label-free spectroscopic imaging 2011 to 2016, annual photonics west conference “advanced chemical microscopy”, from 2020, Gordon Research Conference “chemical imaging” 2023.

**Invited talks:** >300, including >30 plenary/keynote speeches

### Part II. Scholarship

**Personal Statement:**

**I have devoted my research career to precision medicine through manipulation of photons and waves. Over the past 20 years, my team made significant advances along two directions.**

**In the first direction, my team pioneered the development of bond-selective chemical microscopy** thatutilizes fingerprint spectroscopic signals to map molecular interactions inside a living system temporally and spatially (For a review, “Vibrational spectroscopic imaging of living systems: an emerging platform for biology and medicine”, *Science* 2015, 350:aaa8870). My team has been constantly pursuing novel research by breaking the fundamental limits of chemical microscopy, and making new scientific discoveries from observation of subtleties and via cross-disciplinary collaborations. My inventions, including CARS microscope, multiplex SRS microscope, and mid-infrared photothermal microscope, have become products being used by many researchers in different countries. Among the applications, my group discovered metabolic markers for aggressive prostate cancer (Cell Metabolism 2014) and human ovarian cancer stems cells (Cell Stem Cell 2017). My group was the first to report label-free imaging of membrane voltage using a vibrational spectroscopic signature (JPC Lett 2017). Towards clinical translation, we have developed an intravascular photoacoustic catheter (PRL 2011) for in vivo sensing of lipid-laden plaques at video rate (Sci Rep 2018) and a fiber optoacoustic guide with augmented reality for precision lumpectomy (Light Sci&Appl 2018). Our imaging findings also led to a photosensitizer-free treatment of pathogens. I co-founded Vibronix Inc in 2014 and served as Scientific Advisor of Photothermal Spec Corp since 2018, with the mission of disseminating vibrational imaging technologies for life science and medicine. To grow the chemical imaging community, I served as the lead editor of the first book on coherent Raman scattering microscopy, published by CRC Press in 2012, and the first book on stimulated Raman scattering microscopy, published by Elsevier in 2022. From 2011 to 2016, I organized an annual international summer school for hands-on training of advanced spectroscopic imaging. I also initiated multiple conferences, which includes the biennial Telluride Summer Symposium on frontiers of laser-based microscopy in 2011, the advanced chemical microscopy symposium at Photonics West in 2019, and the inaugural Gordon Research Conference on Chemical Imaging in 2023.

**In the second direction, my team invented a panel of tools that precisely control the cellular activity via electromagnetic and ultrasound waves. First**, my team developed a fiber optoacoustic emitter (Utility Track I 17/690,948), which converts laser pulses into a highly local ultrasound field at the fiber tip, for submillimeter-precision stimulation of neurons (Nature Communications 2020) and single cell stimulation through a taped fiber design (Light S&A 2021). My team further developed an optically generated focused ultrasound for non-invasive brain modulation at ultrahigh spatial precision (Light S&A 2022). Our technology is licensed to Axorus, a Paris-based company dedicated to retinal prosthesis. **Second**, my team developed a microwave split ring resonator for gap-based ultrasound generation with a programmable waveform (Advanced Photonics 2020). Our team further harnessed this device for inhibition of neural activity at a precision that is far beyond the diffraction limit of microwave (US Utility Track 1 17/737,710). **Third**, my group discovered that endogenous chromophores in bacteria and fungi are prone to photo-inactivation at specific wavelengths. Harnessing such photochemistry, my team developed a photo-inactivation therapy that sensitizes drug-resistant fungal and bacterial infections to very low concentration hydrogen peroxide. In 2019, I co-founded Pulsethera Inc to convert these discoveries into medical device for treatment of infections.

**Part II.A Publications**

**Books:**

**Stimulated Raman Scattering Microscopy: Techniques and Applications.** Elsevier, 2022.

Editors: Ji-Xin Cheng (editor-in-chief), Wei Min, Yasuyuki Ozeki, Dario Polli

**Coherent Raman Scattering Microscopy**. CRC Press, Taylor & Francis Group, 2012. Editors: Ji-Xin Cheng and Xiaoliang Sunney Xie, Series in Cellular and Clinical Imaging, Editor: Ammasi Periasamy

**Mathematical Competition of Modelling***,* Editors: Shanzi Li, Ji-Xin Cheng, 1996, Jiang Shu Education Press.

**Peer-reviewed Journal Publications. \*Corresponding author, h-index 93 (Google Scholar)**

**Year 2023**

322. Nan Zheng, Ying Jiang, Shan Jiang, Jongwoon Kim, Guo Chen, Yueming Li, Ji-Xin Cheng, Xiaoting Jia, and Chen Yang, “Multifunctional Fiber-Based Optoacoustic Emitter as a Bidirectional Brain Interface”. ****Advanced Healthcare Materials****, e2300430 (2023).

321. Yuying Tan, Haonan Lin, Ji-Xin Cheng. “Profiling single cancer cell metabolism via high-content SRS imaging with chemical sparsity”. ****Science Advances**, 2023**, 9: eadg6061.

320. Sebastian Jusuf, Yuewei Zhan, Meng Zhang, Natalie J. Alexander, Adam Viens, Michael K. Mansour\* and Ji-Xin Cheng\*, Blue Light Deactivation of Catalase Suppresses Candida Hyphae Development Through Lipogenesis Inhibition, Photochemistry and Photobiology, 2023, 99, 936-946, DOI: 10.1111/php.1371

319. Le Wang, Ji-Xin Cheng, Nanoscale Bond-selective Imaging by Computational Fusion of Atomic Force Microscopy and Coherent anti-Stokes Raman Scattering Microscopy, Analyst, 2023, DOI: 10.1039/d3an00662j

318. Meng Zhang, Pu-Ting Dong, Hassan E. Eldesouky, Yuewei Zhan, Haonan Lin, Zian Wang, Ehab A. Salama, Sebastian Jusuf, Cheng Zong, Zhicong Chen, Mohamed N. Seleem,\* and Ji-Xin Cheng\*, Fingerprint Stimulated Raman Scattering Imaging Unveils Ergosteryl Ester as a Metabolic Signature of Azole Resistant Candida albicans, Analytical Chemistry, 2023, doi.org/10.1021/acs.analchem.3c0090

317. Nathan Tague, Haonan Lin, Jean-Baptiste Lugagne, Owen M. O’Connor, Deeya Burman, Wilson W. Wong, Ji-Xin Cheng, and Mary J. Dunlop, Longitudinal Single-Cell Imaging of Engineered Strains with Stimulated Raman Scattering to Characterize Heterogeneity in Fatty Acid Production, Advanced Science, 2023, 2206519

316. Jian Zhao, Lulu Jiang, Alex Matlock, Yihong Xu, Jiabei Zhu, Hongbo Zhu, Lei Tian, Benjamin Wolozin, Ji-Xin Cheng, Mid-infrared Chemical Imaging of Intracellular Tau Fibrils using Fluorescence-guided Computational Photothermal Microscopy Light: Science and Applications, 2023, 12: 147

315. Jiaze Yin, Meng Zhang, Yuying Tan, Zhongyue Guo, Hongjian He, Lu Lan, Ji-Xin Cheng, Video-rate mid-infrared photothermal imaging by single pulse photothermal detection per pixel, Science Advances, 2023, 9: eadg8814

314. Mingwei Tang, Yubing Han, Danchen Jia, Qing Yang, Ji-Xin Cheng, Far-field super-resolution chemical microscopy, Light: Science and Applications, review article, 2023, 12: 137

313. Haonan Lin, Ji-Xin Cheng, Computational coherent Raman scattering imaging: breaking physical barriers by fusion of advanced instrumentation and data science, elight, review article, 2023, 3:6

312. Danchen Jia, Yi Zhang, Qianwan Yang,Yujia Xue,Yuying Tan,Lei Tian,Ji-Xin Cheng, 3D Chemical Imaging by Fluorescence-detected Mid-Infrared Photothermal Fourier Light Field Microscopy, Chemical and Biomedical Imaging, 2023, https://doi.org/10.1021/cbmi.3c00022

311. Sebastian Jusuf, Ji-Xin Cheng\*, Catalase photo-deactivation improves antimicrobial efficiency of silver sulfadiazine in vitro and in vivo, Photobiomodulation, Photomedicine, and Laser Surgery, 2023, 41: 80-87

310. Yeran Bai, Zhongyue Guo, Fátima C. Pereira, Michael Wagner, Ji-Xin Cheng, Mid-Infrared Photothermal - Fluorescence in Situ Hybridization for Functional Analysis and Genetic Identification of Single Cells, Analytical Chemistry, 2023, 95: 2398-2405.

309. Zhongyue Guo, Yeran Bai, Meng Zhang, Lu Lan, Ji-Xin Cheng, High-Throughput Antimicrobial Susceptibility Testing of Escherichia coli by Wide-Field Mid-Infrared Photothermal Imaging of Protein Synthesis, Analytical Chemistry, 2023, 95, 2238-2244.

308. Yuhao Yuan, Guangju Zhang, Yuqi Chen, Hongli Ni, Mingsheng Li, Michael Sturek, Ji-Xin Cheng\*, A high-sensitivity high-resolution intravascular photoacoustic catheter through mode cleaning in a graded-index fiber, Photoacoustics, 2023, 29:100451

**Year 2022**

307. Jian Zhao, Alex Matlock, Ziqi Song, Jiabei Zhu, Fukai Chen, Yuewei Zhan, Zhicong Chen, Yihong Xu, Biao Wang, Xingchen Lin, Hongbo Zhu, Lei Tian,\* Ji-Xin Cheng\*, Bond-selective Intensity Diffraction Tomography, Nature Communications, 2022, 13:7767.

306. Peng Lin, Chuan Li, Andres Flores-Valle, Zian Wang, Meng Zhang, Ran Cheng, Ji-Xin Cheng, Tilt-angle stimulated Raman projection tomography, Optics Express, 2022, 30: 37112-37123.

305. Guan-Jie Huang, Pei-Chen Lai, Ming-Wei Shen, Jia-Xuan Su, Jhan-Yu Guo, Kuo-Chuan Chao, Peng Lin,Ji-Xin Cheng, Li-An Chu, Ann-Shyn Chiang, Bo-Han Chen,Chih-Hsuan Lu,Shi-Wei Chu, Shang-Da Yang, “Stimulated Raman Scattering Spectro-Microscopy Across the Entire Raman Active Region Using Multiple-plate Continuum”, Optics Express, 2022, 30: 38975.

304. Qing Xia, Jiaze Yin, Zhongyue Guo, Ji-Xin Cheng\*, Mid-infrared photothermal microscopy: principle, instrumentation, applications, Journal of Physical Chemistry B, Feature Article, 126, 8597−8613

303. Yueming Li, Ying Jiang, Lu Lan, Xiaowei Ge, Ran Cheng, Yuewei Zhan, Guo Chen, Linli Shi, Runyu Wang, Nan Zheng, Chen Yang\*, Ji-Xin Cheng\*. Optically-Driven Focused Ultrasound for Noninvasive Submillimeter-Precision Brain Stimulation, Light Science and applications, 2022, 11:321

302. Jing Zhang, [Jonghyeon Shin](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Shin%2C+Jonghyeon), [Nathan Tague](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Tague%2C+Nathan), [Haonan Lin](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Lin%2C+Haonan), [Meng Zhang](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Zhang%2C+Meng), [Xiaowei Ge](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Ge%2C+Xiaowei), [Wilson Wong](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Wong%2C+Wilson), [Mary J. Dunlop](https://onlinelibrary.wiley.com/action/doSearch?ContribAuthorRaw=Dunlop%2C+Mary+J), Ji-Xin Cheng, Visualization of a Limonene Synthesis Metabolon Inside Living Bacteria by Hyperspectral SRS Microscopy, Advanced Science, 2022: 2203887, <https://doi.org/10.1002/advs.202203887>

301. Sebastian Jusuf, Yuewei Zhan, Meng Zhang, Natalie J. Alexander, Adam Viens, Michael K. Mansour, JiXin Cheng, Blue Light Deactivation of Catalase Suppresses *Candida* Hyphae Development Through Lipogenesis Inhibition, Photochemistry and Photobiology, 2022, DOI: 10.1111/php.13719.

300. Guo Chen, Linli Shi, Lu Lan, Runyu Wang, Yueming Li, Zhiyi Du, Mackenzie Hyman, Ji-Xin Cheng, Chen Yang, High-precision neural stimulation by a highly efficient candle soot fiber optoacoustic emitter, 2022, Frontiers in Neurology; doi.org/10.1101/2022.07.30.502146

299. Yi Zhang, Erik Taylor, Nasi Huang,James Hamilton\*, Ji-Xin Cheng\*, Survival intravascular photoacoustic imaging of lipid-rich plaque in cholesterol fed rabbits, Translational Biophotonics, 2022, 4:e202200012

298. Guangyuan Zhao, Yuying Tan, Horacio Cardenas, David Vayngart, Hao Huang, Yinu Wang, Russell Keathley, Jian-Jun Wei, Christina R. Ferreira, Ji-Xin Cheng\*, Daniela Matei\*, Ovarian Cancer Cell Fate Regulation by the Dynamics between Saturated and Unsaturated Fatty Acids, Proc. Natl. Acad. Sci. USA, 2022, 119: e2203480119.

297. Yuying Tan, Junjie Li, Guangyuan Zhao, Kai-Chih Huang, Horacio Cardenas, Yinu Wang, Daniela Matei\*. Ji-Xin Cheng\*, Metabolic Reprogramming from Glycolysis to Fatty Acid Uptake and beta-Oxidation in Platinum-Resistant Cancer Cells, Nature Communications, 2022, 13:4554.

296. Linli Shi, Ying Jiang, Nan Zheng, Ji-Xin Cheng\*, Chen Yang\*, High-precision neural stimulation through optoacoustic emitters, Neurophotonics, Primer, 2022, 9: 032207.

295. Pu-Ting Dong, Sebastian Jusuf, Jie Hui, Yuewei Zhan, Yifan Zhu, George Y. Liu, and Ji-Xin Cheng\*, Photoinactivation of Catalase Sensitizes Wide-Ranging Bacteria to ROS-Producing Agents and Immune Cells, JCI Insights, 2022, 7: e153079

294. Xiaowei Ge, Fatima C. Pereira, Matthias Mitteregger, David Berry, Meng Zhang, Michael Wagner\*, and Ji-Xin Cheng\*, SRS-FISH: high-throughput platform linking function to identity at single cell level”, Proc. Natl. Acad. Sci. USA, 2022, 119, 26, e2203519119

293. Cheng Zong, Ran Cheng, Fukai Chen, Peng Lin, Meng Zhang, Zhicong Chen, Chen Yang, Ji-Xin Cheng, Wide-field surface enhanced CARS (WISE CARS) microscopy, ACS Photonics, 2022, 3, 1042-49.

292. Pu-Ting Dong, Yuewei Zhan, Sebastian Jusuf, Jie Hui, Zeina Dagher, Michael K. Mansour\*, Ji-Xin Cheng\*, Photoinactivation of catalase sensitizes *Candida albicans* and *Candida auris* to ROS-producing agents and immune cells, Advanced Science, 2022, 2104384

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291. Jiaze Yin, Lan Lu, Yi Zhang, Hongli Ni, Yuying Tan, Meng Zhang, Yeran Bai, Ji-Xin Cheng, Nanosecond-resolution photothermal dynamic imaging via MHZ digitization and match filtering, Nature Communications, 2021, 12: 7097.

290. Lee, K. S.; Landry, Z.; Pereira, F. C.; Wagner, M.; Berry, D.; Huang, W. E.; Taylor, G. T.; Kneipp, J.; Popp, J.; Zhang, M.; Cheng, J.-X.; Stocker, R., Raman microspectroscopy for microbiology. **Nature Reviews Methods Primers** 2021, 1 :80.

289. Ni, H.; Lin, P.; Zhu, Y.; Zhang, M.; Tan, Y.; Zhan, Y.; Wang, Z.; Cheng, J. X.\*, Multiwindow SRS Imaging Using a Rapid Widely Tunable Fiber Laser. **Analytical Chemistry**, 2021, 93, 47, 15703–15711

288. Haonan Zong, Celalettin Yurdakul, M. Selim Ünlü\*, Ji-Xin Cheng\*, Contrast-enhanced high-throughput mid-infrared photothermal imaging through pupil engineering, ACS Photonics,  2021, 8, 11, 3323–3336

287. Hyon Jeong Lee, Z. Chen, M. Collard, F. Chen, J. G. Chen, M. Wu, R. M. Alani, J.-X. Cheng\*, Multimodal Metabolic Imaging Reveals Pigment Reduction and Lipid Accumulation in Metastatic Melanoma, **BME Frontiers**, 2021 article ID 9860123.

286. Lulu Jiang, Weiwei Lin, Cheng Zhang, Peter E.A. Ash, Mamta Verma, Julian Kwan, Emily van Vliet, Zhuo Yang, Anna Lourdes Cruz, Samantha Boudeau, Brandon F. Maziuk, Shuwen Lei, Jaehyup Song, Victor E. Alvarez, Stacy Hovde, Jose F. Abisambra, Min-Hao Kuo, Nicholas Kanaan, Melissa E. Murray, John F. Crary, Jian Zhao, Ji-Xin Cheng, Leonard Petrucelli, Hu Li, Andrew Emili, Benjamin Wolozin, Interaction of tau with HNRNPA2B1 and N6-methyladenosine RNA mediates the progression of tauopathy, Molecular Cell, 2021, 81, 1-19.

285. Peng Lin, Wei-Ting Chen, Kerolos M.A. Yousef, Justin Marchioni, Alexander Zhu, Federico Capasso, Ji-Xin Cheng, Coherent Raman scattering imaging with a near-infrared achromatic metalens, APL Photonics. 2021, 6: 096107.

284. Linli Shi, Ying Jiang, Fernando R. Fernandez, Guo Chen, Lu Lan, Heng-ye Man, John A. White, Ji-Xin Cheng\*, Chen Yang\*. Non-genetic photoacoustic stimulation of single neurons by a tapered fiber optoacoustic emitter, Light Science and Applications, 2021, 10:143.

283 Yi Zhang, Haonan Zong, Cheng Zong, Yuying Tan, Meng Zhang, Yuewei Zhan, Ji-Xin Cheng\*, Fluorescence-detected mid-infrared photothermal microscopy, Journal of American Chemical Society, 2021, 143:11490-9.

282. Celalettin Yurdakul, Haonan Zong, Yeran Bai, Ji-Xin Cheng\*, and M Selim Ünlü\*, Bond-selective interferometric scattering microscopy, Journal of Physics D: Applied Physics, 2021, 54: 364002

281. Zhang, M., Seleem, M.N., Cheng, J.X\*, Rapid Antimicrobial Susceptibility Testing by Stimulated Raman Scattering Imaging of Deuterium Incorporation in a Single Bacterium, **JoVE, 2021**, e62398, doi:10.3791/62398(2021)

280. Yeran Bai, Jiaze Yin, Ji-Xin Cheng\*, “Bond-Selective Imaging by Optically Sensing the Mid-Infrared Photothermal Effect”, Science Advances, review, 2021, 7: eabg1559

279. Haonan Lin, Hyeon Jeong Lee, Nathan Tague, Jean-Baptiste Lugagne, Cheng Zong, Fengyuan Deng, Tian Lei, Wilson Wong, Mary Dunlop and Ji-Xin Cheng\*. “Fingerprint Spectroscopic SRS Imaging of Single Living Cells and Whole Brain by Ultrafast Tuning and Spatial-Spectral Learning”, Nature Communications, 2021, 12:3052.

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276. Sebastian Juruf, Pu-Ting Dong, Jie Hui, Erlinda R. Ulloa, George Y. Liu, Ji-Xin Cheng, “Granadaene PhotobleachingReduces *Streptococcus agalactiae* Virulence and Increases Its Susceptibility to Antimicrobials”, Photobiology and Photochemistry, 2021, DOI: 10.1111/php.13389

275. Jiayingzi Wu, Liyan You, Saadia T. Chaudhry, Jiazhi He, Ji-Xin Cheng, and Jianguo Mei, Ambient Oxygen-Doped Conjugated Polymer for pH-Activatable Aggregation-Enhanced Photoacoustic Imaging in the Second Near-Infrared Window, Analytical Chemistry, 2021, 6: 3189-95.

274. Minghua Zhuge, Kai-Chih Huang, Hyeon Jeong Lee, Ying Jiang, Yuying Tan, Haonan Lin, Pu-Ting Dong, Guangyuan Zhao, Daniela Matei, Qing Yang, Ji-Xin Cheng, “Ultra-Sensitive Vibrational Imaging of Retinoids by Visible Pre-resonance Stimulated Raman Scattering Microscopy”, Advanced Science, 2021, 8:2003136.

273. Cheng Zong, Yurun Xie, Yimin Huang, Chen Yang, Ji-Xin Cheng\*, “PECARS versus PESRS, comparison of line shapes and signal to noise ratio”, Journal of Chemical Physics. 2021 Special issue, 154, 034201.

272. Yinu Wang, Guangyuan Zhao, Salvatore Condello, Hao Huang, Horacio Cardenas, Edward Tanner, Jian-Jun Wei, Yanrong Ji, Junji Li, Ji-Xin Cheng, Daniela Matei, “Frizzled-7 Identifies Platinum Tolerant Ovarian Cancer Cells Susceptible to Ferroptosis”, Cancer Research, 2021, 81: 384-399. doi: 10.1158/0008-5472.CAN-20-1488

271. Zhaoyi Li, Peng Lin, Yao-Wei Huang, Joon-Suh Park, Wei-Ting Chen, Zhujun Shi, Cheng-Wei Qiu, Ji-Xin Cheng, Federico Capasso\*, “Meta-optics for a virtual reality and augmented reality system”, Science Advances, 2021, 7: eabv4458.

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267. Bi, Hai; Huo, Chanyuan; Tang, Haoning; Griesse-Nascimento, Sarah; Jian, Jiahuang; Kang, Hongjun; Li, Yang; Wu, Xiaohong; Huang, Kai-Chih; Cheng, Ji-Xin; Nienhaus, Lea; Bawendi, Moungi; Lin, Hao-Yu ; Saikin, Semion, “Room-Temperature Phosphorescence and Low-Energy Induced Direct Triplet Excitation of Alq3 Engineered Crystals”, JPC Letters, 2020, 11(21):9364-9370

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49. L. Li, **J. X. Cheng**, “Co-existing stripe and patch-shaped gel domains in giant unilamellar vesicles,” *Biochemistry*, 2006, 45:11819-11826.

48. J. Yang, H. Chen, **J.X. Cheng**, P.S. Low, “Evaluation of disulfide reduction during receptor-mediated endocytosis using fluorescence resonance energy transfer imaging,” *Proc. Natl. Acad. Sci. USA*, 2006, 103:13872-13877.

47. Y. Fu, H. Wang, R. Shi, **J.X. Cheng**, “Characterization of photodamage in coherent anti-Stokes Raman scattering microscopy,” *Opt. Express*, 2006, 14: 3942-3951.

46. H. Wang, T.B. Huff, **J.X. Cheng**, “Coherent anti-Stokes Raman scattering imaging with photonic crystal fiber delivered laser source,” *Opt. Lett.*, 2006, 31:1417-1419.

**Year 2005 (total 4)**

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43. H. Wang, Y. Fu, P. Zickmund, R. Shi, **J.X. Cheng**, “Coherent anti-Stokes Raman scattering imaging of live spinal tissues,” *Biophys. J*., 2005, 89:581-591.

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**Peer-reviewed Journal Articles during Postdoctoral and Graduate Study:**

**Year 2004**

41. **J.X. Cheng** and X.S. Xie**, “**Coherent anti-Stokes Raman scattering microscopy: Instrumentation, theory, and applications,” *J. Phys. Chem. B*, 2004, 108:827-840, **feature article**.

**Year 2003**

40. X. Nan, **J.X. Cheng**, and X.S. Xie, “Vibrational imaging of lipid droplets in live fibroblast cells using coherent anti-Stokes Raman scattering microscopy,” *J. Lipids Res*., 2003, 44:2202-2208.

39. E.R. Dufresne, E.I. Corwin, N.A. Greenblatt, J. Ashmore, D.Y. Wang, A.D. Dinsmore, **J.X. Cheng**, X.S. Xie, J.W. Hutchinson, and D.A. Weitz, “Flow and fracture in drying nanoparticle suspensions,” *Phys. Rev. Lett*., 2003, 91:224501.

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37. **J.X. Cheng**, S. Pautot, D.A. Weitz, and X.S. Xie, “Ordering of water molecules between phospholipid bilayers visualized by CARS microscopy,” *Proc. Natl. Acad. Sci. USA*, 2003, 100:9826-9830.

**Year 2002**

36. **J.X. Cheng,** E.O. Potma, and X.S. Xie**, “**Coherent anti-Stokes Raman scattering correlation spectroscopy: Probing dynamical processes with chemical selectivity,” *J. Phys. Chem. A,* 2002, 106:8561-8568.

35. **J.X. Cheng**,A. Volkmer, L.D. Book, and X.S. Xie, “Multiplex coherent anti-Stokes Raman scattering microspectroscopy and study of lipid vesicles,” *J. Phys. Chem.* *B*, 2002, 106:8493-8498.

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33. **J.X. Cheng**, A. Volkmer, and X.S. Xie, “Theoretical and experimental characterization of coherent anti-Stokes Raman scattering microscopy,” *J. Op. Soc. Am. B*, 2002, 19:1363-1375.

32. **J.X. Cheng** andX.S. Xie**, “**Green’s function formulation for third harmonic generation microscopy,” *J. Op. Soc. Am. B*, 2002, 19:1604-1610.

31. E.O. Potma,D.J. Jones, **J.X. Cheng,** X.S. Xie**,** and J. Ye, “High sensitivity CARS microscopy with two tightly synchronized picosecond lasers,” *Opt. Lett.*, 2002, 27:1168-1170.

30. **J.X. Cheng,** and X.S. Xie**, “**CARS microscopy: 3D vibrational imaging of proteins, DNA, and lipids in living cells,” in *Ultrafast Phenomena XIII*, R.J.D. Miller, M.M. Murnane, N.F. Scherer, A.M. Weiner, Eds. Springer Series in Chemical Physics, 2002.

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27. S.M. Hu, O.N. Ulenikov, E.S. Bekhtereva, G.A. Onopenko, S.G. He, H. Lin, **J.X. Cheng**, and Q.S. Zhu, “High-resolution Fourier-transform intracavity laser absorption spectroscopy of D2O in the region of the 4ν1+ν3 band,” *J. Mol. Spectrosc.,* 2002,212:89-95.

**Year 2001**

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**Year 1999**

16. R. Xu, **J.X. Cheng**, and Y. Yan, “A simple theory of optimal coherent control,” *J. Phys. Chem. A*, 1999, 103:10611-10618.

15. C. Yang, **J.X. Cheng,** and Q. Zhu, “Molecular localized excitation by optimal laser fields,” *Spectrochim. Acta*, A, 1999, 55:2399-2402.

14. Z. Shen, Y. Yan, **J.X. Cheng**, F. Shuang, Y. Zhao, and G. He, “Pump-dump control of molecular dynamics and the related transient absorption spectroscopies,” *J. Chem. Phys.,* 1999*,* 110:7192-7201.

13. S. Hu, H. Lin, S. He, **J.X. Cheng**, and Q. Zhu, “Fourier-transform intracavity laser absorption spectroscopy of HOD VOD=5 overtone,” *Physical Chemistry Chemical Physics*, 1999, 1:3727-3730.

**Year 1998**

12. **J.X. Cheng**, Z. Shen, and Y. Yan, “Optimal control of multi-surface molecular systems,” *J. Chem. Phys.*, 1998, 109:1654-1662.

11. **J.X. Cheng**, X. Wang, H. Lin, and Q. Zhu, "The high resolution spectrum of AsH3 (400) local mode state: Symmetry reduction and rotational re-quantization," *Spectrochim Acta*, *A*, 1998, 54:1946-1960.

10. **J.X. Cheng**, D. Wang, and G. Graner, “High resolution infrared spectrum of H3SiI in the ν1/ν4 region near 2200 cm−1,” *J. Mol. Spectrosc.,* 1998, 190:240-247.

9. **J.X. Cheng**, R. Xu, Q. Shi, H. Lin, and Q. Zhu, “Selective bond-breaking in a polyatomic molecule,” *Chinese J. Chem. Phys.*, 1998, 11(6):530-534.

8. **J.X. Cheng**, G. He, Z. Shen, F. Shuang, Y. Zhao, and Y. Yan, “Pump-dump-probe transient absorption spectroscopies in the detection of high-vibrational excited molecular dynamics,” *Chinese J. Chem. Phys.*, 1998, 11(6):519-524.

**Year 1997 and before**

7. **J.X. Cheng** and G. Graner, “High-resolution study of the infrared spectrum of H3SiI in the regions 330-680 and 1070-1360 cm−1: Accurate determination of the ground state constants,” *J. Mol. Spectrosc.*, 1997, 185:79-92.

6. **J.X. Cheng**, X. Wang, H. Lin, and Q. Zhu, “Symmetry reduction and rotational re-quantization of symmetric top molecules at local mode limit,” *Chinese Phys. Lett.*, 1997, 14(9):656-659.

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3. X. Wang, S. Hu, **J.X. Cheng**, S. Yang, and Q. Zhu, “High-resolution spectroscopy of molecular highly excited vibrational states by high-sensitive intracavity laser absorption spectrometer,” *Laser in China*, 1997, A24(12):1112-1118.

2. X. Zhou, K. Hong, Q. Zhu, S. Shen, and **J.X. Cheng**, “Analysis of free volume content in ultra-high molecular weight polyethylene and polypropylene blends,” *Chinese J. of Chem. Phys.,* 1996, 9(6):537-542.

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**Book Chapters**

1. Xiaojie Li, Jiabao Xu. Ji-Xin Cheng, “Raman-integrated optical photothermal infrared microscopy: technology and applications”, In Molecular and Laser Spectroscopy: Advances and Applications. Vol 3. Edited by V. P. Gupta. 2022. Elsevier.
2. Chen Li, Ji-Xin Cheng, “Absorption-based far-field label-free super-resolution microscopy”, in Label-Free Super-Resolution Microscopy, Springer, Ed. Vasily Astratov. 2021
3. Jie Hui, Ji-Xin Cheng, “Intravascular photoacoustic imaging of lipid laden plaques”, in Multimodality Imaging, Ed. Qifa Zhou and Zhongping Chen
4. 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
5. 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
6. 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.
7. 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.
8. 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.
9. 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*](http://www.americanlaboratory.com/)*,* feature article, April 2007, 39(8):12-14.
10. 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.
11. 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.
12. Q. Zhu, X. Wang, L. Hao, S. Yang, J.X. Cheng, Q. Shi, and F. Shuang, “Spectroscopy and Dynamics of Molecular Local Mode Vibrations,” in *Spectroscopy: Perspective and Frontiers*, A.P. Roy (ed.), Narosa Publishing House, New Delhi, 192-203, 1997.

### Part II.B. Research Grants

### Summary of grants, current and finished.

**National Institutes of Health (NIH)**

Active:

R01HL125385-05A1 (2020 to 2024, PI) intravascular photoacoustic imaging

R01CA224275 (2018 to 2023, multi-PI), ovarian cancer metabolism

R01AI141439 (2018 to 2027, PI), rapid antimicrobial susceptibility test

R01NS109794 (2018 to 2023, multi-PI, contact PI), ultrasound neurostimulation mechanism

R01EB032391 (April 2022 to Dec 2015), Cheng PI, computational SRS microscopy

R21EY034275 (8/1/2022 to 7/31/2025), Cheng PI, microwave neuromodulation

R33CA261726 (2021 to 8/31/2024, PI), cancer metabolism by IR

R35GM136223 (2020 to 2025, PI) **MIRA Award**, pushing physical limits of chemical imaging

R44GM142346 (2022 to 2024), SBIR phase 2, Photothermal Spec Corp

Finished:

R44EB027018 (2020 to March 2022), SBIR phase 2, Photothermal Spec Corp

R42CA244844 (2019 to 2021, PI), STTR phase 2, Photothermal Spec Corp

R43GM142346 (2021 to 2022), SBIR phase 1, Photothermal Spec Corp

R33CA223581 (2018 to 2021, PI), cancer metabolism by SRS

R01GM126049 (2018 to 2020, PI), IR chemical microscopy

R01GM118471 (2016 to 2020, PI) SRS flow cytometry

R01HL125385 (2015 to 2019, PI) intravascular photoacoustic imaging

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)

**National Science Foundation (NSF)**

Active: NA

Finished:

NSF 1807106-CHE (single PI), 2018 ~ 2021, Volumetric Chemical Imaging, NCE to 2022

NSF SBIR, 2019-2020, subcontract from Vibronix Inc. 4/15/2019 to 3/31/2020.

0416785-MCB (single PI)

0828832-Photonics (single PI)

I/UCRC for Biophotonic Sensors and Systems, New Site Planning Grant (2015-2016, PI)

**Department of Veterans Affairs (VA)**

VA grant, Merit Review Award (Jan 2023 to Dec 2026), “Understanding Metabolic Reprogramming in Platinum Resistant Ovarian Cancer”, PI: Daniela Matei, Cheng: co-PI

**Department of Defence (DOD)**

Active:

ARO (2022 to 2024), co-I, “Understanding the Mechanism of Microwave Neuron Inhibition”

Finished:

Prostate Cancer Program (2014-2017)

Spinal Cord Injury Program (2012-2015)

Breast Cancer Program (2010-2013)

**Department of Energy (DoE)**

Finished:

Co-PI, “High-throughput Chemical Imaging for Optimizing Biofuel Synthesis using Synthetic Biology”, 2018 ~ 2021, NCE to 2022

**Foundations**:

Active:

Chan-Zuckerburg Initiative, Dynamic Imaging Program (March 1, 2023 to Aug 31, 2025), PI

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, PI

Coulter Foundation Translational Research Award (2010-2014), PI

**Industrial**:

Active:

Hologic (2021 to 2023) chemical histology of breast cancer

Daylight Solutions (2019 ~ 2023) IR chemical imaging

Finished:

L’Oreal, Roche

**Full List of Grants Received**

|  |  |  |  |
| --- | --- | --- | --- |
| **Funding Agency & Grant #** | **Title of Grant & PI information** | **Amount to Cheng** | **Start and end date** |
| **Year 2023** |  | **$$$** |  |
| NIH R01 AI141439-05A1 | “Rapid AST through Metabolic Imaging at Single Cell Leve”, Cheng PI | $2,484,714 |  |
| Chan Zuckerberg Initiative | “Bond-selective Intensity Diffraction Tomography” Cheng PI | $1,360,955 | 3/1/2023 to 8/31/2025 |
| **Year 2022** |  | **$$$** |  |
| Daylight solutions | **“**Infrared Thermal Sensing of Single Bio-nanoparticles**”,** Cheng PI | $100,000 | 10/1/2022 to 9/30/2023 |
| NIH  R21 EY034275 | **“**Sub-millimeter precision wireless neuromodulation using a microwave split ring resonator”, Cheng, PI | $660,000 | 8/1/2022 to 7/31/2025 |
| NIH  R01EB032391 | **“**High-content High-speed Chemical Imaging of Metabolic Reprogramming by Integration of Advanced Instrumentation and Data Science”, Cheng, PI | $1,986,282 | 4/1/2022 to 12/31/2025 |
| **Year 2021** |  | **$1,580,000** |  |
| NIH R33CA261726 | “Mapping Cancer Metabolism by Mid-infrared Photothermal Microscopy”, Cheng PI | $1,200,000 | 09/20/2021~08/31/2024 |
| Daylight solutions | “Chemical IDT”, Cheng, PI | $216,000 | 10/01/2021~9/30/2022 |
| Hologic | “Breast cancer detection by SRS microscopy”, Cheng, PI | $300,000 | 11/01/2021~5/31/2023 |
| Photothermal spectroscopy corp | R43GM142346, SBIR phase 1, Cheng: subcontractor | $80,000 | March to Sept 2021 |
| **Year 2020** |  | **$5,500,000** |  |
| NIH/NIGMS R35 GM36223 | “Vibrational Spectroscopic Imaging to Unveil Hidden Signatures in Living Systems”, Cheng, PI | $2,845,971 | 07/01/2020 – 06/30/2025 |
| NIH R01 HL125385-05A1 | “Sensing Vulnerable Plaque in vivo by an All-optical Intravascular Ultrasound and Photoacoustic Catheter”, Cheng, PI | $2,416,922 | 09/01/2020 – 08/31/2024 |
| R44 EB027018 | “IRaman”, subcontract from Photothermal Spec Corp | $300,000 | 04/15/2020 – 03/31/2022 |
| **Year 2019** |  | **~$760,000** |  |
| 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 |
| R42CA224844  NIH STTR Phase 2 | Optical photothermal microscopy | $350,000 | 09/12/2019 to 08/31/2021 |
| **Year 2018** |  | **~$10,000,000** |  |
| 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”  PI: Ji-Xin Cheng | $1,398,179 | 8/1/2018 ~ 7/31/2021 |
| 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 |
| **Year 2017** | **Note: transition from Purdue University to Boston University** | **Total:**  **$100,000** |  |
| NIH R41  CA244844 | C**onfocal photothermal IR micro-spectroscopy (CPIR), PI: Ji-Xin Cheng** | $100,000 | 10/1/2017 to 3/31/2018 |
| **Year 2016** |  | **Total: $1,754,708** |  |
| 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 |
| **Year 2015** |  | **Total: $2,497,646** |  |
| 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 |
| **Year 2014** |  | **$3,469,626** |  |
| 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 |
| **Year 2013** |  | **Total: $1,425,000** |  |
| 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 |
| **Year 2012** |  | **Total: $1,306k** |  |
| 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 |
| **Year 2011** |  | **Total: $650k** |  |
| NIH R21  EB015901 | Vibrational photoacousic 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 – 12/31/2075 |
| 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 |
| **Year 2010** |  | **Total $512k** |  |
| 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 |
| **Year 2009** |  | **Total $890k** |  |
| 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 |
| **Year 2008** |  | **Total: $428k** |  |
| 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 |
| **Year 2007** |  | **Total: $1,383,000** |  |
| 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 |
| **Year 2006** |  | **Total: 366k** |  |
| 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 |
| **Year 2005** |  | **Total:354k** |  |
| 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 |
| **Year 2004** |  | **Total: 571k** |  |
| 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**

1. **Start-up Companies**

**Vibronix Inc, 2014**

Co-founders: Ji-Xin Cheng, Pu Wang

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

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

Closed in 2019

**Photothermal Spectroscopy Corp, 2018**

Cheng is Scientific advisor of the company which commercialize O-PTIR microscope invented in the Cheng lab.

**Pulsethera Corp, 2019**

Co-founders: Ji-Xin Cheng, Steven Qian, Michael Mansour

2021 STTR phase 1, blue light treatment of acne

1. **Issued/licensed Patents (total 32)**

**Note: Patents in green font are based on work at BU since fall 2017 (total 11)**

**Inventions on coherent Raman microscopy and multiphoton multimodal microscopy**

1.

**Inventors**: X. Sunney Xie, Ji-Xin Cheng

**Title**: System and method for polarization coherent anti-Stokes Raman scattering microscopy

**Status**: US 6,798,507 B2, Issued 09/28/2004, Licensed to Olympus &, Leica

2.

**Inventors**: X. Sunney Xie, Andreas Volkmer, Ji-Xin Cheng

**Title**: System and method for Epi-detected coherent anti-Stokes Raman scattering microscopy

**Status**: US 6,809,814 B2, Issued 10/26/2004, Licensed to Olympus & Leica

3.

**Inventors**: Philip Low, Ji-Xin Cheng, Wei He

**Title**: Multiphoton in vivo flow cytometer method and device

**Status**: US 8,795,633 B2, Issued 08/05/2014, Licensed to Endocyte Inc

4.

**Inventors**: Ji-Xin Cheng, Hongtao Chen, Mikhail N. Slipchenko, Haifeng Wang

**Title**: Multimodal Platform for nonlinear optical microscopy and micro-spectroscopy

**Status**: US 8,994,932 B2, Issued 03/31/2015, Licensed to Vibronix Inc

5.

**Inventors**: Ji-Xin Cheng, Mikhail N. Slipchenko, Robert A [Oglesbee](https://patents.google.com/?inventor=Robert+A.+Oglesbee)

**Title**: Method and device for optical imaging with a resonant amplifier assembly

**Status**: US 9,222,878 B2, Issued 12/29/2015, Licensed to Vibronix Inc

6.

**Inventors**: Ji-Xin Cheng, Mikhail N. Slipchenko Robert A [Oglesbee](https://patents.google.com/?inventor=Robert+A.+Oglesbee)

**Title**: System and methods for multiplex spectroscopic imaging

**Status**: US 9,068,949 B2, Issued 06/30/2015, Licensed to Vibronix Inc

7.

**Inventors**: Ji-Xin Cheng, Mingji Dai

**Title**: Raman tag

**Status**: US 9,688,717 B2**,** Issued 6/27/2017

8.

**Inventors**: Ji-Xin Cheng, Pu, Wang, Chien-Sheng Liao

**Title**: A stimulated Raman spectroscopic microscope by resonant delay-line tuning

**Status**: [US16/470,119, PCT/US2017/066424](https://patents.google.com/patent/US10928324B2/en?inventor=ji-xin+cheng&oq=ji-xin+cheng), licensed to Vibronix Inc

9.

**Inventors**: Ji-Xin Cheng, Mohamed Seleem, Weili Hong

**Title**: Method for determination of antibiotic susceptibility through stimulated Raman metabolic imaging

**Status**: US11,231,371B2, issued 01/25/2022[, CN201880058493.0A, EP18854690.7A, JP2020513572A, PCT/US2018/05024](https://patents.google.com/patent/US20200278301A1/en?inventor=ji-xin+cheng&oq=ji-xin+cheng)1, licensed to Vibronix Inc

10

**Inventors**: Ji-Xin Cheng, Haonan Lin

**Title:** High-speed delay scanning and deep learning techniques for spectroscopic SRS imaging

**Status:** UC11,237,111B2, issued 2/1/2022, Licensed to Vibronix Inc

11.

**Inventors**: Ji-Xin Cheng, Junjie Li, Yuying Tan, Guangyuan Zhao, Daniela Matei

**Title:** Metabolic Index for Cancer Drug Resistance

**Status:** **Utility Track 1 17/839,080** (filed 6/13/22) (Pending), licensed to Vibronix Inc

12.

**Inventors**: Ji-Xin Cheng, Yifan Zhu, Xiaowei Ge, Hongli Ni, Jiaze Yin

**Title:** Stimulated Raman photothermal microscope

**Status:** **Provisional patent** (63/441,297, filed 1/26/2023), being licensed to Vibronix Inc and Photothermal Spectroscopy Corp

**Inventions on vibrational photoacoustic imaging**

1.

**Inventors**: Ji-Xin Cheng

**Title**: Vibrational photoacoustic tomography using Raman laser

**Status**: US9,357,928 B2, Issued 06/07/2016, Licensed to Vibronix Inc

2.

**Inventors**: Ji-Xin Cheng, Pu Wang, Lu Lan, Rui Li

**Title**: Method and device for in situ cancer margin detection

**Status**: [US11,083,437B2](https://patents.google.com/patent/US11083437B2/en?inventor=ji-xin+cheng&oq=ji-xin+cheng&page=1), [CN108603784A,](https://patents.google.com/patent/US11083437B2/en?inventor=ji-xin+cheng&oq=ji-xin+cheng&page=1) licensed to Vibronix Inc

3

**Inventors**: Ji-Xin Cheng, Yingchun Cao

**Title:** Intravascular photoacoustic tomography apparatus and method thereof

Status: [US20210212571A1](https://patents.google.com/patent/US20210212571A1/en?inventor=ji-xin+cheng&oq=ji-xin+cheng&page=2), licensed to Vibronix Inc

4

Inventors: Ji-Xin Cheng, Pu Wang, Yingchun Cao, Jie Hui

Title: Photoacoustic catheter and imaging system using same

Status: [US15/998,889, CN201780020588.9A, PCT/US2017/017598](https://patents.google.com/patent/US20190216330A1/en?oq=US20190216330A1), licensed to Vibronix Inc

5.

**Inventors**: Ji-Xin Cheng, Pu Wang, Lu Lan

**Title**:An intraoperative optoacoustic guide apparatus and method

**Status**: [US15/774070, CN201680064924.5A, PCT/US2016/060798](https://patents.google.com/patent/US20180310831A1/en?inventor=ji-xin+cheng&oq=ji-xin+cheng), Licensed to Vibronix INC

**Inventions on phototherapy of drug-resistant infections**

1.

**Inventors**: Ji-Xin Cheng, Pu-Ting Dong, Mohamed Seleem

**Title**: Method and device for annihilation of methicillin-resistant Staphylococcus Aureus

**Status**: US 11,013,933 B2, issued 5/25/2021

2.

**Inventors**: Pu-Ting Dong, Jie Hui, Ji-Xin Cheng, Yifan Zhu

**Title**:Bactericidal methods and compositions

**Status**: US 11,110,296 B2, issued 9/7/2021, Pulsethera Inc

**Inventions on mid-infrared photothermal imaging**

1.

**Inventors**: Ji-Xin Cheng, Delong Zhang

**Title**: Depth-resolved mid-infrared photothermal imaging of living cells and organisms with sub-micron spatial resolution

**Status**: US11,280,727B2, issued 5/22/2022, Licensed to Photothermal Spectroscopy Corp

2.

**Inventors**: Ji-Xin Cheng, Delong Zhang, Yeran Bai, Ali Shakouri, D. Kerry Maize

**Title:** Wide-field mid-infrared photothermal microscopy: methods and device

**Status:** PCT filed, Licensed to Photothermal Spectroscopy Corp

3.

**Inventors**: Ji-Xin Cheng, Lu Lan, Delong Zhang

**Title**: Systems and methods for bond-selective transient phase imaging

**Status**: US10, 845, 248 B1, to be licensed to Daylight Solutions

4.

**Inventors**: Ji-Xin Cheng, Yi Zhang, Cheng Zong

**Title:** Fluorescence-coded mid-infrared photothermal microscope

**Status:** Non-provisional US patent filed 9/4/2021, 63/074,668, licensed to Photothermal Spectroscopy Corp

5.

**Inventors**: Ji-Xin Cheng, Haonan Zong, Celalettin Yurdakul, Selim Unlu

**Title:** Dark-field mid-infrared photothermal microscope

**Status:** Provisional 63/165,890 filed, to be licensed to Photothermal Spectroscopy Corp

6.

**Inventors**: Ji-Xin Cheng, Lan Lu, Jiaze Yin

Title: Lock-in free photothermal dynamic imaging

Status: US Utility Track 1 17/881,996 (Pending), licensed to Vibronix Inc and Photothermal Spectroscopy Corp

7.

**Inventors**: Ji-Xin Cheng, Lan Lu, Jiaze Yin

Title: Video rate sync-scan mid-infrared photothermal imaging

Status: US provisional patent filed Aug 2022, licensed to Vibronix Inc and Photothermal Spectroscopy Corp

**Inventions on cancer diagnosis**

**1.**

**Inventors**: Ji-Xin Cheng

**Title**: Methods for determining aggressiveness of a cancer and treatment thereof

**Status**: US 9,164,084 B2, Issued 10/20/2015, Licensed to Resarci Therapeutics LLC

2.

**Inventors**: Ji-Xin Cheng, Seung-Young Lee

**Title**: Cholesteryl ester-depleting nanomedicine for non-toxic cancer chemotherapy

**Status**: US 2016/0199497 A1

3.

**Inventors**: Ji-Xin Cheng, Junjie Li, Yuying Tan, Guangyuan Zhao, Daniela Matei

**Title:** Metabolic Index for Cancer Drug Resistance

**Status:** Utility Track 1 17/839,080 (6/13/22) (Pending), licensed to Vibronix Inc

**Inventions on genetics-free neuromodulation technologies**

**1.**

**Inventors**: Ji-Xin Cheng, et al.

**Title:** Optoacoustic brain stimulation at submillimeter spatial precision

**Status: Utility Track I 17/690,948 (Pending)**

2.

**Inventors**: Ji-Xin Cheng, et al.

**Title:** microwave neuromodulation through a split ring resonator

**Status: Utility Track 1 17/737,710 (5/5/22)**

**Other Inventions**

**Inventors:** Zhaoyi Li, Federico Capasso, Peng Lin, Ji-Xin Cheng

**Title:** META-OPTICS FOR VIRTUAL REALITY AND AUGMENTED REALITY SYSTEMS

**Status:** US Utility 17/308,905 pending, licensed to Samsung

**Part III. Teaching and Mentoring**

**Part III.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 |  |  |
| **Fall 2017** | **Transition to BU** |  |  |  |  |
| Spring 2018 | EC500/BE500 | Optical Spectroscopic Imaging | 10 | 4.9/5.0 | 4.9/5.0 |
| Spring 2019 | EC500/BE500, BU | Optical Spectroscopic Imaging | 14 | 4.3/5.0 | 4.3/5.0 |
| Spring 2020 | EC556/BE556 | Optical Spectroscopic Imaging | 16 | 4.3/5.0 | 4.3/5.0 |
| Fall 2020 | EK100 | Undergraduate advising | 9 | 4.29/5.0 | 4.43/5.0 |
| Spring 2021 | EC556/BE556 | Optical Spectroscopic Imaging | 17 | 4.3/5.0 | 4.3/5.0 |
| Spring 2022 | EC556/BE556 | Optical Spectroscopic Imaging | 21 | 4.0/5.0 | 4.0/5.0 |
| Spring 2023 | EC56/BE556 | Optical Spectroscopic Imaging | 27 | 3.76/5.0 | 3.71/5.0 |

**Part III.B Mentoring**

**Ph. D. Supervised (35)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Name** | **Degree** | **Year** | **Major** | **Current position** | **Thesis title** |
| 1 | Li Li | PhD | May 2008 | Analytical Chemistry | NA | Imaging of lipid membrane organization and internalization pathways of cell-penetrating peptides |
| 2 | Hongtao Chen | PhD | May 2009 | Biomedical Engineering | Center manager, NW | Chemical imaging of nanocarriers in live cells and live animals |
| 3 | Yan Fu | PhD | Dec 2009 | Biomedical Engineering | NA | Study of Myelin Disease by Coherent anti-Stokes Raman Scattering Microscopy |
| 4 | Brandon Huff | PhD | Dec 2009 | Analytical Chemistry | MD | Ex vivo and in vivo coherent Raman imaging of the peripheral and central nervous system |
| 5 | Yunzhou Shi | PhD | Dec 2010 | Biomedical Engineering | Director, Samsung | Nanomedicine and chemical imaging approaches to traumatic spinal cord injury |
| 6 | Yookyung Jung | PhD | Dec 2010 | Physics | Center manager, Tufts | Nonlinear optical imaging of nanomaterials and transient absorption microscopy |
| 7 | Ling Tong | PhD | Dec 2010 | Analytical Chemistry | Research Scientist, Stanford | Imaging nanomaterials in vitro and in vivo by exploring their intrinsic nonlinear optical signals |
| 8 | Han-Wei Wang | PhD | Aug 2011 | Biomedical Engineering | Group leader, Li-COR Bioscience | Label-free Bond-selective Imaging of Atherosclerosis |
| 9 | Shuhua Yue | PhD | Dec 2013 | Biomedical Engineering | Professor, Beihang Univ | Altered Cholesterol Metabolism in Human Cancers Unravelled by Label-free Spectroscopic Imaging |
| 10 | Delong Zhang | PhD | Aug 2014 | Analytical Chemistry | Professor, JZU | Stimulated Raman Scattering Microscopy |
| 11 | Seung Young Lee | PhD | Aug 2014 | Biomedical Engineering | Professor, UIC | Nanomedicines for cancer chemotherapy |
| 12 | Pu Wang | PhD | Aug 2014 | Biomedical Engineering | CEO Vibronix; faculty, Beihang Univ | Intravascular photoacoustic imaging for cardiovascular disease management |
| 13 | Junjie Li | PhD | Aug 2015 | Biological Science | Scientist, Pfizer | Raman spectroscopic imaging reveals lipid metabolism as a marker and therapeutic target of cancers |
| 14 | Bin Liu | PhD | 2016 | Optical Engineering | Engineer, MKS | High-spectral-resolution stimulated Raman spectroscopic imaging and its applications |
| 15 | Rui Li | PhD | May 2017 | BME | CFO, Vibronix | High-speed intraoperative assessment of breast tumor margins using a multimodal vibrational photoacoustic tomography system |
| 16 | Chien-Sheng Liao | PhD | May 2017 | BME | Senior Scientist, Thermo | Microsecond-scale stimulated Raman spectroscopic imaging: technical innovations & biomedical applications |
| 17 | Hyeon Jeong Lee | PhD | Dec 2017 | Biology / PULSe | Professor, ZJU | Imaging cholesterol metabolism and trafficking by stimulated Raman scattering microscopy |
| 18 | Jie Hui | PhD | Dec 2017 | Physics | Postdoc, MGH | Intravascular photoacoustic imaging of lipid-laden plaque: from fundamental concept towards clinical translation |
| 19 | Ayeeshik Kole | MD PhD | Feb 2018 | BME | MD | Depth-resolved assessment of atherosclerosis by intravascular photo-acoustic-ultrasound imaging |
| 20 | Andy Jing Chen | PhD | Aug 2018 | Biology | Patent Lawyer | Label free chemical imaging reveals novel metabolic signatures in living model organisms |
| 21 | Brittani Bungart | MD PhD | Feb 2019 | BME | MD, MGH | DEVICE AND ANALYSIS ADVANCEMENTS TOWARDS PHOTOACOUSTIC TOMOGRAPHY-GUIDED PROSTATE BIOPSY |
| 22 | Yeran Bai | PhD | May 2019 | Optical Engineering | Postdoc, UCSB | Mid-infrared photothermal spectroscopic imaging |
| 23 | Lu Lan | PhD | Aug 2019 | BME | CTO, Vibronics | Photo- and thermos-acoustic imaging and sensing |
| 24 | Pu-Ting Dong | PhD | Dec 2019 | Chemistry | Postdoc, Harvard | SINGLE-CELL PUMP PROBE IMAGING OF INTRINSIC CHROMOPHORES IDENTIFIES DIAGNOSTIC MARKER AND THERAPEUTIC TARGET OF DISEASES |
| 25 | Kai-Chih Huang | PhD | Dec 2019 | BME | Pfizer Inc | Single-cell metabolic analysis by stimulated Raman scattering cytometry |
| 26 | Minghua Zhuge | PhD | May 2020 | Optical Engineering | Postdoc, Shenzhen | Ultrasensitive SRS imaging |
| 27 | Chen Li | PhD | May 2020 | Chemistry | Scientist, Cytochip Inc | Mid-infrared photothermal microscopy for improved chemical imaging |
| 28 | Jiayingzi Wu | PhD | May 2020 | Chemistry | Assistant Prof, Shenzhen U | Photoacoustic imaging in near II window using semi-conducting polymers |
| 29 | Caroline W Karanja | PhD | Dec 2020 | Chemistry | Postdoc, Cornell | Towards efficacious management of microbial infections |
| 30 | Ying Jiang | PhD | Jan 2021 | Neuroscience | Postdoc, MIT | HIGH PRECISION OPTOACOUSTIC NEURAL MODULATION |
| 31 | Haonan Lin | PhD | Sept 2021 | Biomedical Engineering | Postdoc, BU | STIMULATED RAMAN SPECTROSCOPIC IMAGING:DATA SCIENCE DRIVEN INNOVATIONS & APPLICATIONS |
| 32 | Yi Zhang | PhD | Jan 2022 | Physics | Scientist, Huawei | Pushing the Physical Limits of Chemical Imaging |
| 33 | Peng Lin | PhD | May 2022 | ECE | Scientist, Apple | Volumetric Stimulated Raman Scattering Imaging |
| 34 | Sebastian Jusuf | PhD | May 2023 | BME | Postdoc, MGH, Harvard Med School |  |
| 35 | Yuying Tan | PhD | May 2023 | BME | Joined startup **OncoXome** | [minervatan27@gmail.com](mailto:minervatan27@gmail.com) |

**M.S. supervised (9)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Name** | **Degree** | **Graduation** | **Major** | **Current position** | **Thesis title** |
| **1** | Zhu, Jiabin | MS | Dec 2008 | Biomedical Engineering | NA | A Dynamic, Cytoplasmic Triacylglycerol Pool in Enterocytes Revealed by ex vivo and in vivo Coherent Anti-Stokes Raman Scattering Imaging |
| **2** | Lin, Nan | MS | May 2010 | Biomedical engineering | NA | Synthesis and optical properties of Si-Au core-shell nanowires |
| 3 | Tyler, Jacqueline | MS | Aug 2013 | Biomedical Engineering | Genetech | Treating acute spinal cord injury with methylprednisolone modified and loaded glycol chitosan nanocarriers |
| 4 | Liu, Rui | MS | Dec 2018 | liu1312@bu.edu | Moderna | NA |
| 5 | Zhan, Yuewei | MS | Dec 2019 | BME | In China | Near infrared anti-microbial therapy |
| 6 | Chen, Fukai | MS | Sept 2021 | Biology | PhD BU | LIPA-DRIVEN CHOLESTEROL ESTER HYDROLYSIS PROMOTES CANCER AGGRESSIVENESS |
| 7 | Wang, Runyu | MS | Jan 2022 | ECE | In China | NA |
| 8 | Wang, Zian | MS | Jan 2022 | BME | PhD BU | Rapid Antifungal Susceptibility Testing by Spectroscopic Stimulated Raman Scattering imaging of D2O Metabolism |
| 9 | Yang, Yongjie | MS | Jan 2022 | ECE | NA | NA |
| 10 | Chen, Yuqi | MS | Jan 2023 | BME | Research associate, Broad Institute | NA |
| 11 | Xu, XinXin | MS | Jan 2023 | ME | NA | NA |
| 12 | Chen, Jiyang | MS | May 2023 | BME, phototherapy | NA | NA |

**Current Cheng Group**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Major** | **Project** | **Entering** | **Projected Grad Date** |
| **Manager** |  |  |  |  |
| Huang, Stephanie | MBA | Lab management | 10.1.2023 | 2024 |
| **Technician** |  |  |  |  |
| Cherepashensky, Mark | BME | Data mining | 9.1.2023 | 2024 |
| **MS candidates** |  |  |  |  |
| Wang, Sen | ECE | Data analysis | Sept 2022 | May 2024 |
| **PhD candidates** | **15 Total** |  |  |  |
| Bolarinho, Rylie | Chemistry | MIP | Sept 2022 | rylie@bu.edu |
| Ding, Guangrui | ECE | Deep learning SRS | Sept 2021 | TBD |
| Teng, Xinyan | Chemistry | Probe development | Sept 2021 | TBD |
| Li, Mingsheng | ECE | PA imaging | Sept 2021 | TBD |
| Marar, Carolyn | BME | Neuromodulation | Sept 2020 | TBD |
| Dessai, Chinmayee | BME | Cancer, SRS | Sept 2020 | TBD |
| Jia, Danchen | ECE | MIP, nano | Sept 2020 | TBD |
| Guo, Zhongyue | BME | MIP | Sept 2019 | TBD |
| Yin, Jiaze | ECE | MIP | Sept 2019 | TBD |
| Ge, Xiaowei | ECE | SRS | Sept 2019 | TBD |
| Ni, Hongli | ECE | SRS | Sept 2019 | TBD |
| Zhang, Jing | BME | SRS | Sept 2018 | 2023 Dec |
| Li, Yueming | ME | Neuromodulation | Sept 2018 | 2023 Sept |
| Zong, Haonan | ECE | MIP | Sept 2018 | 2023 Dec |
| Zhu, Yifan | Chemistry | SRS | Sept 2018 | 2024 May |
|  |  |  |  |  |
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**Current postdoctoral fellows and research scientists (7)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Period in Cheng lab** | **Project** | **from** |
| Dong, Dashan | Aug 2023 to | BS IDT | Peking University |
| Ao, Jianpeng | Aug 2023 to | MIP | Fudan University |
| Yu, Feiyuan | Feb 2023 to Jan 2024 | Neuromodulation | Boston University |
| Yuan, Yuhao | Sept 2022 to present | Bond-selective PA imaging | Binghamton University |
| Xia, Qing | Oct 2021 to present | MIP | Nanjing University |
| Lin, Haonan | Oct 2021 to present | SRS | Boston University |
|  |  |  |  |
| Zhang, Meng | March 2018 to present | Rapid AST | Xiamen University |

**Current Visiting Scholars: NA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** |  | **Period in Cheng lab** | **Email** | **from** |
|  |  |  |  |  |

**Supervision of Undergraduate Research Projects:**

**Current:** Zixian Yang (ZJU 2023); Shanyu Wu (ZJU 2023); Yujia Sun (ZJU 2023); Ezekiel Cruz (BME); Chien, Sienna <[siennac@bu.edu](mailto:siennac@bu.edu)>; Huneke, Griffin, Thomas <[ghuneke@bu.edu](mailto:ghuneke@bu.edu)>; Masica, Joseph, John <[jmasica@bu.edu](mailto:jmasica@bu.edu)>; Meier, Stefan, Jakob Shao <[stefanjm@bu.edu](mailto:stefanjm@bu.edu)

**Past:** Stefan A Scott (BME, 2022 spring); Saif Ragab (BME, 2022 summer); Tiffany Tran-Tang (BME, 2017 to 2019, UROP awardee), Ketan Gupta (BME, 2017 to 2019, UROP awardee), 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, *Margerum Research Award*), Kaleigh Evans (05 SURF), Amp Chandrruangphen (2004, *Margerum Research Award*)*,* Michael Chang (04 SURF), Kathryn A. Antle (REU 04), Merrit Debartolo (REU 04), Jonathan Sutcliffe (03 CHM499).

**Former Postdoctoral Fellows (33)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Name** | **In Cheng lab** | **Email** | **Current postion** |
| 1 | Wang, Haifeng | 2004-2007 | [phywh@nus.edu.sg](mailto:phywh@nus.edu.sg) | Faculty, National University of Singapore |
| 2 | Le, Thuc | 2006-2010, NIH F32 fellowship | [thuc@uchicago.edu](mailto:thuc@uchicago.edu) | Faculty, Roseman Univ of Health Sciences, Las Vegas |
| 3 | Liu, Yuxiang | 2011-2012 | [yliu11@wpi.edu](mailto:yliu11@wpi.edu) | Faculty, Worcester Polytechnic Institute |
| 4 | Justin R. RAJIAN | 2012-2013 | NA | NA |
| 5 | Wang, Ping | 2012-2015 | [ping79.wang@gmail.com](mailto:ping79.wang@gmail.com) | Faculty, Huazhong Univ of Sci & Tech |
| 6 | Song, Bing | 2012-2013 | [bsong1023@gmial.com](mailto:bsong1023@gmial.com) | Postdoc, Harvard MGH, back to Zhengzhou |
| 7 | Deng, Shibing | 2016 Feb – Nov | [Deng109@purdue.edu](mailto:Deng109@purdue.edu) | Postdoc, Purdue Chemistry |
| 8 | Slipchenko, Mikhail | 2008 - | [mslipch@gmail.com](mailto:mslipch@gmail.com) | Research Associate Professor, Purdue |
| 9 | Wang, Pu | Sep 2014 to Dec 2016 | [Puwang101@gmail.com](mailto:Puwang101@gmail.com) | CEO of Vibronix INC |
| 10 | Hong, Weili | May 2015 ~ May 2018 | [Hong215@purdue.edu](mailto:Hong215@purdue.edu)  [weilihong@buaa.edu.cn](mailto:weilihong@buaa.edu.cn) | Faculty, Beihang University |
| 11 | Liao, Chien-Sheng | July 2017 ~ Feb 2018 | [cksearching@gmail.com](mailto:cksearching@gmail.com) | Pendar Technologies, Thermo Fisher |
| 12 | Zhang, Jesse | June 2014 ~ July 2018 | [zhangchi@illinois.edu](mailto:zhangchi@illinois.edu) | Assistant Professor, Purdue University |
| 13 | Zhang, Delong | Sept 2014 ~ May 2019 | [dlzhang@zju.edu.cn](mailto:dlzhang@zju.edu.cn) | Faculty, Zhejiang University |
| 14 | Deng, Max | July 2018 ~ April 2019 | [maxd@liquidinstruments.com](mailto:maxd@liquidinstruments.com) | <https://www.liquidinstruments.com/> |
| 15 | Li, Junjie | Sept 2015~ July 2019 | [junjiel168@gmail.com](mailto:junjiel168@gmail.com) | Scientist at Pfizer |
| 16 | Lee, Hyeon Jeong | Jan 2018 to Aug 2019 | [hyjglee@gmail.com](mailto:hyjglee@gmail.com) | Faculty, Zhejiang University |
| 17 | Cao, Yingchun | March 2015 ~ Dec 2019 | [ychcao1984@gmail.com](mailto:ychcao1984@gmail.com) | Scientist, Dassault Systemes |
| 18 | Hui, Jie | Jan 2018 ~ Jan 2020 | [Jhui1@mgh.harvard.edu](mailto:Jhui1@mgh.harvard.edu) | Postdoc at MGH |
| 19 | Dong, Pu-Ting | Feb 2020 ~ July 2020 | [pdong@forsyth.org](mailto:pdong@forsyth.org) | Postdoc at Harvard Dental School |
| 20 | Chen, Zhicong | Sept 2020 ~ July 2021 | [zcchen\_n@163.com](mailto:zcchen_n@163.com) | MD, Guangzhou |
| 21 | Zong, Cheng | Jan 2017~ Sept 2021 | [czongcz@gmail.com](mailto:czongcz@gmail.com) | Scientist, Bay Spec |
| 22 | Bai, Yeran | Oct 2016 to Sept 2021 | [byr1213@163.com](mailto:byr1213@163.com) | Postdoc, UCSB |
| 23 | Jiang, Ying | April 2021 to Dec 2021 | Graduate from BU | Postdoc, MIT |
| 24 | Zhao, Jian | Oct 2019 ~ Aug 2022 | From CREOL | Postdoc, MIT |
| 25 | Zhang, Guangju | Nov 2020 to Oct 2022 | From Tsinghua University | Industry job at New York |
| 26 | Lan, Lu | Sept 2019 to Oct 2022 | Part-time research scientist | CTO, Vibronix inc |

**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 | [hqyang@fjnu.edu.cn](mailto:hqyang@fjnu.edu.cn) | Professor, Fujian Normal University |
| 3 | Wei WU | 2011-2012 | [wu99@iupui.edu](mailto:wu99@iupui.edu) | Postdoc, IUSM |
| 4 | Chunrui HU | 2011-2013 | [chunrhu@gmail.com](mailto:chunrhu@gmail.com) | Postdoc, USTC |
| 5 | Bin Liu (CSC) | 13 Sept-15 Sept | [liu1268@foxmail.com](https://exchange.purdue.edu/owa/redir.aspx?SURL=hXW3t2d4cDdsxCE7RNXyXBMDgi23j3APvfStww6YGlBqn0DOUcPSCG0AYQBpAGwAdABvADoAbABpAHUAMQAyADYAOABAAGYAbwB4AG0AYQBpAGwALgBjAG8AbQA.&URL=mailto%3aliu1268%40foxmail.com) | PhD student, Harbin Institute of Technology |
| 6 | Xiaochao QU | 14 Sept-15 Sept | [xiachaoqu@gmail.com](mailto:xiachaoqu@gmail.com) | Associate professor in Xidian University |
| 7 | Yuanqin XIA | 2015 Sept | [xiayuanqin@hit.edu.cn](mailto:xiayuanqin@hit.edu.cn) | Harbin Institute of Technology |
| 8 | Huaidong YANG | 2015 Aug | [yanghd@mail.tsinghua.edu.cn](mailto:yanghd@mail.tsinghua.edu.cn) | Tsinghua University |
| 9 | Fuyou LI | 2015 Feb to July | [fyli@fudan.edu.cn](mailto:fyli@fudan.edu.cn) | Fudan University |
| 10 | Mei Shi | 2015 – 2016 |  | Fudan University |
| 11 | Yin-Xin Zhang | 2015 – 2016 | yinxin@tju.edu.cn | Tianjin University |
| 12 | Wei Chen CSC | 2015 – 2016 | chw111@mail.ustc.edu.cn | USTC |
| 13 | Xueli Chen | March 2015 – March 2017 | xuelichenmig@gmail.com | 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 | [Zhuf3@mail.sustic.edu.cn](mailto:Zhuf3@mail.sustic.edu.cn) | S-USTC, joined BU Sept 2018 |
| 20 | Shuaibing Chang | 2017 Summer | [csb@mail.ustc.edu.cn](mailto:csb@mail.ustc.edu.cn) | USTC, joined BU sept 2018 |
| 21 | Liang, Lijia CSC | Nov 16~May 18 | [lijialiang3649@163.com](mailto:lijialiang3649@163.com) | Faculty |
| 22 | Ni, Hongli | 2018 Summer |  | Zhejiang University, joined BU Sept 2019 |
| 23 | Chen, Shufan | Sept 18~June 19 | [chenshufan@tju.edu.cn](mailto:chenshufan@tju.edu.cn) | Tianjin University, MS student |
| 24 | Li, Xiaojie (CSC) | Nov 2017 to Nov 2019 | [hitwhlxj@163.com](mailto:hitwhlxj@163.com) | Lecturer of BME, Wenzhou Medical University |
| 25 | Sun, Jieliyue | 2019 Summer |  | Brown University |
| 26 | Xu, Jiabao | June 2019 to Nov 2019 |  | Oxford University, postdoc |
| 27 | Zhuge, Minghua | Sept 2018 to Dec 2019 | [cocky\_string@163.com](mailto:cocky_string@163.com) | Zhejiang University, now postdoc at Shenzhen |
| 28 | Dong, Dashan | March 2019 to May 2019 |  | Peking University |
| 29 | Mavrakis, Kostas | Sept 2019 to Mar 2020 |  | University of Crete |
| 30 | Ji, Ziheng | Aug 2019 to Aug 2020 |  | Peking University |
| 31 | Guo, Qianjin | Dec 2019 to Nov 30 2020 | [guoqj@iccas.ac.cn](mailto:guoqj@iccas.ac.cn) | CAS Institute of Chemistry |
| 32 | Chen, Zhicong | 2019 to July 2021 | [Zcchen\_n@163.com](mailto:Zcchen_n@163.com) | Hospital at Guangzhou |
| 33 | Wang, Le | Sept 2020 to Aug 2023 | [lewangruc@gmail.com](mailto:lewangruc@gmail.com) | Liquid Instrument |

**Part IV. Outreach and Community Building**

**Part IV.A Organized Symposia and Edited Special Issues**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Role** | **Meeting** | **Place / Journal** | **Title** |
| 2023 Aug  7/31-8/4 | Chair | Gordon Research Conference | Easton, MA | Chemical Imaging |
| 2023 June 22/23 | Chair | Chemical Imaging workshop | Boston | Summer Workshop on Chemical Imaging |
| 2023 Jan | Conference Chair | Photonics West | San Francisco, CA | Advanced Chemical Microscopy |
| 2022 Jan | Session Chair | Computational Imaging | Online by IS&T | Computational chemical imaging |
| 2022 Jan | Conference Chair | Photonics West | San Francisco, CA | Advanced Chemical Microscopy |
| 2021 Jan | Conference Chair | Photonics West | San Francisco, CA | Advanced Chemical Microscopy |
| 2020 Jan | Conference Chair | Photonics West | San Francisco, CA | Advanced Chemical Microscopy |
| 2019 June | Symposium Chair | European CLEO | Munich | Label-free Techniques for Molecular Identification |
| 2019 Jan | Organizer/ Session Chair | Photonics West | San Francisco, CA | Nonlinear and Linear Chemical Microscopy |
| 2018 June | Organizer | International symposium | Beijing | 1st Beihang Symposium on Medical Photoncis |
| 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 | 4th 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 | 6th 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 | 3rd 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 | 4th 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 | 2nd 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 | 2nd 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 | 1st Summer Symposium | Telluride, CO | New Frontiers and Grand Challenges in Laser-Based Biological Microscopy |
| 2011 July | Organizer | 1st 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 | *Journal of Innovative Optical Health Sciences* (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 | 231st 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 | 230th ACS Meeting | Washington, DC | Analytical and Biological Applications of Nonlinear Optics |

**Part IV.B Invited Presentations (total >300)**

**Invited talks in conferences and institutes (year 2022)**

1. Dec 15 to 17, Biomedical Imaging and Sensing Conference (BISC), Taiwan.
2. Nov 30 to Dec 2, NIH IMAT PI meeting, University of Kansas, Lawrence, Kansas.
3. Nov 16 to 18, Seminar at Stanford University, Optica/SPIE chapter
4. Nov 14 to 16, Seminar at Purdue University Chemistry Department
5. Nov 7-8, Immunometabolism, Dana-Farber Cancer Institute, Boston, MA
6. Nov 1, 2022, Photonics Spectra Webinar, Bond-selective Chemical Imaging.
7. Oct 28, Optica Webinar, Therapeutic Laser Applications. “blue light phototherapy”
8. Oct 17 to 20, ACS webinar, Innovation in Measurement Science
9. Oct 2 to 7, SciX meeting, total 4 invited talks
10. Sept 26, seminar at TU Wien, mid-infrared photothermal microscopy.
11. Sept 16, seminar to Nangjing Sci&Tech University, “Bond-selective chemical imaging”.
12. Sept 5-7, Raman Nanotheranostic, Exeter, UK. “New advances in coherent Raman scattering microscopy”
13. Aug 14-19, keynote speech, International Raman conference, Long Beach, CA, “Bond-selective chemical imaging”
14. June 19-23, plenary talk, International conference of photothermal and photoacoustic phenomenon, Bled, Slovenia. “mid-infrared photothermal microscopy”
15. June 19-23, plenary talk, Spec2022, Dublin, Ireland, “Bond-selective chemical imaging”
16. May 24 – 26, Photonics North, in zoom.
17. April 4, keynote speech, PIERS, Zhejiang University, China. “Watching molecular in life by advanced chemical microscopy”
18. March 22-24, national ACS spring meeting, in zoom.
19. March 31, 2022, CREOL colloquium, in person
20. Feb 2022, Analytical Science summit
21. Jan 14, 2022, seminar, UCSD Bioengineering, in zoom

**Invited talks in conferences and institutes (year 2021)**

1. Dec 2021, IMAT PI meeting, NIH, “imaging cancer metabolism at single cell level by SRS microscopy”
2. Dec 2021, seminar at Tsinghua, “Department of Precision Instruments, Watching life at molecular level by bond-selective chemical imaging”
3. Dec 2021, BAARN, Harvard University, “Eliminating Drug-resistant Bacteria and Fungi by Photo-bleaching of Intrinsic Chromophore”
4. Dec 2021, OPTICS, Taiwan, “Bond-selective imaging by optically sensing the mid-infrared photothermal effect”
5. Nov 2021, NPL SRS workshop, UK, “SRS microscopy, the future is bright”
6. Nov 2021, Logic lab molecular sensing symposium, “Watching life at molecular level by advanced chemical microscopy”
7. Nov 2021, Wiley Conference, “Coherent Raman Scattering Microscopy: Technical Innovations and Biomedical Applications”
8. Aug 2021, ICAVS-11, Poland, Plenary talk, “Mid-infrared photothermal microscopy”
9. Aug 2021, ACS fall meeting, “Coherent Raman Scattering Microscopy: Technical Innovations and Biomedical Applications”
10. July 2021, OECC, Hongkong, Bond-Selective Imaging by Optically Sensing the Mid-Infrared Photothermal Effect
11. June 2021, webinar in Chinese, “中红外光热显微镜”
12. May 2021, Photothermal microscopy and spectroscopy webinar, organized by Orrit, “Mid-infrared photothermal microscopy”
13. April 2021, OSA Biomedical Optics, Optics and Brain, “Non-genetic high-precision neural stimulation using laser-produced ultrasound”
14. April 2021, LAMP seminar at UC Irvine, “Harnessing Photons for Label-free Chemical Imaging, High-Precision Neuromodulation, and Killing of Superbugs”.
15. Jan 2021, Keynote Speech in inaugural Photonic Spectra Conference, “Seeing Life at Molecular Level via Advanced Chemical Microscopy”,

**Invited talks in conferences and institutes (year 2020)**

1. Dec 2020, Vebleo Lecture (zoom), Harnessing Photons for Label-free Chemical Imaging and Precision Medicine
2. Aug 2020, ACS meeting (zoom), O-PTIR Microscopy
3. May 23, 2020, Light Scattering Workshop, organized by Max Planck Institute for the Science of Light
4. May 6, 2020, webinar, O-PTIR microscopy
5. March 3, 2020, PITTCON, Pittsburgh Spectroscopy Award Speech, “understanding life at molecular level by advanced chemical microscopy”
6. Feb 14, 2020, Harvard, SEAS Colloqium
7. Feb 3, 2020, Photonics West, multiphoton symposium, “phototherapy”
8. Feb 3, 2020, Photonics West, Keynote speech in label-free imaging symposium, “Label-free vibrational imaging for life science and medicine”
9. Feb 1, 2020, Photonics West, Advanced Chemical Microscopy, Chair Introduction
10. Jan 14, 2020, BU Neurophotonics Center annual symposium

**Invited talks in conferences and institutes (year 2019)**

1. Dec 5, 2019, UT Austin BME seminar
2. Dec 2, 2019, Odense, Denmark, CRS workshop
3. Nov 24, 2019, Osaka university, Biomedical Raman Conference
4. Nov 21, 2019, BU Photonics Center Annual Symposium, “Harnessing and manipulating photons for precision medicine”
5. Nov 05, 2019, Lehigh University, Department of Chemistry Seminar
6. Oct 14, 2019, SciX meeting, “SRS Imaging Cytometry”
7. Oct 14, 2019, SciX, Plenary Talk for Lippincott Award, “**From Bond-selective Chemistry to Imaging: my 30 years’ learning and innovating vibrational spectroscopy**”
8. Oct 3, 2019, University of Vienna, Seminar in microbiology department
9. Sept 28, 2019, USTC Boston Peak Summit
10. Sept 9, 2019, Photothermal IR Webinar
11. Sept 4, 2019, BU Department of Dermatology seminar
12. Aug 25, 2019, San Diego, ACS meeting, Chemical imaging of Living systems at time and space limits
13. Aug 2, 2019, Zhejiang University Seminar, Chemical imaging of Living systems at time and space limits
14. July 11, 2019, BU Medical Campus, Department of Surgery
15. June 27, 2019, Munich, CLEO, bond-selective transient phase imaging
16. June 26, Paris, ENS seminar
17. June 25, 2019, Ramanfest, Oxford University
18. May 30, 2019, Infraredx, intravascular photoacoustic imaging
19. May 17, 2019, MERCK seminar, Chemical microscopy
20. May 7, 2019, CLEO invited, Deep learning SRS microscopy
21. April 15, 2019, OSA Biophotonics, Deep Learning SRS imaging
22. April 2, 2019, MIT, Modern Optical Spectroscopy Seminar
23. March 19, 2019, PITTCON, “enabling precision medical via innovations in chemical microscopy”
24. March 18, 2019, PITTCON, “Mid-infrared photothermal microscopy”
25. March 14, 2019, Harvard Joslin Diabetic Center, “Imaging single cell metabolism”
26. Feb 22, 2019, UMD Bioengineering seminar, “Chemical microscopy”
27. Feb 15, 2019, Yale University Applied Physics Seminar, “Chemical microscopy”
28. Feb 3, 2019, Photonics West, “IR chemical microscopy”
29. Feb 2, 2019, Photonics West, “Bond-selective transient phase imaging”
30. Jan 15, 2019, UC Irvine, PCHEM seminar, “Chemical microscopy: seeing hidden signatures in living system”
31. Jan 9, 2019, BU Medical School GI Round, “Chemical microscopy: seeing hidden signatures in living system”

**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, Boston Photonics Conference, Boston, MA. “Seeing the unseen in living systems through molecular fingerprints”,
29. 02-23-2018, Seminar in Department of Biomedical Engineering, University of Virginia
30. 01-12-2018, Plenary Talk, PQE conference, “Label-free spectroscopic imaging, from physics to medicine”, Snowbird, Utah

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

1. 10-20-2017, Seminar in Mechanical Engineering, Boston University, Boston, MA
2. 10-16-2017, Seminar in Tufts University BME Department, Boston, MA
3. 10-12-2017, SciX Innovation Award Symposium, “Probing cancer with spontaneous and stimulated Raman scattering”, Reno, Nevada
4. 10-02-2017, IEEE Photonics, “Pushing the physical limits of label-free spectroscopic imaging for biology and medicine”, Orlando, FL
5. 09-22-2017, Medicine Conference, “**无标记分子诊疗的技术前沿与应用**”,Shijiazhuang, China
6. 09-16-2017, Applied Spectroscopy Symposium, “Revisiting the little animals under a chemical microscope”, Purdue University, West Lafayette, IN
7. 08-17-2017, Proteomics Center, Beijing, China
8. 08-16-2017, Peking University 1st Hospital, Beijing, China
9. 08-15-2017, 301 Hospital, Beijing, China
10. 08-03-2017, Frontiers and Challenges of Laser-based Microscopy Symposium, “Revisiting the little animals under a chemical microscope”, Telluride, CO
11. 06-05-2017, Janelia Farm Conference, “Seeing deeper via PA imaging at the second window”.
12. 06-02-2017, Ramanfest, “Latest advances in coherent Raman microscopy”, Purdue University, West Lafayette, IN
13. 05-18-2017, CLEO, “Nonlinear Spectroscopic Imaging”, San Jose, CA
14. 04-03-2017, Keynote Speech, ECONOS, Jena, Germany, “Nonlinear Spectroscopic Imaging: a new window into the unseen world”
15. 03-24-2017, Colloquium, Living System Chemistry: Analytical Innovation, Signature Discovery, & Clinical Translation, Chemistry at BU, Boston, MA
16. 03-06-2017, PITTCON, “Seeing the invisible using spectroscopic signal”, Chicago, IL
17. 01-30-2017, SPIE Spectroscopic Imaging, “Pushing the physical limits of spectroscopic imaging”, San Francisco, CA
18. 01-23-2017, Seminar, “Chemical Microscopy”, BU Medical Campus, Boston, MA

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

1. 12-07-2016, “Cancer Metabolism: from single cell biology to in vivo diagnosis”, Boston University Photonics Center Annual Symposium, Boston, MA.
2. 12-01-2016, “Cancer Metabolism: from single cell biology to in vivo diagnosis”, Podium talk in NCI IMAT PI meeting, Bethesda, MD
3. 09-21-2016, “Label-free diagnosis and detection using molecular fingerprint”, SciX meeting, RSC & ACS Joint symposium, Minneapolis.
4. 09-20-2016, “Living system spectroscopy for diagnosis and therapy monitoring”, SciX meeting, Multimodal Imaging symposium, Minneapolis.
5. 09-09-2016, “Lipid metabolism: from single cell biology to in vivo diagnosis”, BTCRC Summit, Indianapolis, IN.
6. 08-21-2016, “Sparsely-sampled stimulated Raman scattering microscopy towards video-rate hyperspectral imaging”, ACS National Meeting, Philadelphia, PA.
7. 07-13-2016, “Imaging metabolism inside living cells”, ISOTT, Chicago, IL.
8. 07-07-2016, “Molecular spectroscopic imaging: An emerging platform for biology and medicine”, Label-free Imaging Workshop, Purdue University.
9. 06-29-2016, “Molecular spectroscopic imaging towards precision medicine”, Cancer Moonshot, Purdue University.
10. 06-20-2016, **Plenary Talk** International Symposium of Molecular Spectroscopy, UIUC, Champaign, IL. “Molecular Spectroscopy of Living Systems”
11. 05-27-2016, “Label-free spectroscopic imaging towards precision medicine”, Beihang University, Beijing, China.
12. 05-06-2016, “Label-free spectroscopic imaging towards precision medicine”, Department of Bioengineering, UCSD, San Diego, CA.
13. 04-14-2016, “Label-free spectroscopic imaging: An emerging platform for biology and medicine”, IUSM Wells Center, Indianapolis, IN.
14. 04-04-2016, “Label-free spectroscopic imaging: An emerging platform for biology and medicine”, Center for Biophotonics, Vanderbilt University.
15. 03-14-2016, “In vivo vibrational spectroscopic imaging: emerging platform for biology and medicine”, ACS Meeting, San Diego, CA.
16. 03-10-2016, “Label-free spectroscopic imaging for molecular diagnosis”, PITTCON, Lednev Symposium, New Orleans.
17. 03-06-2016, “Vibrational spectroscopic imaging of living system”, PITTCON, In situ Analysis Symposium, New Orleans.
18. 02-14-2016, “Label-free vibrational imaging of membrane potential in live neurons”, Photonics West, Coherent Raman Scattering Microscopy Symposium, San Francisco, CA.
19. 02-14-2016, **Keynote Speech** “Coherent Raman scattering microscopy: An emerging platform for biology and medicine”, Photonics West, Multiphoton Microscopy Symposium, San Francisco, CA.
20. 02-13-2016, “In vivo vibrational imaging: An emerging platform for biology and medicine”, Photonics West, Vibrational Spectroscopy Symposium, San Francisco, CA.
21. 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)**

1. Dec 2015, “Transforming vibrational spectroscopy into an in vivo imaging platform for biology and medicine”, Pacific Chem, presented by Delong Zhang, Hawaii, USA
2. 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
3. Oct 2015, “Pushing the speed limit of label-free hyperspectral microscopy”, presented by Pu Wang, Frontiers in Optics/Laser Science, San Jose, CA
4. Oct 16, 2015, “Label-free spectroscopic imaging of atherosclerosis”, IUPUI Imaging Symposium, Indianapolis, IN.
5. Oct 1, 2015, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Neuroscience Program, IUSM, Indianapolis.
6. Sept 2015, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, sciX, Rode island.
7. Sept 2015, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Department of Nutrition, Purdue University.
8. Aug 215, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Dalian, China
9. 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.
10. Aug 2015, “Spectroscopic imaging of living systems: emerging platform for biology and medicine”, Eli Lilly, Indianapolis
11. 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
12. July 2015, Summer Workshop, “In vivo and in situ spectroscopic imaging: emerging platform for biology and medicine”, Purdue University.
13. May 26-28, 2015, Targeting Cancer Metabolism Conference, “Spectroscopic imaging of cancer metabolism at single cell level”, Boston, MA
14. May 2015, Zhejiang University, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Hanzhou, China
15. May 2015, Ramanfest meeting “Stimulated Raman imaging for biology and medicine”, Xiamen China.
16. May 2, 2015, Xiamen University Department of Chemistry, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Xiamen, China.
17. April 2015, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, University of Notre Dame.
18. April 2015, Single Cell Symposium, “Single-cell metabolic imaging using molecular fingerprint”. NIH, Bethesda, MD.
19. April 2, 2015, Purdue Center for Cancer Research, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Purdue University.
20. March 26, Medicinal Chemistry, “In vivo spectroscopic imaging: emerging platform for biology and medicine”, Purdue University.
21. March 11, 2015, PITTCON, “Stimulated Raman spectroscopic imaging”, New Orleans.
22. Feb 10, 2015, SPIE, “Spectroscopic imaging of membrane potential in living neurons”, San Francisco, CA.
23. Jan 4-8, 2015, **Plenary Talk, PQE**, “In vivo spectroscopic imaging for biology and medicine”, Snowbird, Utah.

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

1. Dec 9-10, NSF I/UCRC meeting at UC Davis, “Biophotonics at Purdue University”, Sacramento, CA
2. Nov 2014, STJU, “Frontiers of Label-free Spectroscopic Imaging and its applications to Biology, Medicine and Materials Science”, Shanghai, China.
3. Nov 2014, USTC, same title as above, Hefei, China.
4. Nov 2014, Tianjing University, same title as above, Tianjing, China.
5. Nov 2014, Tsinghua University, same title as above, Beijing, China.
6. Nov 12-13, NIH IMAT meeting, “Imaging cancer cell in metabolic space using molecular fingerprint”, NIH campus, Bethesda, MD
7. Oct 7, Indiana University School of Medicine, “in vivo spectroscopic imaging for paradigm shifting biomedical applications”, Indianapolis, IN
8. Oct 1, FACSS Meeting, “Vibrational imaging beyond the ballistic regime”, Reno, NV.
9. Sept 30, FACSS Meeting, “Imaging single cell metabolism using molecular fingerprint”, Reno, NV.
10. Sept 4, Drug Discovery Center Symposium, “In vivo spectroscopic imaging for biology and medicine”, Purdue University.
11. Sept 16, UIUC BME seminar, “Transforming spectroscopy from in vitro to in vivo for paradigm shifting biomedical applications”, Urbana-Champaign, IL
12. Sept 11, Colloquium in Chemistry Department, “Transforming spectroscopy from in vitro to in vivo for paradigm shifting biomedical applications”, Purdue University.
13. Sept 2, Seminar in Department of Biochemistry, “Imaging biochemistry in living cells using molecular fingerprint”, Purdue University.
14. Aug 10-15, ICORS, “microsecond-scale Raman spectral imaging for in vivo molecular analysis”, Jena, Germany.
15. July 13-18, Gordon Conference on the Lasers in Biology and Medicine, “Vibrational spectroscopic imaging for biology and medicine”, Holderness School, New Hampshire.
16. July 10-11, Label-free Spectroscopy Imaging Workshop, “Resolving the complex machinery of a cell by spectroscopic imaging”, Purdue University.
17. July 1, Vibrational Imaging Workshop, “Deep tissue imaging by listening to molecular vibration”, Marseille, France.
18. June 30, Vibrational Imaging Workshop, “Stimulated Raman scattering microscopy”, Marseille, France.
19. June 26, Beihan University, “Spectroscopic imaging: An emerging platform for biology, medicine and materials science”, Beijing, China
20. June 25, Institute of Chemistry, “Spectroscopic imaging: An emerging platform for biology, medicine and materials science”, Beijing, China
21. June 23, Tsinghua University, “Spectroscopic imaging: An emerging platform for biology, medicine and materials science”, Beijing, China
22. June 12-13, RamanFest at Harvard, “Microsecond Raman spectral imaging”, Boston, MA
23. May 28, UIUC Photonics Workshop, “Label-free visualizaiton of the nervous system with chemical bond selectivity and cm imaging depth”, Champaign, IL
24. May 15, Boston University Photonics Center, “Imaging single cell function with molecular vibrational spectroscopy”, Boston, MA
25. May 7, Structural Biology Seminar, “Imaging single cell function with molecular vibrational spectroscopy”, Purdue University.
26. April 10, Oregon Health & Science University, “Spectroscopic imaging for biology and medicine: pushing the limits of speed, depth, resolution”, Portland, Oregon.
27. Feb 24-25, MIT, “In vivo spectroscopic imaging: analysis of molecules in their natural environment”, Boston, MA.
28. 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.
29. Jan 21, 2014, University of Chicago, “In vivo spectroscopic imaging”, Chicago.
30. Jan 5-9, 2014, Planetary talk, “Spectroscopic Imaging: from physics to medicine”, 44th Winter Symposium of Physics of Quantum Electronics, Snowbird, Utah. Not attend due to snow storm.

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

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

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

1. Dec 6, 2012, Elsevier Webinar, Sponsored by Andor Technology, “Seeing the unseen in cell machinery by label-free spectroscopic imaging”.
2. Dec 5, 2012, Structure Biology Seminar, Purdue University, “Seeing the unseen in cell machinery by label-free spectroscopic imaging”
3. Oct 2012, PUCCR seminar, Purdue University, “Altered lipid metabolism in human prostate, pancreas and cervical cancer”.
4. Sept 22-23, 2012, The International Neural Regeneration Symposium 2012, Shenyang, China, “Nanotechnology and imaging in CNS research”.
5. Sept 21, 2012, Peking University, “Seeing the unseen in cell machinery by label-free spectroscopic imaging”
6. Sept 10, 2012, University of Maryland, Biophysics Program, College Park, MD, “Seeing the unseen in cell machinery by label-free spectroscopic imaging”
7. Aug 20, 2012, ACS meeting, Philadelphia, PA, “seeing the secret in life by label-free spectroscopic imaging”
8. Aug 15, 2012, Coulter Foundation Meeting, Fort Lauderdale, FL, “Nanomedicine for repair of spinal cord injury”.
9. July 26, 2012, The 2nd workshop on multimodal nonlinear optical microscopy, “Molecular vibration based spectroscopic imaging”
10. July 9, 2012, Fudan University, Shanghai, China, “Seeing the Unseen by Spectroscopic Imaging”
11. July 1, 2012, Shenzhen University, Shenzhen, China, “Seeing the Unseen by Spectroscopic Imaging”
12. June 29, 2012, The Third Workshop on Imaging in Biology and Medicine, Chengdu, China, “Seeing the Unseen in Cell Machinery by Spectroscopic Imaging”
13. June 8, 2012, Indiana SCBI meeting, Indianapolis, IN, “Nanomedicine for functional recovery of spinal cord injury”
14. April 23, 2012, CRS Symposium, Exeter, UK, “Seeing the secret in cell machinery by spectroscopic imaging”
15. April 11, 2012, Purdue Center for Cancer Research, “Seeing the secret in cell machinery by spectroscopic imaging”
16. March 2012, University of Michigan Medical School, “Seeing the secret in life and disease by label-free spectroscopic imaging”,
17. March 2012, Materials Today Virtual Conference, “Imaging nanomaterials in vitro and in vivo by exploring intrinsic optical signals”
18. Feb 1, 2012, Indiana University School of Medicine, Indianapolis, IN “Spectroscopic imaging of lipid metabolism in prostate cancer: new opportunities for diagnosis and treatment”
19. Jan 2012, SPIE Photonics West, “vibrational photoacoustic microscopy”, San Francisco, CA.
20. Jan 2012, SPIE Photonics West, “Lock-in free SRS microscopy”, San Francisco, CA.

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

1. November 4, 2011, Department of Chemistry, University of Notre Dame, “Seeing the secret in life and disease by label-free spectroscopic imaging”
2. Oct 23-27, 2011, American Association of Pharmaceutical Scientists (AAPS) Annual Meeting, Washington DC, “High-speed coherent Raman imaging of pharmaceutical products”.
3. Aug 28-Sep 1, 2011, Fall ACS Meeting, Denver, “Label-free, Bond-selective Microscopy”.
4. 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”.
5. 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”
6. June 20-21, 2011 **Keynote speaker** in CARS Explorer symposium, Marseille, France, “Offering new solutions to biomedicine via molecular imaging of cells and tissues”
7. June 8-10, 2011, ACS Central Region Meeting, Indianapolis, “Label-free bio-imaging through spectroscopic signals”.
8. May 18, 2011, Cancer Research Award presentation in Lafayette Loins Club, West Lafayette, “Developing new therapies based on imaging studies of nano-bio interactions”.
9. May 17, 2011, Zhejiang University School of Medicine, “Offering new solutions to Biomedicine via label-free imaging of cells and Organisms”.
10. 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”.
11. May 9-13, 2011, Cold Spring Harbor Asia Conference, “Label-free imaging by listening to molecular vibration”.
12. May 2, 2011, Hot topics in CLEO conference, Baltimore, “Label-free molecular imaging by listening to molecular vibration”
13. April 3-6, 2011, Janelia Farm Research Campus, symposium on multiphoton imaging, “Advanced optical microscopy for label-free imaging”.
14. March 17, 2011, IUSM Center for Diabetes Research**, “**Chasing lipids in health and disease by label-free microscopy”
15. March 2, 2011, Coulter Foundation Meeting, Las Vegas, “Synergistic Therapy for Early Stage Nerve Repair”
16. Jan 24, 2011, Photonics West Meeting, San Francisco, “Vibrational photoacoustic microscopy”

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

1. November 2010, CARS workshop, Ottawa, Canada, “Chasing lipids in health and diseases by CARS”.
2. October 2010, UIUC Imaging Symposium, Urbana, IL, “Label-free imaging by transient absorption microscopy”.
3. August 2010, Coulter Foundation Meeting, Fort Lauderdale, FL, “A micelle approach to early nerve repair”.
4. August 2010, Coherent Raman Scattering Symposium, Boston, MA, “Pushing the limits of CRS microscopy with new laser sources”.
5. July 14, 2010, the 37th Controlled Release Society Annual Meeting, Portland, “Vibrational imaging of drug delivery systems”.
6. June 2010, CRS workshop, Harvard University, “Biological Applications of Coherent Raman Scattering Microscopy”
7. June 2010, China-US Nanomeeting, Shuzhou, China, “Nanomedicine: a fancy or fantacy?”
8. May 2010, CLEO meeting, San Jose, CA, “OPO-based multimodal NLO microscopy”.
9. May 14, 2010, Breast Cancer Discovery Retreat, Purdue University, “Raman imaging of lipids in cancer”.
10. May 11, 2010, **keynote speaker** in microCARS Workshop, Goteborg, Sweden, “Shedding new light on lipid biology by multimodal CARS microscopy”.
11. May 8, 2010, International symposium on the membrane biology of cancer, Purdue University, “CARS microscopy: seeing the invisible”.
12. Mar 2, 2010, Membrane Biophysics Workshop in Telluride, “Membrane translocation and membrane repair with amphiphilic molecules”.
13. Feb 4, 2010, Roche Nutley, “Assisting drug formulation by molecular vibration based imaging”.
14. Feb 3, 2010, IFPAC, Baltimore, Maryland, “High-speed vibrational imaging of tablets by stimulated Raman scattering microscopy”.
15. January 23, 2010, Photonic West, San Francisco, CA, “Current status and new advances of coherent Raman microscopy”.
16. November 2009, **keynote speaker** in the Opening Ceremony of CARSLab in the Steacie Institute for Molecular Sciences, Ottawa, Canada.
17. September 2009, Purdue-KIST Symposium, “A micelle approach for membrane repair after spinal cord injury.”
18. August 2009, ACS National Meeting, “Bond-selective chemical imaging by coherent Raman scattering”, Washington DC.
19. July 13, 2009, **Keynote speech** in NSF Center for Biophotonics, “Bridging nonlinear optical microscopy and nanophotonics with medicine,” UC Davis, CA.
20. June 25, 2009, Harvard University CARS Workshop, “Biological applications of coherent Raman scattering imaging,” Boston, MA.
21. June 10, 2009, UIUC Nano-Biophotonics Summer School, “Bond-selective imaging based on coherent Raman scattering,” Urbana, IL.
22. April 22, 2009, invited talk in Myelin Repair Foundation, Bay Area, CA.
23. March 2009, O’Brien Workshop on Applied Microscopy in Kidney Research, “CARS microscopy,” Indianapolis, IN.
24. January 2009, Photonics West, “Compound Raman microscopy,” San Jose, CA.
25. November 2008, The 21st Annual Meeting of The IEEE Lasers & Electro-Optics Society, “New advances in nonlinear optical microscopy,” Newport, CA.
26. 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
27. August 2008, Microscopy & Microanalysis 2008 Meeting, “Driving CARS into biomedical field,” Albuquerque, NM.
28. August 2008, ACS Annual Meeting, “Intravital imaging of circulating nanoscale drug carriers,” Philadelphia, PA.
29. July 2008, Chinese Academy of Sciences Conference on Imaging in Biology and Medicine, “CARS microscopy: A central tool for tissue biology,” Lijiang, China.
30. June 2008, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
31. May 2008, CLEO Conference, “Biomedical applications and new developments of CARS microscopy,” San Jose, CA.
32. March 2008, OSA Topical Meeting, BIOMED, “Multimodality nonlinear optical imaging,” St. Petersburg, FL.
33. January 2008, Photonics West, “New development and biomedical applications of CARS microscopy,” San Jose, CA.
34. October 2007, FACSS Meeting, “CARS microscopy: seeing the invisible without labeling,” Memphis, TN.
35. September 2007, First Purdue – KIST Symposium, “Bridging nonlinear optical microscopy and nanotechnology with medicine,” West Lafayette, IN.
36. September 2007, The 3rd 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.
37. August 2007, National ACS Meeting, “Nonlinear optical imaging of obesity and related health risks,” Boston, MA.
38. 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.
39. June 2007, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
40. May 2007, Lecture in summer workshop on nonlinear optics, Purdue University, West Lafayette, IN.
41. February 2007, 13th International Symposium on Recent Advances in Drug Delivery Systems, “Imaging drug delivery with advanced optical microscopy,” Salt Lake City, UT.
42. February 2007, Pittcon 2007, “Driving CARS into the biological field,” Chicago, IL.
43. January 2007, Biomedical Optics Symposium, Biophotonics West, “Driving CARS into biological field,” San Jose, CA.
44. September 2006, Workshop on Biological Imaging and Engineered Biosystems, “Driving CARS into the biological field,” Lehigh University, Bethlehem, PA.
45. September 2006, First Purdue-KIST Collaborative Symposium, “Biomedical photonics,” Seoul, Korea.
46. June 2006, Lecture in summer workshop on CARS microscopy, Harvard University, Boston.
47. June 2006, The 6th International Meeting of the European Light Microscopy Initiative, “Ex vivo and in vivo imaging with multimodality multiphoton microscopy,” Ofir, Portugal.
48. March 2006, National ACS Meeting, “In vivo molecular imaging with nonlinear optical microscopy,” Atlanta, GA.
49. January 2006, Photonics West, “Biomedical applications and new developments of CARS microscopy,” San Jose, CA.
50. October 2005, National APS Meeting, “Coherent anti-Stokes Raman scattering microscopy,” Tucson, AZ.
51. August 2005, National ACS Meeting, “Nonlinear optical imaging of central nervous systems,” Washington D.C.
52. Summer 2005, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
53. January 2005, Photonics West, “Biophysical and biomedical applications of CARS microscopy,” San Jose, CA.
54. Summer 2004, Lecture in summer workshop on CARS microscopy, Harvard University, Boston, MA.
55. October 2002, Annual Meeting of OSA, “CARS microscopy: theory, implementation, and applications,” Orlando, FL.
56. 2002,29th Annual Meeting of FACSS, “CARS microscopy and microspectroscopy,” Providence, RI.
57. 2001, Advances in Optics for Biotechnology, Medicine and Surgery, “Coherent anti-Stokes Raman scattering (CARS) microscopy of living cells,” Banff, Canada.
58. August 2002, 7th International Conference on Near-field Optics and Related Techniques, “Multiphoton vibrational imaging: CARS microscopy and microspectroscopy,” Rochester, NY.
59. January 2002, SPIE’s International Biomedical Optical Symposium, “A fresh look into cells with coherent anti-Stokes Raman scattering (CARS) microscopy,” San Jose, CA.
60. January 2001, SPIE’s International Biomedical Optical Symposium, “New advances in coherent anti-Stokes Raman scattering (CARS) microscopy,” San Jose, CA.
61. 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)**

1. March 2010, Phys Chem Division, Purdue University, “Vibrational Photoacoustic Microscopy”.
2. January 2010, Stark Institute of Neuroscience, IU School of Medicine, “New approaches for imaging and repairing spinal cord injury”.
3. February 2009, School of Pharmacy, Purdue University, “Chemically selective imaging of drug delivery systems,” West Lafayette, IN.
4. February 2009, Department of Chemistry, Purdue University, “On the frontier of coherent Raman imagine: Instrumentation development and application to lipid biology,” West Lafayette, IN.
5. December 2008, National Nanocenter, “Chemical microscopy and applications to biology and medicine,” Beijing, China.
6. December 2008, University of Science and Technology of China, “Chemical microscopy and applications to biology and medicine,” Hefei, China.
7. July 2008, Institute for Laser Medicine & Biophotonics, “Nonlinear optical microscopy and its application to bioimaging,” Shanghai JiaoTong University, China.
8. July 2008, Hefei No.1 People’s Hospital, “Optical imaging and nanotechnology in early diagnosis, basic understanding and new treatment of cancer,” Hefei, China.
9. April 2008, Physical Chemistry Division, Purdue University, “Gold nanophotonics and its application to bio-imaging,” West Lafayette, IN.
10. March 2008, Cancer Research Clinical Partnership Workshop, Purdue University, “Fighting cancer with imaging,” West Lafayette, IN.
11. March 2008, IUPUI BME Departmental Seminar, “Nanomedicine: from pharmacokinetic behaviour to photothermal therapy,” West Lafayette, IN.
12. September 2007, University of Pennsylvania, Physical Chemistry Seminar, “CARS microscopy: seeing the invisible without labelling,” Philadelphia, PA.
13. December 2006, University of Science and Technology of China, “Bridging nonlinear optical microscopy and nanotechnology with medicine,” Heifei, China.
14. December 2006, Qsinghua University, China, “Bridging nonlinear optical microscopy and nanotechnology with medicine,” Hefei, China.
15. October 2006, Ohio University, Department of Chemistry, “Label-free molecular imaging with CARS microscopy,” Athens, OH.
16. April 2006, Steacie Institute for Molecular Sciences, “In vivo molecular imaging with nonlinear optical microscopy,” Ottawa, Canada.
17. 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.
18. 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.
19. October 2005, Department of Physics, Indiana University Purdue University at Indianapolis, “Nonlinear optical microscopy,” Indianapolis, IN.
20. 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.
21. 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.
22. 2004, Analytical Division, Chemistry Department, Purdue University, “Bioanalytical and biomedical imaging,” West Lafayette, IN.
23. 2004, Biological Division, Chemistry Department, Purdue University, “Biophysical and biomedical imaging of living cells,” West Lafayette, IN.
24. 2003, Physical Division, Chemistry Department, Purdue University, “Coherent anti-Stokes Raman scattering microscopy,” West Lafayette, IN.

**Part V. Professional Service**

### Editorship:

### *Associate Editor, Science Advances, 2020 -*

### Editorial Board:

### *ACS Chemical and Biomedical Imaging; 2022 -*

### *Neurophotonics, 2021 -*

### *BME frontiers, 2021 -*

### *Applied Spectroscopy, 2016 -*

### *Scientific Reports, 2015 -*

*Journal of Innovative Optical Health Sciences,* 2013 –

### *Vibrational Spectroscopy*, 2005 –

**Panel Review**

New Cornerstone Fund (Chinese Academy of Science), 2022; Innovation Fund (Hong Kong), 2022; NIH DP5 Proposals (mail review), 2021; NIH Transformative Proposals (mail review), Feb 2021; NIH Transformative Proposals (mail review), Feb 2020; NIH/ITD study section, Oct 2020; 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

