SHENGHUA HE

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Education and Job

PAII Inc.   Palo Alto, CA, USA
Senior research scientist   *Dec 2021-present*

University of Illinois Urbana-Champaign (UIUC)   Urbana, IL, USA
Visiting PhD student   *Apr 2019 – Dec 2021*

Washington University in St. Louis   St. Louis, MO, USA
Ph.D. in Computer Science   *Aug 2016 – Dec 2021*
- GPA, 3.92/4.0   Advisors: Mark Anastasio (UIUC), Hua Li (UIUC)

Beijing University of Posts and Telecommunications (BUPT)   Beijing, China
M.E. in Electronics and Communications Engineering   *Sep 2012 – Apr 2015*
- GPA:82/100   Advisor: Xiangming Wen

Wuhan University of Technology (WUT)   Wuhan, China
B.E. in Electronic Science and Technology   *Sep 2008 – Jun 2012*
- GPA: 90.4/100 (top 3.7%)

Research Interests

3D geometry and computer vision
- 3D reconstruction, video understanding and object tracking.

Deep learning (DL) for biomedical image analysis
- Cell counting, cell segmentation, image translation, and medical image classification.

Machine learning (ML) for clinical applications
- Classification with unbalanced and small-size clinic data.

Publications

10 published peer-reviewed journal papers, including Nature Phonetics (IF 38.77), Natural communications (IF 14.92), Medical Image Analysis (IF 11.148), ACS Photonics (IF 7.5), Bioinformatics (IF 6.9) and Elife (IF 8.14), etc.; 17 published conference papers; 6 published abstracts; 1 pre-print paper.

Journal Papers(*indicates equal contribution)

Xi Chen, Mikhail E. Kandel, **Shenghua He**, Chenfei Hu, Young Jae Lee, Kathryn Sullivan, Gregory Tracy, Hee Jung Chung, Hyun Joon Kong, Mark Anastasio, Gabriel Popescu. "Artificial confocal microscopy for deep label-free imaging." *Nature Phonetics(Accepted in Oct 2022)* (**impact factor 38.77**)

Michael Fanous, **Shenghua He**, Sourya Sengupta, Krishnarao Tangella, Nahil Sobh, Mark A Anastasio, Gabriel Popescu. "White blood cell detection, classification and analysis using phase imaging with computational specificity." *Scientific Reports* (Accepted in Sep 2022). (***impact factor 4.996***)

Yuchen He*, **Shenghua He***, Mikhail E Kandel*, Young Jae Lee, Chenfei Hu, Nahil Sobh, Mark A Anastasio, Gabriel Popescu. "Cell cycle stage classification using phase imaging with computational specificity." *ACS Photonics* (March 2022). (***impact factor 7.5***)

Chenfei Hu*, **Shenghua He***, Young Jae Lee, Yuchen He, Edward Minjae Kong, Hua Li, Mark A. Anastasio, and Gabriel Popescu. "Live-dead assay on unlabeled cells using phase imaging with computational specificity." *Nature Communication* (Feb 2022). (***impact factor 14.92***)

Maliazurina Saad*, **Shenghua He***, Wade Thorstad, Hiram Gay, Su Ruan, Xiaowei Wang, and Hua Li, "Learning-based Cancer Treatment Outcome Prognosis using Multimodal Biomarkers", IEEE Transactions on Radiation and Plasma Medical Sciences, Aug 2021

Shenghua He, Chunfeng Lian, Wade Thorstad, Hiram Gay, Yujie Zhao, Su Ruan, Xiaowei Wang, and Hua Li, "A novel systematic approach for cancer treatment prognosis and its applications in oropharyngeal cancer with microRNA biomarkers" *Bioinformatics. 2021 Apr, **impact factor 6.937***

Kyaw Thu Minn, Yuheng C. Fu, **Shenghua He**, Sabine Dietmann, Steven C. George, Mark A. Anastasio, Samantha A. Morris, and Lilianna Solnica-Krezel. "High-resolution transcriptional and morphogenetic profiling of cells from micropatterned human ESC gastruloid cultures." *Elife* 9 (2020): e59445., **impact factor 8.14**

Shenghua He, Kyaw Thu Minn, Lilianna Solnica-Krezel, Mark A. Anastasio, and Hua Li. "Deeply-supervised density regression for automatic cell counting in microscopy images." *Medical Image Analysis* 68 (2020): 101892., **impact factor 11.148**

Shenghua He*, Jian Wu*, Chunfeng Lian, H. Michael Gach, Sasa Mutic, Walter Bosch, Jeff Michalski, and Hua Li. "An Adaptive Low-Rank Modeling-based Active Learning Method for Medical Image Annotation." *IRBM* (2020), **impact factor 1.022**.

Yan Zhuang, Lei Yu, Haiying Shen, William Kolodzey, Nematollah Iri, Gregori Caulfield, and **Shenghua He**. "Data collection with accuracy-aware congestion control in sensor networks." *IEEE Transactions on Mobile Computing 18, no. 5 (2018): 1068-1082., **impact factor 5.112***

Jun Zhao, Zhaoming Lu, Xiangming Wen, Haijun Zhang, **Shenghua He**, and Wenpeng Jing. "Resource management based on security satisfaction ratio with fairness-aware in two-way relay networks." *International Journal of Distributed Sensor Networks 11, no. 7 (2015): 819195*. **impact factor 1.15**

Shenghua He, Zhaoming Lu, Xiangming Wen, Zhicai Zhang, Jun Zhao, and Wenpeng Jing. "A pricing power control scheme with statistical delay QoS provisioning in uplink of two-tier OFDMA femtocell networks." *Mobile Networks and Applications 20, no. 4 (2015): 413-423., **impact factor 2.6***

Published Conference papers

- Zong Fan, **Shenghua He**, Ethan Chen, Su Ruan, Xiaowei Wang, and Hua Li, "Multi-class classification based on multi-loss strategy and auxiliary deep learning network with applications in medical imaging." *accepted to AAPM Annual Meeting 2021*.

- Xi Chen, Mikhail Kandel, **Shenghua He**, Young Jae Lee, Kathryn Sullivan, Hyun Joon Kong, Mark Anastasio, and Gabriel Popescu. "Laser scanning GLIM (LS-GLIM) for label-free imaging of turbid samples." *SPIE Photonics West BiOS 2021*.

- Chenfei Hu*, **Shenghua He***, Young Jae Lee, Yuchen R. He, Mark Anastasio, and Gabriel Popescu, "Label-free cell viability assay using phase imaging with computational specificity (PICS)", *SPIE Photonics West BiOS 2021*.

- Yuchen R. He*, **Shenghua He***, Mikhail E. Kandel*, Young Jae Lee, Nahil Sobh, Mark Anastasio, and Gabriel Popescu, "Cell cycle detection using phase imaging with computational specificity (PICS)", *SPIE Photonics West BiOS 2021*.

- Zong Fan, **Shenghua He**, Su Ruan, Xiaowei Wang, and Hua Li, "Deep learning-based multi-class COVID-19 classification with x-ray Images", *SPIE Medical Imaing 2021*.

- **Shenghua He**, Weimin Zhou, Hua Li, and Mark A. Anastasio, "Learning numerical observers using unsupervised domain adaptation," *SPIE Medical Imaging 2020*.

- **Shenghua He**, Kyaw Thu Minn, Lilianna Solnica-Krezel, Hua Li, and Mark Anastasio. "Automatic microscopic cell counting by use of unsupervised adversarial domain adaptation and supervised density regression", *SPIE Medical Imaging 2019*.

- **Shenghua He**, Ziyao Yi, Su Ruan, Mark Anastasio, Sasa Mutic, Hiram Gay, Wade Thorstad, Xiaowei Wang, Hua Li, "MicroRNA-Based Survival and Relapse Prognosis for Oropharyngeal Cancer Treatment by Use of Cox Regression and Belief Function Theory", *AAPM 2019*

- **Shenghua He**, Kyaw Thu Minn, Lilianna Solnica-Krezel, Mark Anastasio, and Hua Li. "Automatic microscopic cell counting by use of deeply-supervised density regression model," *SPIE Medical Imaging 2019*.

- **Shenghua He**, Jie Zheng, Akiko Maehara, Gary Mintz, Dalin Tang, Mark Anastasio, and Hua Li. "Convolutional neural network based automatic plaque characterization for intracoronary optical coherence tomography images", *SPIE Medical Imaging 2018*.

- **Shenghua He**, Haiying Shen, Vivekgautham Soundararaj, and Lei Yu. "Cloud Assisted Traffic Redundancy Elimination for Power Efficiency in Smartphones." *In 2018 IEEE 15th International Conference on Mobile Ad Hoc and Sensor Systems (MASS), pp. 371-379. IEEE, 2018.*

- Shen, Haiying, **Shenghua He**, Lei Yu, and Ankur Sarker. "Prediction-based redundant data elimination with content overhearing in wireless networks." *In 2017 IEEE International Conference on Pervasive Computing and Communications (PerCom), pp. 50-58. IEEE, 2017.*

- **Shenghua He**, Ling Zhang, Xiangming Wen, Zhicai Zhang, Zhaoming Lu, and Yong Sun."Price-based power control with statistical delay QoS guarantee in two-tier femtocell networks." *In 2014 21st International Conference on Telecommunications (ICT), pp. 318-322. IEEE, 2014.*

- Zhang, Ling, Xiangming Wen, Ting Xu, Zhaoming Lu, Jun Zhao, and **Shenghua He**. "Coordinated Scheduling in Downlink Multi-Cell OFDMA Networks." *In 2014 IEEE 80th Vehicular Technology Conference (VTC2014-Fall), pp. 1-5. IEEE, 2014.*

- **He, Shenghua**, Zhaoming Lu, Xiangming Wen, Zhicai Zhang, Yong Sun, and Ling Zhang. "Energy-efficient power allocation with QoS guarantee in OFDMA wireless networks."*In 2014 International Symposium on Wireless Personal Multimedia Communications (WPMC), pp. 163-167. IEEE, 2014.*

- Zhang, Zhicai, Xiangming Wen, Zhengfu Li, **Shenghua He**, Wenpeng Jing, and Jun Zhao. "QoS-aware energy-efficient power control in two-tier femtocell networks based on Q-learning." *In 2014 21st International Conference on Telecommunications (ICT), pp. 313-317. IEEE, 2014.*

- Zhang, Ling, **Shenghua He**, Xiangming Wen, Zheng Wei, Jun Zhao, and Zhiqun Hu. "Network MIMO with decision tree classification in downlink OFDMA networks."*In 2014 21st International Conference on Telecommunications (ICT), pp. 22-26. IEEE, 2014.*

Published Abstracts

- Fu Li, Umberto Villa, Seonyeong Park, **Shenghua He**, Mark A. Anastasio, "A framework for ultrasound computed tomography virtual imaging trials that employs anatomically realistic numerical breast phantoms", *SPIE Medical Imaing 2021*.

- **Shenghua He**, Weimin Zhou, Kaiyan Li, Mark Anastasio, and Hua Li, "Quantitative Performance Analysis of Supervised Transfer Learning and Unsupervised Domain Adaptation Methods Employed in Medical Imaging Applications." *2020 Joint AAPM/COMP Meeting*.

- Kaiyan Li, Weimin Zhou, **Shenghua He**, Hua Li, and Mark Anastasio, "Supervised Learning-Based Ideal Observer Approximation for Joint Detection and Estimation Tasks." *2020 Joint AAPM/COMP Meeting*.

- Maliazurina Saad, **Shenghua He**, Wade Thorstad, Hiram Gay, Xue Wu, Su Ruan, Yujie Zhao, Xiaowei Wang, and Hua Li, "Multimodal Biomarkers for Cancer Treatment Outcome Prediction by Use of Deep Learning and Canonical Correlation Analysis." *2020 Joint AAPM/COMP Meeting*

- Maliazurina Saad, **Shenghua He**, Wade Thorstad, Hiram Gay, Xue Wu, Su Ruan, Yujie Zhao, Xiaowei Wang, and Hua Li, "Leveraging Incomplete Multimodal Biomarkers for Cancer Treatment Outcome Prediction." *2020 Joint AAPM/COMP Meeting*.

- **Shenghua He**, Ziyao Yi, Su Ruan, Mark Anastasio, Sasa Mutic, Hiram Gay, Wade Thorstad, Xiaowei Wang, Hua Li,"MicroRNA-Based Survival and Relapse Prognosis for Oropharyngeal Cancer Treatment by Use of Cox Regression and Belief Function Theory", *AAPM 2019*

Pre-print paper

- Xi Chen, Mikhail E. Kandel, **Shenghua He**, Chenfei Hu, Young Jae Lee, Kathryn Sullivan, Gregory Tracy, Hee Jung Chung, Hyun Joon Kong, Mark Anastasio, Gabriel Popescu. "Artificial confocal microscopy for deep label-free imaging." *Nature Phonetics* (2022). (*Accepted*)

Academic activities

- Journal reviewer: Pattern Recognition, IEEE Access, IEEE Intelligent Systems, Neurocomputing, Medical Physics, IEEE Journal of Biomedical and Health Informatics, Journal of Biomedical Optics, and IEEE Internet of Things Journal.

- Conference reviewer: SIGKDD, MICCAI, and CCDC.

Honor and Awards

- Honors Award (top 15-20%) in annual Periodic Review of Doctoral Students, WashU CSE department, 2020-2021
- National Scholarship for Graduates (top 5%), Ministry of Education, P.R.China, Oct 2014
- Outstanding Graduate Award (top 5%), Wuhan University of Technology, Sep 2011
- National Scholarship of Encouragement (top 10%), Ministry of Education, P.R.China, Sep 2011
- Excellent Student Work Award, School of Information Engineering, WUT, Sep 2011
- National Scholarship of Encouragement (top 10%), Ministry of Education, P.R.China, Sep 2010
- Excellent Student Work Award (top 10%), School of Information Engineering, WUT, Mar 2010
- National Scholarship of Encouragement (top 10%), Ministry of Education, P.R.China, Sep 2009
- 3-A student award, Wuhan University of Technology, Mar 2009