

# Liqiang Wang

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## RESEARCH INTERESTS

My research focuses on big data computing and analytics techniques in the following aspects: (1) improving accuracy and security of big data analysis models; (2) optimizing performance and scalability of big data processing and parallel computing systems, including multi-threading, HPC, Cloud and GPU platforms; (3) using program analysis and deep learning techniques to detect and prevent programming errors and execution anomaly in big data and/or parallel programs.

## EMPLOYMENT HISTORY

08/2022 - present: Full Professor, Dept. of Computer Science, Univ. of Central Florida.  
08/2015 - 07/2022: Associate Professor, Dept. of Computer Science, Univ. of Central Florida.  
08/2018 - 08/2021: Graduate Coordinator, Dept. of Computer Science, Univ. of Central Florida.  
07/2012 - 07/2015: Associate Professor, Dept. of Computer Science, Univ. of Wyoming.  
07/2012 - 06/2013: Visiting Research Scientist (Sabbatical), IBM T.J. Watson Research Center, NY.  
08/2006 - 06/2012: Assistant Professor, Dept. of Computer Science, Univ. of Wyoming.  
07/1998 - 07/2000: Lecturer, Department of Computer Science, Hebei University of Economics and Business, China.

## EDUCATIONAL BACKGROUND

<b>Ph.D. in Computer Science</b>	State University of New York at Stony Brook	Aug. 2006
<b>M.S. in Computer Science</b>	State University of New York at Stony Brook	Dec. 2003
<b>M.Eng. in Computer Science</b>	Sichuan University, China	Jul. 1998
<b>B.S. in Mathematics</b>	Hebei Normal University, China	Jul. 1995

## GRANTS

- Sole PI, *Education in Advanced Artificial Intelligence*. Facebook Inc. \$50,000. 01/2022-12/2023.
- Co-PI, *Advancing Interdisciplinary Cyber Security and Privacy Research*, \$150,000, 2021. UCF Jump Start Award. PI: Paul Gazzillo.
- PI in UCF, *Context-aware Unobtrusive Sensing for Indoor Navigation Environment (CO-SINE)*. DoD STTR. \$53,040. With Dr. Devu M. Shila (Industrial Leader). 01/2021-06/2021.
- PI, *An AI-Powered and Epidemiology-Informed Modeling System for Accurate COVID-19 Prediction and Analysis*. UCF. \$37,000. With Dr. Shunpu Zhang (Co-PI), my share 75%. 08/2020-05/2022.

- Co-PI, *SCC-IRG Track 2: Leveraging Smart Technologies and Managing Community Resilience through Networked Communities and Cross-Sector Partnerships*. NSF. \$1,225,000. PI, Dr. Yue Ge, my share 25%. 09/01/2020-08/31/2023.
- Sole PI, *Privacy Enhancing Technologies: Tools and Techniques*. Florida High Tech Corridor Council and Unknot.id Inc. \$50,000. 08/2020-5/2021.
- Sole PI, *UCF Mid-Career Refresh Award*. University of Central Florida. \$54,890. 04/2020-06/2022.
- PI, *RI: Medium: Collaborative Research: Understanding and Editing Visual Sentiment*. NSF. \$485,688 (Prior PI, Dr. Guojun Qi). 07/01/2017-06/30/2022.
- Sole PI, *ICE-T:RI: Towards End-to-End Resource Optimization for Time-Critical Computing Using Reinforcement Learning and Program Analysis*. NSF. \$100,000. 10/01/2018-09/30/2019.
- PI in UCF, *Security-Aware Virtual Machine Management on Cloud Platform Using the Game-Theoretic Approach*. Florida Center for Cybersecurity. \$35,479. 07/01/2018-06/30/2019.
- Sole PI, *Efficient Hierarchical Big Data Computing System*. Office of Naval Research (DURIP). \$154,184. 02/01/2018-01/31/2019.
- Co-PI, *BIGDATA: IA: Distributed Semi-Supervised Training of Deep Models and Its Applications in Video Understanding*, with Boqing Gong (Prior PI) and Mubarak Shah (Current PI). NSF. \$662,431.00 + \$274,269 (Cloud Usage Credits), my share 33%. 09/01/2017-08/31/2020.
- Sole PI, *Big Data Research Using Amazon AWS*. \$15,000. Amazon.com, Inc. 08/2017-07/2018.
- Sole PI, *Interdisciplinary "Enhanced Experience" Training on Atmospheric Big Data Analytics*, Supplemental Fund. NSF. \$10,694. 09/2016-08/2017.
- PI, *Optimizing Performance for Cloud and Big Data Computing*. \$2,550. UCF I-Corps. 01/2016-07/2016.
- Sole PI, *Big Data Research on Cloud Computing Using Amazon AWS*. \$10,000. Amazon.com, Inc. 10/2015-10/2016.
- Co-PI, *Wyoming High Performance Computational Science and Engineering Cluster*, with Dimitri Mavriplis (PI) et al., \$1.25m (Dr. Wang's portion around \$250,000). University of Wyoming. 09/2014-09/2016.
- PI, *HPC and Cloud Equipment Enhancement*. \$200,000. University of Wyoming, 2014.
- Sole PI, *Research and Education on Cloud Computing Using Amazon AWS*. \$20,000. Amazon.com, Inc. 04/2013-04/2015.
- PI, *Petascale Implementation and Optimization of LSQR and SeisSol*, with Po Chen (Co-PI). NSF, subaward from the University of Illinois at Urbana-Champaign, \$75,000. 05/2012-05/2013.
- Sole PI, *CSR:Small: Towards Reliable Concurrent Computing Using Hybrid Program Analysis*. NSF. \$354,591. 08/2011-07/2014.

- Sole PI, *Towards Scalable Error Detection for Parallel Software Systems on Emerging Computing Platforms*. NSF CAREER Award. \$450,495. 06/2011-05/2016.
- Sole PI, *Establishing A CUDA Teaching Center at the University of Wyoming*. NVIDIA. \$4,275 in cash and \$4,600 in GPU donation. 2011.
- PI, *Competitive Graduate Assistant*, with James Caldwell and Jerry Hamann (Co-PIs). University of Wyoming. \$44,030 (one graduate assistantship). 08/2011 - 05/2013.
- Sole PI, *EWSI-UW Curriculum Improvement Grant*. University of Wyoming. \$6,500. 2011.
- PI, at Computer Science, *Addressing the Computational Challenges of Time-Lapse, Full-Wave Seismic Imaging Using Hybrid Cluster of GPUs and CPUs*, with Po Chen (Department of Geology and Geophysics, PI at Geophysics). School of Energy Resources at the University of Wyoming. \$114,880 (two graduate assistantships). 08/2011 - 08/2013.
- Sole PI, *Enhancing the Research and Teaching of HPC Software System*. NCAR-CISL, Research and Supercomputing Visitor Program. \$2,400. 2010.
- PI, *Enabling Large-Scale, High-Resolution, and Real-Time Earthquake Simulations on Petascale Parallel Computers*, with Po Chen (Dept of Geology and Geophysics, Co-PI). NSF. \$38,610. 10/2009-09/2013.
- Co-PI, *Acquisition of Graphic-Processing-Units (GPUs) to Upgrade the CPU Cluster at University of Wyoming*, with Po Chen (Dept of Geology and Geophysics, PI) and Manchung Yeung (Dept of Mathematics, Co-PI). NSF. \$74,101. 09/2009-09/2010.
- Sole PI, *Accelerating Utilization of TeraGrid at the University of Wyoming*. NSF TeraGrid Pathways Fellowship. \$8,500. 2009.
- PI, at Computer Science, *Addressing the Computational Challenges of Time-Lapse, Full-Wave Seismic Imaging Using Hybrid Cluster of GPUs and CPUs*, with Po Chen (Department of Geology and Geophysics, PI at Geophysics). School of Energy Resources at the University of Wyoming. \$124,588 (two graduate assistantships). 08/2009 - 08/2011.
- PI, *Continuously Monitoring and Checking Software in the Era of Multicore Systems*, with Zijiang Yang (Western Michigan University, Co-PI at subcontract). Office of Naval Research. \$142,965. 04/2009 - 12/2011.
- Sole PI, *Combined Static and Dynamic Analysis of Concurrency Errors for Critical Software*. Wyoming NASA Space Faculty Research Grant. \$15,000. 2007-2008.

## PUBLICATIONS<sup>1</sup>

### Ph.D. Dissertation

- **Liqiang Wang**. *Analysis of synchronization errors for multi-threaded programs*. Stony Brook University, Stony Brook, NY, Aug. 2006. Advisor: Scott D. Stoller.

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<sup>1</sup>All publications, including journal, conference, and workshop, are peer-reviewed except for the Ph.D. thesis.

**Journal Publications**

- [1] Jie Yao<sup>†</sup>, Bingbing Rao<sup>†</sup>, Weiwei Xing, **Liqiang Wang**. Bug-Transformer: Automated Program Repair Using Attention-Based Deep Neural Network. In *Journal of Circuits, Systems and Computers (JCSC)*, Vol 31 No. 11, July 2022. World Scientific Publishing.
- [2] Rongjie Yu, Ruici Zhang, Haoan Ai, **Liqiang Wang**, Zihang Zou<sup>†</sup>. Personalized driving assistance algorithms: Case study of federated learning based forward collision warning. In *Accident Analysis Prevention* (Impact Factor: 4.993). Volume 168, April 2022. Elsevier. <https://doi.org/10.1016/j.aap.2022.106609>
- [3] Dongdong Wang<sup>†</sup>, Qingyang Liu, Dazhong Wu, and **Liqiang Wang**. Meta Domain Generalization for Smart Manufacturing: Tool Wear Prediction with Small Data. In *Journal of Manufacturing Systems* (Impact Factor: 8.63). Volume 62, Pages 441-449, January 2022. Elsevier. <https://doi.org/10.1016/j.jmsy.2021.12.009>
- [4] Yao Jie<sup>†</sup>, Dongdong Wang<sup>†</sup>, Hao Hu<sup>†</sup>, Weiwei Xing, and **Liqiang Wang**. ADCNN: Towards Learning Adaptive Dilation for Convolutional Neural Networks. In *Pattern Recognition* (Impact Factor: 7.74). Volume 123, March 2022. Elsevier. <http://dx.doi.org/10.1109/TCSVT.2021.3086104>
- [5] Weiwei Xing, Yuxiang Yang<sup>†</sup>, Shunli Zhang, Qi Yu<sup>†</sup>, and **Liqiang Wang**. NoisyOTNet: A Robust Real-Time Vehicle Tracking Model for Traffic Surveillance. In *IEEE Transactions on Circuits and Systems for Video Technology* (Impact Factor: 4.133). 2021. IEEE. <http://dx.doi.org/10.1109/TCSVT.2021.3086104>
- [6] Jie Yao<sup>†</sup>, Weiwei Xing, Dongdong Wang<sup>†</sup>, Jintao Xing, **Liqiang Wang**. Active Dropblock: A New Method to Enhance Deep Model Accuracy and Robustness. In *Neurocomputing* (Impact Factor: 4.438). 2021. Elsevier. <https://doi.org/10.1016/j.neucom.2021.04.101>
- [7] Yuxiang Yang<sup>†</sup>, Weiwei Xing, Dongdong Wang<sup>†</sup>, Shunli Zhang, Qi Yu<sup>†</sup>, **Liqiang Wang**. AEVRNet: Adaptive Exploration Network with Variance Reduced Optimization for Visual Tracking. In *Neurocomputing* (Impact Factor: 4.438). 2021. Elsevier. <https://doi.org/10.1016/j.neucom.2021.03.118>
- [8] Rongjie Yu, Yiyun Wang, Zihang Zou<sup>†</sup>, **Liqiang Wang**. Convolutional neural networks with refined loss functions for the real-time crash risk analysis. In *Transportation Research Part C: Emerging Technologies* (Impact Factor: 6.077). Vol 119. October, 2020. Elsevier. <https://doi.org/10.1016/j.trc.2020.102740>
- [9] Jun Wang<sup>†</sup>, Weibin Liu, Weiwei Xing, **Liqiang Wang**, and Shunli Zhang. Attention Shake Siamese Network with Auxiliary Relocation Branch for Visual Object Tracking. In *Neurocomputing* (Impact Factor: 4.438). Volume 400, 4 August 2020, Pages 53-72. Elsevier. <https://doi.org/10.1016/j.neucom.2020.02.120>
- [10] Hong Zhang<sup>†</sup>, Hai Huang, and **Liqiang Wang**. Meteor: Optimizing Spark-on-Yarn for Short Applications. In *Future Generation Computer Systems (FGCS)* (Impact Factor: 6.125), Volume 101, December 2019, Pages 262-271. Elsevier. <https://doi.org/10.1016/j.future.2019.05.077>

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<sup>†</sup>Students under Dr. Wang's supervision.

- [11] Wingyan Chung, Bingbing Rao<sup>†</sup>, and **Liqiang Wang**. Interaction Models for Detecting Nodal Activities in Temporal Social Media Networks. In *ACM Transactions on Management Information System* (Impact Factor: 1.5), 2019. ACM.<https://doi.org/10.1145/3365537>
- [12] JianYing Jiao, Ye Zhang, and **Liqiang Wang**. A New Inverse Method for Contaminant Source Identification under unknown Solute Transport Boundary Conditions. In *Journal of Hydrology* (Impact Factor: 4.500) , Volume 577, October 2019. Elsevier. <https://doi.org/10.1016/j.jhydrol.2019.123911>
- [13] Siyang Lu<sup>†</sup>, Xiang Wei<sup>†</sup>, Bingbing Rao<sup>†</sup>, Byungchul Tak, Long Wang, and **Liqiang Wang**. LADRA: Log-Based Abnormal Task Detection and Root-Cause Analysis in Big Data Processing with Spark. In *Future Generation Computer Systems (FGCS)*(Impact Factor: 6.125), 2019. Elsevier. <https://doi.org/10.1016/j.future.2018.12.002>
- [14] Wei Lu, Lei Chen<sup>†</sup>, **Liqiang Wang**, Haitao Yuan, Weiwei Xing, Yong Yang<sup>†</sup>. NPIY: A Novel Partitioner for Improving MapReduce Performance. In *Journal of Visual Languages and Computing* (Impact Factor: 2.0), Volumes 46, 2018, Pages 1-11. Elsevier. <https://doi.org/10.1016/j.jvlc.2018.04.001>
- [15] Weidong Wang<sup>†</sup>, Zhangqin Huang, **Liqiang Wang**. ISAT: An intelligent Web service selection approach for improving reliability via two-phase decisions. In *Information Sciences*(Impact Factor: 5.91), Volumes 433-434, Pages 255-273, April 2018. Elsevier. <https://doi.org/10.1016/j.ins.2017.12.048>
- [16] Lei Chen<sup>†</sup>, Wei Lu, Ergude Bao, **Liqiang Wang**, Weiwei Xing, Yuanyuan Cai. Naive Bayes Classifier Based Partitioner for MapReduce. In *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, 101(5), pp. 778-786, 2018. Japan. <https://doi.org/10.1587/TRANSFUN.E101.A.778>
- [17] Yong Yang<sup>†</sup>, Wei Lu, Weiwei Xing, **Liqiang Wang**, Xiaoping Che, and Lei Chen<sup>†</sup>. An Algorithm for Detecting and Resolving Deadlocks in Mobile Agent Systems. In *Journal of Visual Languages and Computing* (Impact Factor: 2.0), Volume 42, October 2017, Pages 23-30. Elsevier. <https://doi.org/10.1016/j.jvlc.2017.08.002>
- [18] Wei Lu, Yong Yang<sup>†</sup>, **Liqiang Wang**, Weiwei Xing, Xiaoping Che, and Lei Chen<sup>†</sup>. A Fault Tolerant Election-based Deadlock Detection Algorithm in Distributed Systems. In *Software Quality Journal* (Impact Factor: 1.48), June 2017. Springer. <https://doi.org/10.1007/s11219-017-9379-1>
- [19] Wei Lu, Weidong Wang<sup>†</sup>, Ergude Bao, **Liqiang Wang**, Weiwei Xing, and Yue Chen. FAQs: Fast web service composition algorithm based on QoS-aware sampling. In *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, 99-A(4), pp. 826-834, 2016. Japan. <http://dx.doi.org/10.1587/transfun.E99.A.826>
- [20] Ping Guo<sup>†</sup>, and **Liqiang Wang**. Accurate Cross-Architecture Performance Modeling for Sparse Matrix-Vector Multiplication (SpMV) on GPUs. In *Concurrency and Computation: Practice and Experience* (Impact Factor: 1.536). Volume 27, Issue 13, September 2015, Pages 3281-3294. Wiley Press. <https://doi.org/10.1002/cpe.3217>
- [21] Wei Lu, Yuanyuan Cai, **Liqiang Wang**, and Weiwei Xing. Cloud Computing Research Analysis Using the Bibliometric Method. In *International Journal of Software Engineering*

- and Knowledge Engineering* (Impact Factor: 1.47), Volume 25, Issue 03, April 2015. World Scientific Publishing. <https://doi.org/10.1142/S0218194015400203>
- [22] Ping Guo<sup>†</sup>, **Liqiang Wang**, and Po Chen. A Performance Modeling and Optimization Analysis Tool for Sparse Matrix-Vector Multiplication on GPUs. In *IEEE Transactions on Parallel and Distributed Systems* (Impact Factor: 5.1), Vol. 25, no. 5, pp. 1112-1123, May 2014. IEEE Press. <https://doi.org/10.1109/TPDS.2013.123>
- [23] Dawei Mu, Po Chen, and **Liqiang Wang**, Accelerating the Discontinuous Galerkin Method for Seismic Wave Propagation Simulations Using Multiple GPUs with CUDA and MPI. In *Earthquake Science* (Impact Factor: 0.36), Volume 26, Issue 6, pp 377-393, December 2013. Springer. <https://doi.org/10.1007/S11589-013-0047-7>
- [24] Po Chen, En-Jui Lee, and **Liqiang Wang**, A Cloud-based Synthetic Seismogram Generator Implemented Using Windows Azure. In *Earthquake Science* (Impact Factor: 0.36), Volume 26, Issue 5, pp 321-329, October 2013. Springer. <https://doi.org/10.1007/S11589-013-0038-8>
- [25] En-Jui Lee, He Huang<sup>†</sup>, John M. Dennis, Po Chen and **Liqiang Wang**, An Optimized Parallel LSQR Algorithm for Seismic Tomography. In *Computers and Geosciences* (Impact Factor: 3.34), Volume 61, Pages 184-197, 2013. Elsevier. <https://doi.org/10.1016/j.cageo.2013.08.013>
- [26] Dawei Mu, Po Chen, and **Liqiang Wang**. Accelerating the Discontinuous Galerkin Method for Seismic Wave Propagation Simulations Using the Graphic Processing Unit (GPU): Single-GPU Implementation. In *Computers and Geosciences* (Impact Factor: 3.34), Volume 51, February 2013, Pages 282-292. Elsevier. <https://doi.org/10.1016/j.cageo.2012.07.017>
- [27] Qichang Chen<sup>†</sup>, **Liqiang Wang**, and Zijiang Yang. HEAT: A Combined Approach for Thread Escape Analysis. In *International Journal of Systems Assurance Engineering and Management*, Volume 2, Number 2, pages 135-143, 2011. Springer. <https://doi.org/10.1007/s13198-011-0069-2>
- [28] En-Jui Lee, Po Chen, Thomas Jordan, and **Liqiang Wang**. Rapid Centroid Moment Tensor (CMT) Inversion in a Three-Dimensional Earth Structure Model for Earthquakes in Southern California. In *Geophysical Journal International* (Impact Factor: 3.83), Volume 186, Issue 1, pages 311-330, July 2011. Wiley. <https://doi.org/10.1111/j.1365-246X.2011.05031.x>
- [29] Dharma Teja Nukarapu, Bin Tang, **Liqiang Wang**, and Shiyong Lu. Data Replication in Data Intensive Scientific Applications With Performance Guarantee. In *IEEE Transactions on Parallel and Distributed Systems* (Impact Factor: 5.1), Volume 22, Issue 8, pages 1299 - 1306, August 2011. IEEE Press. <https://doi.org/10.1109/TPDS.2010.207>
- [30] R. Agarwal, S. Bensalem, E. Farchi, K. Havelund, Y. Nir-Buchbinder, S. D. Stoller, S. Ur, and **L. Wang**. Detection of Deadlock Potentials in Multi-Threaded Programs. In *IBM Journal of Research and Development* (Impact Factor: 1.27), 54(5), pages 1-15, September/October 2010. <https://doi.org/10.1147/JRD.2010.2060276>
- [31] Qichang Chen<sup>†</sup>, **Liqiang Wang**, Ping Guo<sup>†</sup>, and He Huang<sup>†</sup>. Analyzing Concurrent Programs for Potential Programming Errors (book chapter). In *Modern Software Engineering Concepts and Practices*. Pages 380-415. IGI Global. 2010. <https://doi.org/10.4018/978-1-60960-215-4.ch016>

- [32] **Liqiang Wang**, Shiyong Lu, Xubo Fei, Artem Chebotko, H. Victoria Bryant<sup>†</sup>, and Jeffrey Ram. Atomicity and Provenance Support for Pipelined Scientific Workflows. In *Journal of Future Generation Computer Systems (FGCS)* (Impact Factor: 6.125). Volume 25, Issue 5, May 2009, pages 568-576. Elsevier Science Inc. <https://doi.org/10.1016/j.future.2008.06.007>
- [33] **Liqiang Wang** and Scott D. Stoller. Runtime Analysis of Atomicity for Multi-threaded Programs. In *IEEE Transactions on Software Engineering* (Impact Factor 6.11), Volume 32, Issue 2, pages 93-110, Feb. 2006. IEEE Press. <https://doi.org/10.1109/TSE.2006.1599419>
- [34] R.D. Cowan, Alan McKendall Jr., Ali Mili, L. Yang, **L. Wang**, D. Chen, V. Janardhana, and T. Spencer. Software Engineering Technology Watch. In *Information Sciences* (Impactor Factor: 5.91), 140(3-4), pages 195-215. Elsevier Science Inc., 2002. [https://doi.org/10.1016/S0020-0255\(01\)00171-2](https://doi.org/10.1016/S0020-0255(01)00171-2)

### Conference and Workshop Publications

- [35] Bingbing Rao<sup>†</sup>, Ehsan Kazemi<sup>†</sup>, Yifan Ding<sup>†</sup>, Devu Shila, Frank Tucker, and **Liqiang Wang**. CTIN: Robust Contextual Transformer Network for Inertial Navigation. In *The Thirty-Sixth AAAI Conference on Artificial Intelligence (AAAI)*. 2022.
- [36] Mohamed Elfeki<sup>†</sup>, Ali Borji, and **Liqiang Wang**. Multi-stream dynamic video Summarization. In *2022 IEEE Winter Conference on Applications of Computer Vision (WACV)*. 2022.
- [37] Muhammad Abdullah Jamal<sup>†</sup>, **Liqiang Wang**, and Boqing Gong. A Lazy Approach to Long-Horizon Gradient-Based Meta-Learning. In *IEEE/CVF International Conference on Computer Vision (ICCV)*. 2021.
- [38] Bingbing Rao<sup>†</sup>, Zixia Liu<sup>†</sup>, Hong Zhang<sup>†</sup>, Siyang Lu<sup>†</sup>, and **Liqiang Wang**. SODA: A Semantics-Aware Optimization Framework for Data-Intensive Applications Using Hybrid Program Analysis. In *IEEE International Conference on Cloud Computing (Cloud)*. 2021.
- [39] Yandong Li<sup>†</sup>, Xuhui Jia, Ruoxin Sang, Yukun Zhu, Bradley Green, **Liqiang Wang**, and Boqing Gong. Ranking Neural Checkpoints. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2021.
- [40] Dongdong Wang<sup>†</sup>, Shunpu Zhang, and **Liqiang Wang**. Deep Epidemiological Modeling by Black-box Knowledge Distillation: An Accurate Deep Learning Model for COVID-19. In *The Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI, IAAI Track)*. 2021.
- [41] Yifan Ding<sup>†</sup>, **Liqiang Wang**, and Boqing Gong. Analyzing Deep Neural Network's Transferability via Fr chet Distance. In *2021 IEEE Winter Conference on Applications of Computer Vision (WACV)*. 2021. IEEE. <https://doi.org/10.1109/WACV48630.2021.00398>
- [42] Li Ren, Kai Li, **Liqiang Wang**, Kien Hua. Beyond the Deep Metric Learning: Enhance the Cross-Modal Matching with Adversarial Discriminative Domain Regularization. In *25th International Conference on Pattern Recognition (ICPR)*, 2020. IEEE. <https://doi.org/10.1109/ICPR48806.2021.9412297>
- [43] Adnan Siraj Rakin, Zhezhi He; Li Yang; Yanzhi Wang; **Liqiang Wang**, and Deliang Fan. Robust Sparse Regularization: Defending Adversarial Attacks Via Regularized Sparse Network. In *Proceedings of the 2020 on Great Lakes Symposium on VLSI*, 2020. <https://doi.org/10.1145/3386263.3407651>

- [44] Yandong Li<sup>†</sup>, Di Huang, Danfeng Qin, **Liqiang Wang**, and Boqing Gong. Improving Object Detection with Selective Self-supervised Self-training. In *the 2020 European Conference on Computer Vision (ECCV)*. SEC, Glasgow. August 23-27, 2020. [https://doi.org/10.1007/978-3-030-58526-6\\_35](https://doi.org/10.1007/978-3-030-58526-6_35)
- [45] Zixia Liu<sup>†</sup>, **Liqiang Wang**, and Gang Quan. Deep Reinforcement Learning based Elasticity-compatible Heterogeneous Resource Management for Time-critical Computing. In *International Conference on Parallel Processing (ICPP)*. Edmonton, Alberta, Canada. ACM. August 17-20, 2020. <https://doi.org/10.1145/3404397.3404475>
- [46] Dongdong Wang<sup>†</sup>, Yandong Li<sup>†</sup>, **Liqiang Wang**, and Boqing Gong. Neural Networks Are More Data-Efficient Teachers Than Human Raters: Active Mixup for Knowledge Distillation from a Blackbox Teacher Model. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR, Oral)*. Seattle, WA, USA. 2020. <https://doi.org/10.1109/cvpr42600.2020.00157>
- [47] Yandong Li<sup>†</sup>, Yu Cheng, Zhe Gan, Licheng Yu, **Liqiang Wang**, and Jingjing Liu. Bach-GAN: High-Resolution Image Synthesis from Salient Object Layout. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. Seattle, WA, USA. 2020. <https://doi.org/10.1109/cvpr42600.2020.00839>
- [48] Muhammad Abdullah Jamal<sup>†</sup>, Matthew Brown, Ming-Hsuan Yang, **Liqiang Wang**, and Boqing Gong. Rethinking Class-Balanced Methods for Long-Tailed Visual Recognition from A Domain Adaptation Perspective. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR, Oral)*. Seattle, WA, USA. 2020. <https://doi.org/10.1109/CVPR42600.2020.00763>
- [49] Yifan Ding<sup>†</sup>, Yong Xu, Shixiong Zhang, Yahuan Cong, and **Liqiang Wang**. Self-Supervised Learning For Audio-Visual Speaker Diarization. In *the 45<sup>th</sup> International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*. Barcelona, Spain. 2020. <https://doi.org/10.1109/ICASSP40776.2020.9054376>
- [50] Yunhui Guo, Yandong Li<sup>†</sup>, **Liqiang Wang**, and Tajana Rosing. AdaFilter: Adaptive Filter Fine-tuning for Deep Transfer Learning. In *the 34<sup>th</sup> AAAI Conference on Artificial Intelligence (AAAI)*. New York, USA. 2020. <https://doi.org/10.1609/aaai.v34i04.5824>
- [51] Qi Yu<sup>†</sup>, Xiaoping Che, Yuxiang Yang, and **Liqiang Wang**. A Transfer Learning Based Interpretable User Experience Model on Small Samples. In *the IEEE 19<sup>th</sup> International Conference on Software Quality, Reliability and Security (QRS)*. Sofia, Bulgaria. 2019. <https://doi.org/10.1109/QRS.2019.00035>
- [52] Yandong Li<sup>†</sup>, Lijun Li, **Liqiang Wang**, Tong Zhang, and Boqing Gong. NATTACK: Improved Black-Box Adversarial Attack with Normal Distributions. In *the 36<sup>th</sup> International Conference on Machine Learning (ICML)*. Long Beach, CA. 2019.
- [53] Yifan Ding<sup>†</sup>, **Liqiang Wang**, Huan Zhang, Jinfeng Yi, Deliang Fan, and Boqing Gong. Defending Against Adversarial Attacks Using Random Forest. In *The Bright and Dark Sides of Computer Vision: Challenges and Opportunities for Privacy and Security (CV-COPS), Workshop of the 30th IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. Long Beach, CA. 2019. IEEE Press. <https://doi.org/10.1109/CVPRW.2019.00019>



- [54] Liheng Zhang<sup>†</sup>, Guo-jun Qi, **Liqiang Wang**, and Jiebo Luo. AET vs. AED: Unsupervised Representation Learning by Auto-Encoding Transformations rather than Data. In *the 30th IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. Long Beach, CA. 2019. IEEE Press. <https://doi.org/0.1109/CVPR.2019.00265>
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## PROFESSIONAL AND SCIENTIFIC SERVICE

- Member of Grant Review Panels
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  - ◊ Research Grants Council of Hong Kong.
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  - ◊ NSF Committee on Software Infrastructure, 2016-2018.
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- Journal Editorial Board
  - Journal of Frontiers in Big Data, Switzerland, 2021-present.
  - Journal of Security and Communication Networks, Wiley (Guest), 2018.
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- Chair or Senior Members of Conference/Workshop Program Committees
  - ◊ Registration Chair, IEEE International Conference on Big Data. 2021.
  - ◊ Program Chair, the 5th Workshop on Benchmarking, Performance Tuning and Optimization for Big Data Applications (BPOD), 2021.
  - ◊ Advisory Committee member, IEEE International Conference on Pervasive, Intelligence and Computing (PICom). Nov, 2019, 2020, 2021.
  - ◊ Executive Chair, The 16th IEEE International Conference on Pervasive, Intelligence and Computing (PICom). Nov, 2018.
  - ◊ Doctoral Symposium Chair, IEEE Intl. Conference on Cloud Engineering (IC2E). 2018.
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- ◇ Chair, the 2nd International Conference on Information Technology and Software Engineering, 2014. Beijing, China.
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- Program Committee Member of Selected Conferences/Workshops
  - ◇ AAAI Conference on Artificial Intelligence. 2020, 2021, 2022.
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- Journal Reviewer for:
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    - ◇ Journal of Artificial Intelligence In Medicine, Elsevier

- ◇ Journal of Supercomputing, Springer.
- ◇ Journal of Data Science and Engineering, Springer.
- ◇ International Journal on Software Tools for Technology Transfer (STTT), Springer.
- ◇ Concurrency and Computation: Practice and Experience.
- ◇ Journal of Sensors. MDPI.
- ◇ Science of Computer Programming.
- ◇ Journal of Zhejiang University Science C (Computers & Electronics).
- ◇ Journal of Manufacturing Systems, Elsevier.

## TEACHING

### University of Central Florida (All are 3 credits)

- Spring 2022, (CAP 6640) Computer Understanding of Natural Language, 3 credits, 50 students.
- Spring 2022, (CDA 5121) High-Performance Computing and Programming, 3 credits, 15 students.
- Fall 2021, (CAP 4630) Artificial Intelligence, 3 credits, 197 students.
- Fall 2021, (COP 6526) Parallel and Cloud Computation, 3 credits, 35 students.
- Spring 2021, (CAP 4630) Artificial Intelligence, 3 credits, 225 students.
- Spring 2021, (CDA 5121) High-Performance Computing and Programming, 3 credits, 15 students.
- Fall 2020, (CAP 4630) Artificial Intelligence, 3 credits, 250 students.
- Fall 2020, (COP 6526) Parallel and Cloud Computation, 3 credits, 38 students.
- Spring 2020, (COP 5611) Operating Systems Design Principles, 3 credits, 12 students.
- Fall 2019, (COP 6526) Parallel and Cloud Computation, 3 credits, 33 students.
- Spring 2019, (COP 4600) Operating Systems, 3 credits, 186 students.
- Spring 2019, (COP 5611) Operating Systems Design Principles, 3 credits, 26 students.
- Fall 2018, (COP 6526) Parallel and Cloud Computation, 3 credits, 22 students.
- Spring 2018, (CDA 5121) High-Performance Computing and Programming, 3 credits, 11 students.
- Spring 2018, (COP 5611) Operating Systems Design Principles, 3 credits, 20 students.
- Fall 2017, (COP 6526) Parallel and Cloud Computation, 3 credits, 13 students.
- Spring 2017, (CIS4932C) Cloud Computing Management, 3 credits, 24 students.
- Fall 2016, (CNT 3004) Computer Network Concepts, 3 credits, 99 students.
- Spring 2016, (CIS4932C) Cloud Computing Management, 3 credits, 24 students.
- Fall 2015, (CNT 3004) Computer Network Concepts, 3 credits, 70 students.

**University of Wyoming**

- Spring 2015, (COSC 4010 & COSC 5010) Big Data and Cloud Computing, 3 credits, 25 students.
- Fall 2014, (COSC 4010 & COSC 5010) Introduction to High-Performance Computing, 3 credits, 18 students.
- Spring 2014, (COSC 4740) Operating Systems Design, 4 credits. 28 students.
- Fall 2013, (COSC 4010 & COSC 5010) Introduction to High-Performance Computing, 3 credits, 20 students.
- Fall 2013, (COSC 4740) Operating Systems Design, 4 credits. 12 students.
- Spring 2012, (COSC 4740) Operating Systems Design, 4 credits. 7 students.
- Spring 2012, (COSC 5000) Computer Science Seminar, 1 credit, 10 students.
- Fall 2011, (COSC 4740) Operating Systems Design, 4 credits. 11 students.
- Fall 2011, (COSC 4010 & COSC 5010) Introduction to High-Performance Computing, 3 credits, 11 students.
- Spring 2011, (COSC 4740) Operating Systems Design, 4 credits, 8 students.
- Fall 2010, (COSC 4740) Operating Systems Design, 4 credits, 5 students.
- Fall 2010, (COSC 4010 & COSC 5010) Introduction to High-Performance Computing, 3 credits, 12 students.
- Spring 2010, (COSC 4740) Operating Systems Design, 4 credits, 8 students.
- Spring 2010, (COSC 5000) Computer Science Seminar, 1 credit, 4 students.
- Fall 2009, (COSC 4010 & COSC 5010) Introduction to High-Performance Computing, 3 credits, 12 students.
- Fall 2009, (COSC 4740) Operating Systems Design, 4 credits, 14 students.
- Spring 2009, (COSC 4740) Operating Systems Design, 4 credits, 6 students.
- Spring 2009, (COSC 5000) Computer Science Seminar, 1 credit, 3 students.
- Fall 2008, (COSC 4740) Operating Systems Design, 4 credits, 8 students.
- Fall 2008, (COSC 4785 & COSC 5785) Compiler Construction I & II, 3 credits, 7 students.
- Spring 2008, (COSC 4740) Operating Systems Design, 4 credits, 9 students.
- Spring 2008, (COSC 5000) Computer Science Seminar, 1 credit, 7 students.
- Fall 2007, (COSC 4760) Computer Networks, 3 credits, 14 students.
- Fall 2007, (COSC 5000) Computer Science Seminar, 1 credit, 9 students.

- Spring 2007, (COSC 4740) Operating Systems Design, 4 credits, 12 students.
- Spring 2007, (COSC 5000) Computer Science Seminar, 1 credit, 12 students.
- Fall 2006, (COSC 4760) Computer Networks, 3 credits, 17 students.

## STUDENTS SUPERVISED

### Current 12 Ph.D. Students (as their primary advisor)

- [1] BingBing Rao (Ph.D. candidate, 01/2016 - present)
- [2] Ehsan Kazemy (Ph.D. candidate, 08/2017 - present)
- [3] Yifan Ding (Ph.D. candidate, 01/2018 - present, Co-supervised with Dr. Boqing Gong)
- [4] Dongdong Wang (Ph.D. candidate, 05/2018 - present)
- [5] Zihang Zou (Ph.D. candidate, 08/2018-present)
- [6] May Alsofyani (Ph.D. candidate, 01/2020-present)
- [7] Yang Gao (Ph.D. candidate, 10/2020-present)
- [8] Scott Piersall (Ph.D. candidate, 01/2021-present, Co-supervised with Dr. Elfayoumy, Sherif, University of North Florida)
- [9] Shenyang Liu (Ph.D. candidate, 01/2021-present)
- [10] Saleh Almohaimed (Ph.D. candidate, 01/2022-present)

### Students Graduated (as primary advisor)

- Zixia Liu (Ph.D., 04/2022). Towards More Efficient Collaborative Distributed Data Analysis and Learning.
- Muhammad Abdullah Jamal (Ph.D., 07/2021, Co-supervised with Dr. Boqing Gong). Visual Learning Beyond Human Curated Datasets. Employment: Intuitive Surgical, Inc.
- Yandong Li (Ph.D., 04/2021, UCF. Co-supervised with Dr. Boqing Gong). Learning Accurate and Robust Deep Visual Models. Employment: Google Research.
- Liheng Zhang (Ph.D., 05/2020, UCF. Co-supervised with Dr. Guojun Qi). Equivariance and Invariance for Robust Unsupervised and Semi-Supervised Learning. Employment: Microsoft.
- Siyang Lu (Ph.D. 08/2019, UCF). Detecting Anomalies from System Logs. Employment: Assistant Professor, Beijing Jiaotong University.
- Hao Hu (Ph.D., 05/2019, UCF. Co-supervised with Dr. Guojun Qi). Learning Robust Sequence Features via Dynamic Temporal Pattern Discovery. Employment: Research Scientist, Fxpai Inc.

- Hong Zhang (Ph.D., 07/2018, UCF). Dissertation topic "Towards High-Performance Big Data Processing Systems". Employment: Associate Professor, Hebei University, China.
- Hongyi Ma (Ph.D., 09/2010-08/2015, UWyo). Dissertation topic "Improving Reliability and Performance of High Performance Computing Applications". Employment: VMWare Inc.
- Ping Guo (Ph.D., 01/2009 - 08/2014, UWyo). Dissertation topic "Performance Prediction and Optimization for Sparse Matrix-Vector Multiplication (SpMV) on GPUs". Employment: Assistant Professor, Department of Computer Science, University of Illinois at Springfield.
- He Huang (Ph.D., 08/2009 - 08/2013, UWyo). Dissertation topic "Addressing Scalability and Resource Provisioning Problems for Scientific Applications on Parallel Platforms". Employment: Amazon.
- Qichang Chen (Ph.D., 08/2006-06/2011, UWyo). Dissertation topic "An Integrated Static and Dynamic Program Analysis Framework for Checking Concurrency-Related Programming Errors". Employment: Huawei Inc.
- Chao Liang (M.S., 08/2015, UWyo) Thesis topic "Processing Seismic Inversion Problems Using Hadoop and Cloud Computing".
- Lisa M. Owen (M.S., 05/2015, UWyo). Thesis topic "Finding Your Keys With Android and iBeacons".
- Soumi Manna (M.S., 12/2014, UWyo). Thesis topic "Evaluating the Performance of the Community Atmosphere Model at High Resolutions".
- Vedaprakash Subramanian (M.S., 12/2011, UWyo). Thesis topic "Implementation of 3D Seismic Source Inversion and Synthetic Seismogram Generation on Windows Azure".
- Rory Jarrard (M.S., 06/2011, UWyo). Thesis topic "Detecting Concurrency Errors in OpenMP Programs Using Static Program Analysis".
- Hao Qian (M.S., 05/2011, UWyo). Thesis topic "The Design and Implementation of SWAT (Scientific Workflow for Adjoint Tomography)".
- Rajeswari Siloju (M.S., 05/2010, UWyo). Thesis topic "Sandbox-based Dynamic Branch Coverage Expansion for Detecting Concurrency Errors".
- Lei Wu (M.S., 07/2009, UWyo). Thesis topic "Parallelization and Implementation of ML(n)BiCGStab".
- Qichang Chen (M.S., 05/2009, UWyo). Thesis topic "HAVE: Detecting Atomicity Violations via Integrated Dynamic and Static Analysis".
- Hongjiang Li (M.S., 7/2008, UWyo). Thesis topic "Classify Atomicity Violation Warnings Using Machine Learning".
- Miranda Bryant (M.S., 7/2007, UWyo). Thesis topic "Meaningful Representation of Provenance in Scientific Workflow Systems".
- Victoria Bryant (M.S., 7/2007, UWyo). Thesis topic "Modeling Atomicity and Isolation in Scientific Workflow Systems".
- David A. Weiser (M.S., 7/2007, UWyo). Thesis topic "Hybrid Analysis of Multi-threaded Java Programs".

**Other Alumni (Visiting Ph.D. students.)**

- Jie Yao (Visiting Ph.D. candidate, 05/2019-09/2020)
- Yuxiang Yang (Visiting Ph.D. candidate, 08/2018-07/2019)
- Qi Yu (Visiting M.S. candidate, 12/2018-03/2019)
- Jun Wang (Visiting Ph.D. candidate, 11/2018-05/2019)
- Lei Chen (Visiting Ph.D. candidate, 04/2017-04/2018)
- Yong Yang (Visiting Ph.D. candidate, 04/2017-10/2017)
- Xiang Wei (Visiting Ph.D. candidate, 11/2016-11/17)
- Weidong Wang (Visiting Ph.D. candidate, 01/2013-01/15, UWyo)

**Ph.D. Dissertation Committee in UCF**

- Sharare Zehtabian. Human Behavior in Domestic Environments: Prediction and Applications. Computer Science. Passed Proposal on 07/2021.
- Fereshteh Jafariakinabad. Machine Learning Techniques for Topic Detection and Authorship Attribution in Textual Data. Computer Science. Passed Proposal on 07/2021.
- Qiang Li. Search Dimension Reduction based Reinforcement Learning for a Class of Dynamic Systems. Mechanical Engineering. Dissertation Defense on 04/2021.
- Sayyed Jaffar Ali Raza. Self Adaptive Reinforcement Learning for High-Dimensional Systems in Real-Time Stochastic Events with Application to Robotic Control. Computer Engineering. Dissertation Defense on 04/2021.
- Baogang Zhang. Robust Acceleration of Data-Centric Applications using Resistive Computing Systems. Computer Engineering. Dissertation Defense on 03/2021.
- Sangwoo Cho. Contextual Understanding of Sequential Data Cross Multi-Modalities. Computer Science. Dissertation Defense on 03/2021.
- Xin Li. Reconstruction of Bacterial Strain Genomes from Shotgun Metagenomic Reads. Computer Science. Dissertation Defense on 11/2020.
- Min Wang. Explore and Design Novel Structures for More Efficient and Better Deep Convolutional Neural Networks. Computer Science. Dissertation Defense on 03/2020.
- Yang Zhang. Learning Transferable Representations for Visual Recognition. Computer Science. Dissertation Defense on 03/2020
- Xiangling Kong. Color-Ratio Based Strawberry Plant Localization and Nutrition Deficiency Detection. Mechanical Engineering. Dissertation Defense on 06/2019.
- Dan Huang. Managing IO Resource for Co-Running Data Intensive Applications in virtual Clusters. Computer Engineering. Dissertation Defense on 04/2018.

## SELECTED AWARDS AND HONORS

- UCF Mid-Career Refresh Award, 2020.
- Best Paper Award, the 3rd IEEE Conference on Cyber Science and Technology, 2018.
- IEEE Outstanding Leadership Award. 2018
- Castagne Faculty Fellow Award, University of Wyoming, 2013.
- NSF CAREER Award, 2011.
- NSF TeraGrid Fellowship, 2009.
- Best Paper Award, IBM Verification Conference, 2005.
- Swiger Endowed Fellowship, 2000-2001.
- Best Student Paper Award, the 14th National Database Conference of China, 1997.
- First class scholarships (Guanghua Prize and Procter & Gamble Prize), Sichuan University, 1996, 1997.
- Exemption for National Postgraduate Entrance Examination, 1995.
- Exemption for National College Entrance Examination, 1991.