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### Zhen YUAN

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#### Education

Ph.D.	Mechanical Engineering (Biomedical Direction), University of Sciences and Technology of China, Hefei, China (2002)
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#### Positions

08/2017-present	Associate Professor, Faculty of Health Sciences, University of Macau
08/2013-08/2017	Assistant Professor, Faculty of Health Sciences, University of Macau <i>Research Field: Molecular Imaging and Neuroimaging.</i>
10/2012-06/2013	Clinical Assistant Professor, Department of Psychology/School of Communication, Arizona State University <i>Research Field: EEG-fMRI fusion</i>
09/2007-10/2012	Research Assistant Professor, Biomedical Engineering Department, University of Florida. <i>Research Field: Biomedical Imaging and Biomedical Optics</i>
01/2005-09/2007	Postdoctoral Research Associate, Biomedical Engineering Department, University of Florida, Gainesville, FL32611. <i>Research Field: Biomedical Imaging and Signal Processing</i>
03/2004-01/2005	Postdoctoral Research Fellow, Department of Physics, Clemson University, SC29634 <i>Research Field: Biomedical Optical Imaging</i>
03/2002-03/2004	Postdoctoral Research Scientist, Institute of High performance Computing, National University of Singapore, Singapore 117523. <i>Research Field: BioMEMS and Biomaterials</i>

#### Research Interests

##### Neurosciences and Neuroimaging

- Neuroimaging
- Brain Disorders and Brain Cognition
- Hyperscanning
- Optogenetics, Brain Intervention and Brain Modulation

##### Biomedical Optics and Optical Molecular Imaging

- Diffuse Optical Tomography(DOT);
- Functional Near Infrared Spectroscopy (fNIRS);

- Photoacoustic Tomography/Photoacoustic Microscopy (PAT and PAM);
- Optical Coherence Tomography(OCT);
- Photothermal and Photodynamic Therapy;
- Molecular Imaging and Cancer Nanomedicine;

### Representative Publications

#### *Neuroscience and Neuroimaging*

1. Zhishan Hu; Juan Zhang; Lingyan Zhang; Yu-Tao Xiang; **Zhen Yuan**. Linking brain activation to topological organization in the frontal lobe as a synergistic indicator to characterize the difference between various cognitive processes of executive functions. *Neurophotonics*, 6(2), 025008, 2019.
2. Z Hu, J Zhang, TA Couto, S Xu, P Luan, **Yuan, Zhen**. Optical Mapping of Brain Activation and Connectivity in Occipitotemporal Cortex during Chinese Character Recognition. *Brain Topography*, 1-15, 2018.
3. X Lin, L Sai, **Yuan, Zhen**. Detecting concealed information with fused electroencephalography and functional near-infrared spectroscopy. *Neuroscience* (06): 049-058, 2018.
4. Liu, CH, Ma, X, **Yuan, Z**. Decreased resting-state activity in the precuneus is associated with depressive episodes in recurrent depression. *The Journal of Clinical Psychiatry*, 13(1). pp. 7-13, 2017.
5. Zhong-Ming Zhang, Meng-Yun Wang, Xiaowei Guo, Xiaocui Miao, Ting Zhang, Dong Gao, **Yuan, Zhen**. Attentional avoidance of threats in obsessive compulsive disorder: An event related potential study. *Behaviour Research and Therapy*, 97, pp. 96-104, 2017.
6. Z Hu, KF Lam, YT Xiang, **Z Yuan**. Causal Cortical Network for Arithmetic Problem-Solving Represents Brain's Planning Rather than Reasoning. *International Journal of Biological Sciences* 15 (6), 1148-1160, 2019..
7. Juan Zhang, Yaxuan Meng, Chenggang Wu, Yu-Tao Xiang, **Zhen Yuan**. Non-speech and Speech Pitch Perception among Cantonese-speaking Children with Autism Spectrum Disorder: an ERP Study. *Neuroscience letters*, 703, 205-212, 2019.
8. HF leong, **Z Yuan**. Desynchronized Lower Alpha Rhythms Were Associated With Functional Ischemia in the Prefrontal Cortex in Heroin Patients After Protracted Abstinence: A Concurrent EEG-fNIRS Study. *Biological Psychiatry* 85 (10), S295-S296, 2019.
9. HF leong, **Yuan, Zhen**. Emotion recognition and its relation to prefrontal function and network in heroin plus nicotine dependence: a pilot study. *Neurophotonics* 5 (2): 025011, 2018.
10. X Lin, VLC Lei, D Li, **Yuan, Zhen**. Which is more costly in Chinese to English simultaneous interpreting, “pairing” or “transphrasing”? Evidence from an fNIRS neuroimaging study. *Neurophotonics* 5 (2): 025010, 2018.
11. MY Wang, FM Lu, Z Hu, J Zhang, **Yuan, Zhen**. Optical mapping of prefrontal brain connectivity and activation during emotion anticipation. *Behavioural Brain Research* (350): 122-128, 2018.
12. Juan Zhang, Yaxuan Meng, Jinbo He, Yutao Xiang, Chenggang Wu, Shibin Wang, **Zhen Yuan**. McGurk Effect by Individuals with Autism Spectrum Disorder and Typically Developing Controls: A Systematic Review and Meta-analysis. *Journal of Autism and Developmental Disorders*: doi.org/10.1007/s10803-018-3680-0, 2018.
13. MY Wang, J Zhang, FM Lu, YT Xiang, **Yuan, Zhen**. (8/2018). Neuroticism and conscientiousness respectively positively and negatively correlated with the network characteristic path length in dorsal lateral prefrontal cortex: A resting-state fNIRS study. *Brain and Behavior*. https://doi.org/10.1002/brb3.1074,
14. Zhang, ZM, Wang, MY, Miao, XC, Li, YJ, Hitchman, G, & **Yuan, Z**. Individuals with high obsessive-compulsive tendencies or undermined confidence rely more on external proxies to access their internal states. *Journal of Behavior Therapy and Experimental Psychiatry*, 54. pp. 263-269, 2016.
15. Liu, CH, Liu, CZ, Zhang, JH, **Yuan, Z**. Reduced spontaneous neuronal activity in the insular cortex and thalamus in healthy adults with insomnia symptoms. *Brain Research*, 8993 (6). pp. doi: 10.1016/j.brainres.2016.07.024.-doi: 10.1016/j.brainres.2016.07.024, 2016.
16. Feng-Mei Lu, Jian-Song Zhou, Xiao-Ping Wang, Yu-Tao Xiang, **Zhen Yuan\***. Short- and long-range functional connectivity density alterations in adolescents with pure conduct disorder at resting-state. *Neuroscience*, 351, 96-107, 2017.
17. Feng-Mei Lu, Chun-Hong Liu, Shun-Li Lu, Li-Rong Tang, Chang-Le Tie, Juan Zhan, **Zhen Yuan\***. Disrupted topology of frontostriatal circuits is linked to the severity of insomnia. *Frontiers in Neuroscience*, 11,214(2017)
18. Zhang, ZJ, **Yuan, Z**. Quantitative Analysis of the Power Changes in BOLD Signals of Cortical Activity during Different Single-hand Motor Imageries Using Welch Spectrum Method. *Magnetic Resonance Imaging*, 32. pp. 1307-1313, 2014.
19. **Yuan, Z**. Fusion of fNIRS and fMRI data: identifying when and where hemodynamic signals are changing in human brains. *Front Hum Neurosci*, 7. pp. 676(1)-676(9), 2013.
20. **Yuan, Z**. Spatiotemporal and time-frequency analysis of functional near infrared spectroscopy brain signals using independent component analysis. *Journal of Biomedical Optics*, 18(10). pp. 106011(1)-106011(10), 2013.
21. **Yuan, Z**. Combining independent component analysis and Granger causality to investigate brain network dynamics with fNIRS measurements. *Biomedical Optics Express*, 4(11). pp. 2629-2643, 2013.

*Molecular Imaging and Cancer Nanomedicine*

22. Hao Xu, Tymish Y Ohulchanskyy, Artem Yakovliev, Roman Zinyuk, Jun Song, Liwei Liu, Junle Qu, **Yuan, Zhen**. Nanoliposomes Co-Encapsulating CT Imaging Contrast Agent and Photosensitizer for Enhanced, Imaging Guided Photodynamic Therapy of Cancer. *THERANOSTICS*, 2019, 9(5), 1323-1335, 2019.
23. K Chang, D Gao, Y Liu, Q Qi, **Yuan, Zhen**. Engineering biocompatible benzodithiophene-based polymer dots with tunable absorptions as high-efficiency theranostic agents for multiscale photoacoustic imaging-guided photothermal therapy. *Biomater. Sci.*, 2019, 7, 1486-1492.
24. Kaiwen Chang, Yubin Liu, Dehong Hu, Qiaofang Qi, Duyang Gao, Yating Wang, Dongliang Li, Xuanjun Zhang, Hairong Zheng, Zonghai Sheng, **Zhen Yuan**. Highly Stable Conjugated Polymer Dots as Multifunctional Agents for Photoacoustic Imaging-Guided Photothermal Therapy. *ACS Appl. Mater. Interfaces*, 10 (8), pp 7012–7021, 2018.
25. Duyang Gao, Xia Ji, Jiuling Wang, Yating Wang, Dongliang Li, Yubin Liu, Kaiwen Chang, Junle Qu, Zheng Jun, **Zhen Yuan**. Engineering Protein-Based Nanoplatfrom as Antibacterial Agents for Light Activated Dual-Modal Photothermal and Photodynamic Therapy of Infection in Both the NIR I and II Windows. *J. Mater. Chem. B*, 6, 732-739, 2018.
26. Gao, DY, Sheng, ZH, Liu, YB, Hu, DR, Zhang, J, Zhang, X., Zheng, HR, & **Yuan, Z**. Protein-Modified CuS Nanotriangle: A Potential Multimodal Nanoplatfrom for in vivo Tumor Photoacoustic/Magnetic Resonance Dual-Modal Imaging. *Advanced Healthcare Materials*, 6(1), 1601094 adhm.201601094, 2017.
27. D Gao, P Zhang, Y Liu, Z Sheng, H Chen, **Yuan, Zhen\***. Protein-modified conjugated polymer nanoparticles with strong near-infrared absorption: a novel nanoplatfrom to design multifunctional nanoprobres for dual-modal photoacoustic and fluorescence imaging. *Nanoscale*, 10, 19742-19748, 2018.
28. Da Zhang, Hao Xu, Xiaolong Zhang, Yubin Liu, Ming Wu, Juan Li, Huanghao Yang, Gang Liu, Xiaolong Liu, Jingfeng Liu, **Zhen Yuan**. Self-Quenched Metal–Organic Particles as Dual-Mode Therapeutic Agents for Photoacoustic Imaging-Guided Second Near-Infrared Window Photochemotherapy. *ACS applied materials & interfaces* 10(30), 25203-25212, 2018.
29. Zhang, J, Chen, HB, ZHou, T, Wang, LM, Gao, DY, Zhang, X., Liu, YB, Wu, CF, & **Yuan, Z**. A PIID-DTBT based semiconducting polymer dot with broad and strong optical absorption in the visible-light region as a highly-effective contrast agent for multiscale and multi-spectral photoacoustic imaging. *Nano Research*, 12274. pp. 1-14, 2016.
30. Duyang Gao, Yuan, Zhen. Controllable synthesis of biocompatible triangular quantum dots with near-infrared emitting and their application for in vivo lymph node imaging. *Nanomedicine: Nanotechnology, Biology and Medicine*. 14(5):1881, 2018.
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34. Kai Sun, Yingkun Yang, Hua Zhou, Shengyan Yin, Weiping Qin, Jiangbo Yu, Daniel T Chiu, **Zhen Yuan**, Xuanjun Zhang, Changfeng Wu. Ultrabright Polymer-Dot Transducer Enabled Wireless Glucose Monitoring via a Smartphone. *ACS Nano* 12 (6): 5176–5184, 2018.
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36. Zhaoyang Ding, Jingyun Tan, Gang Feng, **Zhen Yuan**, Changfeng Wu, Xuanjun Zhang. Nanoscale metal-organic frameworks coated with poly (vinyl alcohol) for ratiometric peroxynitrite sensing through FRET. *Chemical Science*, 8, pp. 5101-5106, 2017.
37. Gao, DY, **Yuan, Zhen**. [Photoacoustic-Based Multimodal Nanoprobres: from Constructing to Biological Applications](#). *International Journal of Biological Sciences*, 13(4), 401-412, 2017.
38. Chen D, Li Q, Meng Z, Guo L, Tang Y, Liu Z, Yin S, Qin W, **Yuan Z**, Zhang X, Wu C. Bright Polymer Dots Tracking Stem Cell Engraftment and Migration to Injured Mouse Liver. *Theranostics*, 7(7), pp.1820–1834, 2017.
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40. Zhang, J, Liu, J, Wang, LM, Li, Zy, & **Yuan, Z**. Retroreflective-type Janus microspheres as a novel contrast agent for enhanced optical coherence tomography. *Journal of Biophotonics*, jbio.20160. pp. 1-9, 2016.

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43. Zhang, YL, Liu, XH, Lang, YB, **Yuan, Z.**, Zhao, D, Qin, GS, & Qin, WP. Synthesis of ultra-small BaLuF 5: Yb 3+, Er 3+@ BaLuF 5: Yb 3+ active-core-active-shell. *Journal of Materials Chemistry*, 2015(3). pp. 2045-2053.
44. Zhang, KZ, Song, WY, He, GH, **Yuan, Z.**, & Qin, WP. Five-photon UV upconversion emissions of Er3+. *Optics Express*, 23(6). pp. 7653-7658, 2015.

#### *Biomedical Optics and Optical Imaging*

45. Xiong Kedi., Wei Wang, Ting, Guo, **Zhen Yuan**, Sihua Yang. Shape-adapting panoramic photoacoustic endomicroscopy, *Optics Letters*, 2019, [https://www.osapublishing.org/DirectPDFAccess/7D6253E9-B64C-569A-9E6518977695128E\\_ads363592.pdf?da=1&adsid=363592&journal=3&seq=0&mobile=no](https://www.osapublishing.org/DirectPDFAccess/7D6253E9-B64C-569A-9E6518977695128E_ads363592.pdf?da=1&adsid=363592&journal=3&seq=0&mobile=no).
46. Yubin Liu Duyang Gao Mengze Xu **Zhen Yuan**. Multispectral photoacoustic imaging of cancer with broadband CuS nanoparticles covering both near-infrared I and II biological windows. *Journal of Biophotonics*, 2019, <https://doi.org/10.1002/jbio.201800237>.
47. Y Liu, L Fu, M Xu, J Zheng, **Yuan, Zhen**. Dual-Modal In Vivo Fluorescence/Photoacoustic Microscopy Imaging of Inflammation Induced by GFP-Expressing Bacteria(2019). *Sensors* 19 (2), 238-243, 2019.
48. Liu, YB, & **Yuan, Z.** Two schemes for quantitative photoacoustic tomography based on Monte Carlo simulation. *Medical Physics*, 43(7). pp. 3987-3997, 2016.
49. Liu, YB, & **Yuan, Z.** (01/07/2016). Multi-spectral photoacoustic elasticity tomography. *Biomedical Optics Express*, 7(9). pp. 3323-3334.
50. Y Zhao, S Yang, Y Wang, **Z Yuan**, J Qu, L Liu (2018). In vivo blood viscosity characterization based on frequency-resolved photoacoustic measurement. *Applied Physics Letters* 113 (14), 143703.
51. Jian Zhang, Sio Hang Pun, Yuanyu Yu, Duyang Gao, Jiujiang Wang, Peng Un Mak, Kin Fong Lei, Ching-Hsiang Cheng, **Yuan, Zhen**. Development of a multi-band photoacoustic tomography imaging system based on a capacitive micromachined ultrasonic transducer array. *Applied Optics*, 56 (24), pp. 4012-4018, 2017.
52. Yubin Liu, Lingyan Zhang, Sushu Li, Xinai Han, **Zhen Yuan\***. Imaging molecular signatures for clinical detection of scleroderma in the hand by multispectral photoacoustic elastic tomography. *Journal of Biophotonics*. DOI: 10.1002/jbio.201700267, 2018.
53. Zhang, J., Ge, W., & **Yuan, Z.** In vivo three-dimensional characterization of the adult zebrafish brain at video rate with a 1325 nm long range spectral-domain optical coherence tomography system. *Biomedical Optics Express*, 6. pp. 3932-3940, 2015.
54. **Yuan, Z.**, Li, XQ, & Xi, L. Listening to light scattering in turbid media: quantitative optical scattering imaging using photoacoustic measurements with one-wavelength illumination. *J. Opt.*, 16. pp. 065301(1)-065301(8), 2014.
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57. **Yuan, Z.**, Zhang, QZ, Sobel, E, & Jiang, HB (21/05/2007). Three-dimensional diffuse optical tomography of osteoarthritis: initial results in the finger joints. *Journal of Biomedical Optics*, 12(3). pp. 034001-1-034001-11.
58. **Yuan, Z.**, & Jiang, HB (18/12/2007). Reconstruction of optical absorption coefficient maps of heterogeneous media by photoacoustic tomography coupled with diffusion equation based regularized Newton Method . *Optics Express*, 15(26). pp. 18076-18081.
59. Zhang, QZ, Yin, L, Tan, YY, **Yuan, Z.**, & Jiang, HB (22/01/2008). Quantitative bioluminescence tomography guided by diffuse optical tomography. *OPTICS EXPRESS*, 16(3). pp. 1481-1486.
60. Zhang, QZ, Liu, Z, Carney, PR, **Yuan, Z.**, Chen, HX, Noper, SR, & Jiang, Hb (01/02/2008). Non-invasive imaging of epileptic seizures in vivo using photoacoustic tomography. *Physics in Medicine and Biology*, 53(7). pp. 1921-1931.
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63. **Yuan, Z.**, & Jiang, HB (16/11/2008). Three-dimensional finite-element-based photoacoustic tomography: Reconstruction algorithm and simulations. *Medical Physics*, 34(2). pp. 538-546.

64. **Yuan, Z.**, & Jiang, HB (01/06/2009). Simultaneous recovery of tissue physiological and acoustic properties and the criteria for wavelength selection in multispectral photoacoustic tomography. *Optics Letters*, 34(11). pp. 1714-1716.
65. **Yuan, Z.**, & Jiang, HB (01/08/2009). Quantitative photoacoustic tomography. *Phil. Trans. R. Soc. A*, 367. pp. 3043-3054.
66. **Yuan, Z.**, Zhang, QZ, Sobel, E, & Jiang, HB (07/10/2009). Comparison of diffusion approximation and higher order diffusion equations for optical tomography of osteoarthritis. *Journal of Biomedical Optics*, 14(5). pp. 054013-1-054013-7.
67. **Yuan, Z.**, Zhang, QZ, Sobel, E, & Jiang, HB (18/06/2010). Image-guided optical spectroscopy in diagnosis of osteoarthritis: a clinical study. *Biomedical Optics Express*, 1(1). pp. 74-86.
68. **Yuan, Z.**, Zhang, QZ, Sobel, E, & Jiang, HB (02/07/2010). High-resolution x-ray guided three-dimensional diffuse optical tomography of joint tissues in hand osteoarthritis: Morphological and functional assessments. *Medical Physics*, 37(8). pp. 4343-4354.
69. **Yuan, Z.**, & Jiang, HB (11/2012). A calibration-free, one-step method for quantitative photoacoustic tomography. *Medical Physics*, 39(11). pp. 6895-6899.
70. **Yuan, Z.**, Wu, CF, Zhao, HZ, & Jiang, HB (15/11/2005). Imaging of small nanoparticle-containing objects by finite-element-based photoacoustic tomography. *Optics Letters*, 30(22). pp. 3054-3056.
71. Jiang, HB, **Yuan, Z.**, & Gu, XJ (01/04/2006). Spatially varying optical and acoustic property reconstruction using finite-element-based photoacoustic tomography. *Journal of the Optical Society of America A*, 23(4). pp. 878-888.
72. **Yuan, Z.**, Zhao, HZ, Wu, CF, Zhang, QZ, & Jiang, HB (01/05/2006). Finite-element-based photoacoustic tomography: phantom and chicken bone experiments. *Applied Optics*, 45(13). pp. 3177-3183.
73. **Yuan, Z.**, & Jiang, HB (05/06/2006). Quantitative photoacoustic tomography: Recovery of optical absorption coefficient maps of heterogeneous media. *Applied Physics Letters*, 88. pp. 231101-1-231101-3.

#### Full publications list

Research Grants	
2018-2021	Photoacoustic Molecular Imaging and Functional Neuroimaging Guided Photodynamic Therapy of Brain Glioma MOP 1,800,000 → FDCT → 澳門科學技術發展基金研究資助
2019-2022	Development of quantitative multispectral photoacoustic elastic tomography for clinical detection of early-stage scleroderma MOP 900,000 → UM MYRG → 澳門大學多年度研究資助
2016-2019	Structural and functional in vivo imaging of the bone-implant systems by multiscale photoacoustic tomography-使用多尺度光聲斷層成像實現骨-植入物系統的活體結構和功能成像 MOP 1,310,000 → UM MYRG → 澳門大學多年度研究資助
2016-2019	Using fused EEG and fNIRS to Study the Efficacy of Physical Therapy on Cerebral Palsy -使用融合的腦電和近紅外光譜成像研究運動療法治療腦癱的效果 MOP 2,200,000 → FDCT → 澳門科學技術發展基金研究資助
2015-2018	Monitoring Responses to Neoadjuvant Chemotherapy in Breast Cancer Using Quantitative Photoacoustic Spectroscopy Imaging-使用定量的光聲 譜成像監測乳腺癌對新輔助化療的反應 MOP 2,000,000 → UM MYRG → 澳門大學多年度研究資助
2015-2018	Development of Functional Multimodal Optical Imaging Techniques for Clinical Screening of Breast Cancer -基於乳腺癌臨床篩選的多功能光學成像技術的研究 MOP 1,780,000 → FDCT → 澳門科學技術發展基金研究資助
2014-2017	Photoacoustic Imaging of Binding Rate of Nanoparticles in Cancer Nanomedicine – 光聲成像癌症納米探針的結合率 MOP 500,000 → UM MYRG → 澳門大學多年度研究資助
2015-2018	Development of Functional Multimodal Optical Imaging Techniques for Clinical Screening of Breast Cancer -基於乳腺癌臨床篩選的多功能光學成像技術的研究 MOP 600,000 → UM MRG → 澳門大學多年度研究資助
2013-2014	Identifying the Cortical Network Dynamics of Gambling Disorders in the Human Brains Using fNIRS Measurements-使用近紅外光譜測量識別人腦賭癮的神經網絡動力 MOP 100,000 → UM SRG → 澳門大學新職員啟動研究資助
Patents	
<ul style="list-style-type: none"> <li>▪ Hybrid Photoacoustic Tomography (PAT) and Diffuse Optical Tomography (DOT): Methods and Algorithms, International Application No. PCT/US2008/055894.</li> <li>▪ METHOD AND APPARATUS FOR TOMOGRAPHIC IMAGING OF ABSOLUTE OPTICAL ABSORPTION COEFFICIENT IN TURBID MEDIA USING COMBINED PHOTOACOUSTIC AND DIFFUSING LIGHT MEASUREMENTS (WO/2009/011934)</li> </ul>	
Awards	

- 2016年中國光學重大成果獎
- 2017 FHS Best Teacher Award in Research

#### Professional Activities

##### Editorial Board Members:

- Associate Editor of BMC Medical Imaging
- Associate Editor of Frontiers in Human Neuroscience
- Editorial Member of Quantitative Imaging in Medicine and Surgery
- Special issue Editor for Biomedical Research International
- Special issue Editor for Journal of Innovative Optical Health Sciences
- Special issue Editor for Frontiers in Human Neuroscience
- Special issue Editor for Biomed Research International
- Guest Associate Editor of Medical Physics

##### Society Membership:

- Senior Member of SPIE
- Senior Member of OSA
- Senior Member of China Biomedical Engineering Society
- Senior Member of China Biomedical Optics Society
- Committee Members of China Biomedical Engineering Society

#### Others

##### Teaching Interests

- Biomedical Optics
- Neuroimaging
- Introduction to Neurosciences
- Introduction to Molecular Imaging; Optical Molecular Imaging
- Introduction to Cognitive Neuroscience
- Cellular and Molecular Neurobiology
- Computational Neuroscience/Neuroengineering
- Systems and Integrative Neuroscience
- Philosophy of Mind
- Neurohumanities, Arts and Society
- Clinical Neuroscience
- Cellular and Molecular Neuroscience

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