Bo Liu

Email | URL

Biography: Bo Liu is an Associate Professor in the Electrical and Computer Engineering Department at the University of Arizona. His research areas cover decision-making under uncertainty, agentic AI, symbolic AI, trustworthy AI, and their applications. He obtained his Ph.D. from the Autonomous Learning Lab at the University of Massachusetts Amherst in 2015, co-led by Drs. Sridhar Mahadevan and Andrew Barto. His Ph.D. thesis helped lay the stochastic optimization foundation of temporal difference learning. He is a recipient of the Tencent Faculty Research Award 2017 and the Amazon Faculty Research Award 2018. His papers won two best paper awards (UAI'2015 Facebook Best Student Paper Award and AAMAS'2022 OptLearnMAS Best Paper Award). He is a senior member of AAAI and IEEE, an editorial board member of Machine Learning (MLJ), and a regular Area Chair/Senior PC of several flagship AI conferences. He has given several tutorials and plenary talks at AAMAS, ICAPS, and UAI.

RESEARCH INTEREST

- **A**gent-centric AI: robotics, autonomous driving, LLMs, AIGC
- **C**ontrol: Reinforcement learning, LLM-aided control
- **T**rustworthy AI: Explainable AI, Risk-aware AI, Accountable AI, Neuro-symbolic AI

EDUCATION

2010-2015 **Ph.D.** Computer Science, University of Massachusetts Amherst
Advisors: Sridhar Mahadevan (Chair), Andrew Barto
- Thesis nominated for ACM Doctoral Dissertation Award
- Addressed a 30-year-old fundamental RL problem. [NIPS'2015 tutorial]. Result included in the "bible of RL" (2nd edition)
- Won UAI-15 Best Student Paper Award.
- Won NIPS-12 Spotlight Paper Award.

2008-2010 **M.S.** Computer Engineering, Stevens Institute of Technology
Advisors: Haibo He
- Won ICNSC-10 Best Paper Award Nomination

2005-2008 **M.S.** Control Engineering, University of Science and Technology of China
- Won Best Paper Award by Institute of Automation, CAS,2008

MAJOR AWARDS

Best paper awards

2022 Best and Visionary Paper Award at AAMAS'22

2015 Facebook Best Student Paper Award at UAI'2015

2012 Spotlight Award at NIPS'2012 (acceptance ratio $\approx 4\%$)

2010 Best Paper Award Nomination at ICNSC'2010

Senior membership and editorship recognition

2023 Promoted to AAAI Senior Member (the major award of AAAI to mid-career members) [AAAI] [Bloomberg] [Yahoo!] [Amazon]

2022 Promoted to Associate Professor with tenure

2022 Elected as Editorial Board member of *Machine Learning* [MLJ]

2021 Elected as Associate Editor of *IEEE-TNNLS*

2020 Promoted to IEEE Senior Member

Federal fundings and industry awards

2019 Received NSF IIS Core Program Funding'2019 ($420K) as single PI, and ∼1 million Federal fundings.

2018 Amazon Research Award, Amazon Inc.[Amazon Media]

2017 Tencent Rhino-Bird Award, Tencent AI Lab

RESEARCH PUBLICATIONS

Publication statistics:

Full publications	https://scholar.google.com/citations?user=8MliTo4AAAAJ
Google Scholar	citation:>3000, h-index:29.
Journal	Total: **27**
	Transaction papers or equivalent: **12**, Impact factor> 2: **25**
	JAIR(1), IEEE-TNNLS(4), IEEE-TETCI(1), ACM-TECS(1), IET(3), AAS(1)
Conference	Total: **30**
	Top-tier AI/ML conferences: **26**
	NIPS/NeurIPS(4), ICML(3), ICLR(1), UAI(3), IJCAI(2), AAAI(5), AAMAS(3), ICLP(1), ICRA(1), UbiComp(1)

Students advised in blue, ∗ denotes co-primary authors with equal contribution.

Five Representative Publications

[26'NeurIPS] Yi Xie, Zhanke Zhou, Yi Fan, Yong Ge, Bo Han, **Bo Liu**. Bayes-Sufficient Compression Is Not Enough: How Communication Helps in Multi-Agent Systems? *Advances in Neural Information Processing Systems* (**NeurIPS**), 2026. [pdf]
Acceptance rate: 25.7% (7900/30709).

[26'ICML] Yi Xie, Shuang Liu, Falong Fan, Yifan Yao, Siyang Cao, Yifan Zhao, **Bo Liu**. TeamTR: Trust-region fine-tuning for multi-agent LLM coordination. *Proceedings of the International Conference on Machine Learning* (**ICML**), 2026. [pdf] [code]
Acceptance rate: 26.6% (6,352/23,918).

[20'ICML] Shangtong Zhang, **Bo Liu**, Shimon Whiteson. Gradientdice: Rethinking generalized offline estimation of stationary values. *International Conference on Machine Learning* (**ICML**), 2020. [pdf]
Acceptance rate: 21%(1088/4990).

[19'AAAI] Daoming Lyu, Fangkai Yang, **Bo Liu**, Steven Gustafson. SDRL: Interpretable and Data-efficient Deep Reinforcement Learning Leveraging Symbolic Planning. *Thirty-Third AAAI Conference on Artificial Intelligence* (**AAAI**), Honolulu, HI, 2019. [pdf]
Acceptance rate: **6.4%(460/7095) (Oral presentation rate).**

[**18'JAIR**] **Bo Liu**, Ian Gemp, Mohammad Ghavamzadeh, Ji Liu, Sridhar Mahadevan, Marek Petrik. Proximal Gradient Temporal Difference Learning: Stable Reinforcement Learning with Polynomial Sample Complexity. *Journal of Artificial Intelligence Research* (**JAIR**), 2018. The arXiv preliminary version is "recommended to read" in the classical RL textbook *Introduction to Reinforcement Learning*, and the short conference version won UAI'2015 Best Student Paper Award. [pdf] [code]
Impact factor: 8.78.

Rigorously-Reviewed Conference Publications (Acceptance Ratio≤30%.)

C1 [**27'ICRA**] Lihao Guo, Louis Liu, Jiahao Tang, **Bo Liu**, Siyang Cao. OpenCDA-MARL: A Unified Benchmarking Framework for Cooperative Autonomous Intersection Management with Multi-Agent Reinforcement Learning. *IEEE International Conference on Robotics and Automation* (**ICRA**), 2027.

C2 [**27'UbiComp**] Haotang Li, Yili Ren, Zhenyu Qi, Sen He, Kebin Peng, Sheng Tan, **Bo Liu**, Jiyue Zhao, Zi Wang. UWB-Fat: Non-Intrusive Body Fat Measurement Using Commodity Ultra-Wideband Radar. *ACM International Joint Conference on Pervasive and Ubiquitous Computing* (**UbiComp**) / *ACM International Symposium on Wearable Computers* (**ISWC**), 2027. [pdf]

C3 [**26'BigData**] Xinyi Xie, Yi Xie, **Bo Liu**, Jerzy W. Rozenblit. More Evidence Is Not Always Better: Benchmarking Evidence Acquisition in Biomedical Agents. *IEEE International Conference on Big Data* (**BigData**), 2026.
Acceptance rate: 19.4%(203/1046).

C4 [**26'BigData**] Yueqing Li, Tianyang Xie, Yong Ge, **Bo Liu**. Encoding Structural Inequality: Time-Aware Representation Learning for Equitable Career Matching. *IEEE International Conference on Big Data* (**BigData**), 2026.
Acceptance rate: 19.4%(203/1046).

C5 [**26'NeurIPS**] Yi Xie, Zhanke Zhou, Yi Fan, Yong Ge, Bo Han, **Bo Liu**. Bayes-Sufficient Compression Is Not Enough: How Communication Helps in Multi-Agent Systems? *Advances in Neural Information Processing Systems* (**NeurIPS**), 2026. [pdf]
Acceptance rate: 25.7% (7900/30709).

C6 [**26'ICML**] Yi Xie, Shuang Liu, Falong Fan, Yifan Yao, Siyang Cao, Yifan Zhao, **Bo Liu**. TeamTR: Trust-region fine-tuning for multi-agent LLM coordination. *Proceedings of the International Conference on Machine Learning* (**ICML**), 2026. [pdf] [code]
Acceptance rate: 26.6% (6,352/23,918).

C7 [**26'AAMAS**] Yi Xie, Yangyang Xu, Yi Fan, **Bo Liu**. SAT: Sequential Agent Tuning for Coordinator-Free Plug-and-Play Multi-LLM Training with Monotonic Improvement Guarantees. *International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS**), 2026. [pdf] [code]
Acceptance rate: 25% (338/1343).

C8 [**26'IROS**] Lihao Guo, Louis Liu, Jiahao Tang, **Bo Liu**, Siyang Cao. OpenCDA-MARL: A Unified Benchmarking Framework for Cooperative Autonomous Intersection Management with Multi-Agent Reinforcement Learning. *The IEEE/RSJ International Conference on Intelligent Robots and Systems* (**IROS**), 2026. [pdf]

C9 [**26'ICLR**] Yiqin Yang, Hao Hu, Yihuan Mao, Jin Zhang, Chengjie Wu, Xu Yang, Runpeng Xie, Yi Fan, **Bo Liu**, Yang Gao, Bo Xu, Chongjie Zhang. OPRIDE: Efficient Offline

Preference-based Reinforcement Learning via In-Dataset Exploration. *The Fourteenth International Conference on Learning Representations* (**ICLR**), Rio de Janeiro, Brazil, 2026. [pdf]
Acceptance rate: 27.4% (5,355/19,525).

C10 **[24'AAAI]** Dhawal Gupta, Scott Jordan, Shreyas Chaudhari, **Bo Liu**, Philip Thomas, Bruno C. da Silva. From Past to Future: Rethinking Eligibility Traces. *Thirty-Eighth AAAI Conference on Artificial Intelligence* (**AAAI**), 2024. [pdf]
Acceptance rate: 23.7%(2342/9862).

C11 **[23'CISS]** Ce Xu, **Bo Liu**, Yue Zhao. Offline Reinforcement Learning for Price-Based Demand Response Program Design. *Proc. the 57th Annual Conference on Information Sciences and Systems* (**CISS**), 2023.[pdf]

C12 **[22'AAMAS]**Liangliang Xu, Daoming Lyu, Yangchen Pan, Aiwen Jiang, **Bo Liu**. TOPS: Transition-based volatility-reduced policy search. **Best and Visionary Papers Award**, Virtual, 2022.[pdf]

C13 **[21'AAAI]** Shangtong Zhang, **Bo Liu**, Shimon Whiteson. Mean-Variance Policy Iteration for Risk-Averse Reinforcement Learning. *Thirty-Fifth AAAI Conference on Artificial Intelligence* (**AAAI**), 2021.[pdf]
Acceptance rate: 21%(1692/7911).

C14 **[20'ICML]** Shangtong Zhang, **Bo Liu**, Hengshuai Yao, Shimon Whiteson. Provably Convergent Two-Timescale Off-Policy Actor-Critic with Function Approximation. *International Conference on Machine Learning* (**ICML**), 2020. [pdf]
Acceptance rate: 21%(1088/4990).

C15 **[20'ICML]** Shangtong Zhang, **Bo Liu**, Shimon Whiteson. Gradientdice: Rethinking generalized offline estimation of stationary values. *International Conference on Machine Learning* (**ICML**), 2020. [pdf]
Acceptance rate: 21%(1088/4990).

C16 **[19'AAAI]** Daoming Lyu, Fangkai Yang, **Bo Liu**, Steven Gustafson. SDRL: Interpretable and Data-efficient Deep Reinforcement Learning Leveraging Symbolic Planning. *Thirty-Third AAAI Conference on Artificial Intelligence* (**AAAI**), Honolulu, HI, 2019. Oral presentation. [pdf]
Acceptance rate: **6.4%(460/7095) (Oral presentation rate).**

C17 **[19'ICLP]** Daoming Lyu, Fangkai Yang, **Bo Liu**, Steven Gustafson. A Human-Centered Data-Driven Planner-Actor-Critic Architecture via Logic Programming. *35th International Conference on Logic Programming* (**ICLP**), Las Cruces, NM, 2019. [pdf]

C18 **[19'AAMAS]** Fan Yang, **Bo Liu**, Wen Dong. Optimal Control of Complex Systems through Variational Inference with a Discrete Event Decision Process. *Autonomous Agents and Multi-agent Systems* (**AAMAS**), Montreal, Canada, 2019. [pdf]
Acceptance rate: 24%(189/781).

C19 **[19'AAAI]** Shangtong Zhang, Borislav Mavrin, Linglong Kong, **Bo Liu**, Hengshuai Yao. QUOTA: The Quantile Option Architecture for Reinforcement Learning. *Thirty-Third AAAI Conference on Artificial Intelligence* (**AAAI**), Honolulu, HI, 2019. [pdf]
Acceptance rate: 16.2%(1150/7095).

C20 **[18'NeurIPS]** Tengyang Xie*, **Bo Liu*** (*equal contribution), Yangyang Xu, Mohammad Ghavamzadeh, Yinlam Chow, Daoming Lyu, Daesub Yoon. A Block Coordinate Ascent Algorithm for Mean-Variance Optimization. *32nd Conference on Neural Information Processing*

Systems (**NIPS**), Montreal, Canada, 2018. [pdf]
Acceptance rate: 20%(1011/4856).

C21 [**18'IJCAI**] Fangkai Yang, Daoming Lyu, **Bo Liu**, Steve Gustafson. PEORL: Integrating Symbolic Planning and Hierarchical Reinforcement Learning for Robust Decision-Making. *International Joint Conferences on Artificial Intelligence* (**IJCAI**), 2018. **Press coverage** [pdf]
Acceptance rate: 20%(710/3470).

C22 [**16'UAI**] **Bo Liu**, Ji Liu, Luwan Zhang. Dantzig Selector with an Approximately Optimal Denoising Matrix. *Proceedings of the Conference on Uncertainty in AI* (**UAI**), 2016. [pdf]
Acceptance rate: 30%(85/275).

C23 [**16'IJCAI**] **Bo Liu**, Ji Liu, Mohammad Ghavamzadeh, Sridhar Mahadevan, Marek Petrik. Proximal Gradient Temporal Difference Learning Algorithms. *International Joint Conferences on Artificial Intelligence* (**IJCAI**), 2016. [pdf] [code]
Acceptance rate: 24%(551/2294).

C24 [**16'AAAI**] Deguang Kong, Ji Liu, **Bo Liu**, Xuan Bao. Uncorrelated Group Lasso. *Association for the Advancement of Artificial Intelligence* (**AAAI**), 2016. [pdf]
Acceptance rate: 26%(549/2132).

C25 [**15'UAI**] **Bo Liu**, Ji Liu, Mohammad Ghavamzadeh, Sridhar Mahadevan, Marek Petrik. Finite-Sample Analysis of Proximal Gradient Algorithms. *Proceedings of the Conference on Uncertainty in AI* (**UAI**), 2015, **Facebook Best Student Paper Award**. [pdf]
Acceptance rate: **1%(3/291) (Best paper award rate).**

C26 [**12'NIPS**] **Bo Liu**, Sridhar Mahadevan, Ji Liu. Regularized Off-Policy TD-Learning. *26th Annual Conference on Neural Information Processing Systems* (**NIPS**), Lake Tahoe, Nevada, 2012, December 3-6, **Spotlight Award**. [pdf]
Acceptance rate: **4%(72/1467) (Oral presentation rate).**

C27 [**12'UAI**] Sridhar Mahadevan, **Bo Liu**. Sparse Q-learning with Mirror Descent. *Proceedings of the Conference on Uncertainty in AI* (**UAI**), 2012. [pdf]
Acceptance rate: 30%(95/304).

C28 [**10'NIPS**] Sridhar Mahadevan, **Bo Liu**. Basis Construction from Power Series Expansions of Value Functions. *24th Annual Conference on Neural Information Processing Systems* (**NIPS**), Vancouver, B.C., Canada, 2010, December 6-8. [pdf]
Acceptance rate: 24%(293/1219).

C29 [**10'ICNSC**] Haibo He, **Bo Liu**. A Hierarchical Learning Architecture with Multiple-Goal Representations Based on Adaptive Dynamic Programming. *IEEE International Conference on Networking, Sensing, and Control*, Chicago, 2010. [pdf]

C30 [**10'ICNSC**] **Bo Liu**, Haibo He, Daniel Repperger. Two-Time-Scale Online Actor-Critic Paradigm Driven by POMDP. *IEEE International Conference on Networking, Sensing, and Control*, Chicago, 2010. **Best Paper Award Nomination** [pdf]

Journal Publications

J1 [**27'IMWUT**] Haotang Li, Yili Ren, Zhenyu Qi, Sen He, Kebin Peng, Sheng Tan, **Bo Liu**, Jiyue Zhao, Zi Wang. UWB-Fat: Non-Intrusive Body Fat Measurement Using Commodity Ultra-Wideband Radar. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (**IMWUT**), 2027. [pdf]
Impact factor: 6.9.

J2 **[26'IEEE-RAL]** Lihao Guo, Louis Liu, Jiahao Tang, **Bo Liu**, Siyang Cao. OpenCDA-MARL: A Unified Benchmarking Framework for Cooperative Autonomous Intersection Management with Multi-Agent Reinforcement Learning. *IEEE Robotics and Automation Letters* (**IEEE RA-L**), 2026. [pdf] [code]
Impact factor: 5.3.

J3 **[25'KBS]** Zhiwei Wang, Defeng He, Li Zhao, **Bo Liu**, Yayu Zheng, Xiaoqin Zhang. DiFusion-Seg: Diffusion-Driven Semantic Segmentation with Multi-Modal Image Fusion for Enhanced Perception. *Knowledge-Based Systems*, Elsevier, 2025.
Impact factor: 7.6.

J4 **[24'ESA]** Yawen Zeng, Yiru Wang, Dongliang Liao, Gongfu Li, Jin Xu, Xiangmin Xu, **Bo Liu**, Hong Man. Contrastive topic-enhanced network for video captioning. *Expert Systems with Applications*, 2024. [pdf]
Impact factor: 8.5.

J5 **[23'IEEE-TNNLS]** Zheng Zhang, Levent Yilmaz, **Bo Liu**. A Critical Review of Inductive Logic Programming Techniques for Explainable AI. *IEEE Transactions on Neural Networks and Learning Systems* (**IEEE-TNNLS**), 2023. [pdf]
Impact factor: 10.4.

J6 **[22'JVCIR]** Zhifeng Wang, Aiwen Jiang, Chunjie, Zhang, Hanxi Li, **Bo Liu**. Self-supervised multi-scale pyramid fusion networks for realistic bokeh effect rendering. *Journal of Visual Communication and Image Representation*, 2022. [pdf]
Impact factor: 2.6.

J7 **[22'IEEE-TETCI]** Daoming Lyu, Fangkai Yang, Hugh Kwon, Wen Dong, Levent Yilmaz, and **Bo Liu**. TDM: Trustworthy Decision-Making via Interpretability Enhancement. *IEEE Transactions on Emerging Topics in Computational Intelligence* (**IEEE-TETCI**), 2022. [pdf]
Impact factor: 5.3.

J8 **[21'SP]** Long Peng, Aiwen Jiang, Haoran Wei, **Bo Liu**, and Mingwen Wang. Ensemble single-image deraining network via progressive structural boosting constraints. *Signal Processing: Image Communication*, 2021. [pdf]
Impact factor: 3.5.

J9 **[21'JVCIR]** Zhaokun Li, Xueliang Liu, Ye Zhao, **Bo Liu**, Zhen Huang, Richang Hong. A Lightweight Multi-scale Aggregated Model for Detecting Aerial Images Captured by UAVs. *Journal of Visual Communication and Image Representation*, 2021. [pdf]
Impact factor: 2.6.

J10 **[20'JOS]** Levent Yilmaz and **Bo Liu**. Model Credibility Revisited: Concepts and Considerations for Appropriate Trust. *Journal of Simulation*, 2020. [pdf]
Impact factor: 2.5.

J11 **[19'IEEE-TNNLS]** Daoming Lyu, **Bo Liu**, Matthieu Geist, Wen Dong, Saad Biaz, and Qi Wang. Stable and Efficient Policy Evaluation. *IEEE Transactions on Neural Networks and Learning Systems* (**IEEE-TNNLS**), 2019. [pdf]
Impact factor: 10.4.

J12 **[19'IEEE-TNNLS]** Qi Wang, Jia Wan, Feiping Nie, **Bo Liu**, Chenggang Yan, Xuelong Li. Hierarchical Feature Selection for Random Projection. *IEEE Transactions on Neural Networks and Learning Systems* (**IEEE-TNNLS**), 2019. [pdf]
Impact factor: 10.4.

J13 **[19'IET-IP]** Kangfu Mei, Aiwen Jiang, Juncheng Li, **Bo Liu**, Mingwen Wang. Deep Residual Refining-based Pseudo Multi-frame Network for Effective Single Image Super-Resolution. *IET Image Processing*, 2019. [pdf]
Impact factor: 2.37.

J14 **[18'JAIR]** **Bo Liu**, Ian Gemp, Mohammad Ghavamzadeh, Ji Liu, Sridhar Mahadevan, Marek Petrik. Proximal Gradient Temporal Difference Learning: Stable Reinforcement Learning with Polynomial Sample Complexity. *Journal of Artificial Intelligence Research* (**JAIR**), 2018. The arXiv preliminary version is "recommended to read" in the classical RL textbook *Introduction to Reinforcement Learning*. [pdf] [code]
Impact factor: 8.78.

J15 **[18'IET-CV]** Shuying Li, Zhanwen Liu, Tao Gao, Fanjie Kong, Ziheng Jiao, Aodong Yang, **Bo Liu**. A Novel Restoration Algorithm for Noisy Complex Illumination. *IET Computer Vision*, 2018. [pdf]
Impact factor: 1.7.

J16 **[17'JCST]** Ai-Wen Jiang, **Bo Liu**, Ming-Wen Wang. Deep Multimodal Reinforcement Network with Contextually Guided Recurrent Attention for Image Question Answering *Journal of Computer Science and Technology*, 32(4), 738-748, 2017. [pdf]
Impact factor: 1.9.

J17 **[14'ACM-TECS]** Shuai Li, Yuesheng Lou, **Bo Liu**. Bluetooth aided mobile phone localization: a nonlinear neural circuit approach. *ACM Transactions on Embedded Computing Systems* (**ACM-TECS**), 2014. [pdf]
Impact factor: 2.8.

J18 **[13'IEEE-TNNLS]** Shuai Li, **Bo Liu**, Yangming Li. Selective Positive-negative Feedback Produces the Winner-take-all Competition in Recurrent Neural Networks. *IEEE Transactions on Neural Networks and Learning Systems* (**IEEE-TNNLS**), 2013. [pdf]
Impact factor: 10.4.

J19 **[12'NC]** Shuai Li, Sanfeng Chen, **Bo Liu**, Yangming Li, Yongsheng Liang. Decentralized Kinematic Control of A Class of Collaborative Redundant Manipulators via Recurrent Neural Networks, *Neurocomputing*, 2012. One of the most highly cited Neurocomputing publications since 2012. [pdf]
Impact factor: 6.

J20 **[12'Sensors]** **Bo Liu**, Sanfeng Chen, Shuai Li, Yongsheng Liang. Intelligent control of a sensor-actuator system via kernelized least-squares policy iteration. *Sensors* 12 (3), 2632-2653, 2012. [pdf]
Impact factor: 4.1.

J21 **[12'NCA]** Shuai Li, **Bo Liu**, Baogang Chen, and Yuesheng Lou. Neural Network-Based Mobile Phone Localization Using Bluetooth Connectivity. *Neural Computing and Applications*, 2012. [pdf]
Impact factor: 5.102.

J22 **[12'CNS]** Shuai Li, Yangming Li, **Bo Liu**, Timmy Murray. Model-free Control of Lorenz Chaos Using an Approximate Optimal Control Strategy. *Communications in Nonlinear Science and Numerical Simulation*, 2012. [pdf]
Impact factor: 4.270.

J23 [**12'NPL**] Shuai Li, Sanfeng Chen, **Bo Liu**. Accelerating a Recurrent Neural Network to Finite-Time Convergence for Solving Time-Varying Sylvester Equation by Using a Sign-Bi-power Activation Function, *Neural Processing Letters*, pp.1-17, 2012 [pdf]
Impact factor: 3.514.

J24 [**12'NCA**] Shuai Li, Hongzhu Cui, Yangming Li, **Bo Liu**, and Yuesheng Lou. Decentralized Control of Collaborative Redundant Manipulators with Partial Command Coverage via Locally Connected Recurrent Neural Networks. *Neural Computing and Applications*, 2012. [pdf]
Impact factor: 5.102.

J25 [**12'CNS**] Shuai Li, Yunpeng Wang, Jiguo Yu, **Bo Liu**. A Nonlinear Model to Generate the Winner-Take-all Competition. *Communications in Nonlinear Science and Numerical Simulation*, 2012. [pdf]
Impact factor: 3.9.

J26 [**12'Sensors**] Sanfeng Chen, Shuai Li, **Bo Liu**, Yuesheng Lou and Yongsheng Liang. Self-Learning Variable Structure Control for a Class of Sensor-Actuator Systems, *Sensors*, Vol.12, pp.6117-6128, 2012. [pdf]
Impact factor: 4.1.

J27 [**10'AAS**] **Bo Liu**, Haibo He, Sheng Chen. Adaptive Dual Network Design for a Class of SIMO Systems with Nonlinear Time-variant Uncertainties. *Acta Automatica Sinica*, Vol.36, pp.564-572, 2010. [pdf]
Impact factor: 11.8.

Tutorials

T1 [**22'AAMAS**] **Bo Liu**, Bo An, Yangyang Xu. Risk-aware Single-Agent & Multi-agent Reinforcement Learning: Algorithms and Meta-Algorithms. *International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS**), Virtual, 2022.

T2 [**22'ICAPS**] Daoming Lyu, **Bo Liu**, Jianshu Chen, Akshat Kumar, Jiajing Ling. Efficient Neural-Symbolic Reasoning via Reinforcement Learning. *32nd International Conference on Automated Planning and Scheduling* (**ICAPS**), Virtual, 2022.

T3 [**22'UAI**] **Bo Liu**, Bo An, Yangyang Xu. Risk-Averse Reinforcement Learning: Algorithms And Meta-algorithms. *Conference on Uncertainties in Artificial Intelligence* (**UAI**), Eindhoven, the Netherlands, 2022.

Book Chapters

B1 Fangkai Yang, Steven Gustafson, Alexander Elkholy, Daoming Lyu and **Bo Liu**. Program Search for Machine Learning Pipelines: Leveraging Symbolic Planning and Reinforcement Learning. *Genetic Programming Theory & Practice XVI*, Springer, 209–231, 2019. ISBN 978-3-030-04734-4.

B2 Daoming Lyu, Fangkai Yang, Hugh Kwon, **Bo Liu**, Wen Dong, Levent Yilmaz. Explainable Neuro-Symbolic Hierarchical Reinforcement Learning. *Frontiers in Artificial Intelligence and Applications*, IOS Press book series, 2021. [pdf]

Workshop Papers with Presentations

W1 Zhanke Zhou, Zongze Li, Weikai Huang, Xuan Li, Chentao Cao, Xiao Feng, Xiangyu Lu, Jinbo Hu, Menghan Lu, Yi Xie, Nico Pelleriti, Shiyang Liu, Max Zimmer, Brando Miranda, Jiangchao Yao, **Bo Liu**, Sanmi Koyejo, Sebastian Pokutta, Bo Han. Reasoning Is More

Than the Model: Harness-Aware Evaluation of Agents on Verifiable Reasoning Tasks. *ICML 2026 Workshop on AI as a Tool for Mathematics, Computer Science, and Machine Learning (AI4Research)*, Seoul, South Korea, 2026.

W2 Shangtong Zhang, **Bo Liu**, Shimon Whiteson. Mean-Variance Policy Iteration for Risk-Averse Reinforcement Learning. *NeurIPS Workshop on Offline Reinforcement Learning*, Vancouver, CA, 2020.

W3 Daoming Lyu, Qi Qi, Mohammad Ghavamzadeh, Hengshuai Yao, Tianbao Yang, and **Bo Liu**. Variance-Reduced Off-Policy Memory-Efficient Policy Search. *NeurIPS Workshop on Offline Reinforcement Learning*, Vancouver, CA, 2020.

W4 Shangtong Zhang, **Bo Liu**, Hengshuai Yao, Shimon Whiteson. Provably Convergent Off-Policy Actor-Critic with Function Approximation. *NeurIPS Workshop on The Optimization Foundations of Reinforcement Learning*, Vancouver, CA, 2019.

W5 Daoming Lyu, Fangkai Yang, Steven Gustafson, **Bo Liu**. A Joint Planning and Learning Framework for Human-Aided Decision-Making. *AAAI Fall Symposium*, DC, 2019. (oral presentation)

W6 **Bo Liu**, Ji Liu, Kenan Xiao. R^2PG: Risk-Sensitive and Reliable Policy Gradient. *32nd AAAI Conference on Artificial Intelligence workshop on planning and inference*, New Orleans, LA, 2018. (oral presentation) [pdf]

W7 Hasan, S. A., **Bo Liu**, Liu, J., et al. Neural Clinical Paraphrase Generation with Attention. ClinicalNLP, Osaka, Japan, 2016.

W8 Ian Gemp, Sridhar Mahadevan, **Bo Liu**. Solving Large-Scale Sustainable Supply Chain Networks using Variational Inequalities, *AAAI Workshop on Computational Sustainability*, Austin, Texas, 2015.

W9 **Bo Liu**, Haibo He, Sheng Chen. A Dual-System Learning and Control Method for Machine Intelligence. *Proc. Int. Conf. on Cognitive and Neural Systems* (ICCNS'09), Boston, May 27-30, 2009.

US Patents

UP1 Sadid Hasan. S., **Bo Liu**, O. Farri Farri, Junyi Liu, & Aaditya Prakash. (2019). Systems and methods for neural clinical paraphrase generation. U.S. Patent Application No. 16/072,128.

ACADEMIC SERVICES

Associate Editor

IEEE Trans. on Fuzzy Systems (**IEEE-TFS**)(2025-present);
Editorial Board of Machine Learning (**MLJ**)(2021-present);
IET Image Processing (2020-present);
IEEE Geoscience and Remote Sensing Letters (2016-2019);
IEEE Trans. on Neural Networks and Learning Systems (**IEEE-TNNLS**) (2021-2023);

Area Chair/Senior PC

IJCAI 2017-present, UAI 2021-present, AAAI 2022-present
Conference Review:
ICML, NIPS/NeurIPS, COLT, UAI, AISTATS, AAAI, IJCAI, ICLR, etc.
Journal Review:
JMLR, JAIR, MLJ, AIJ, Neural Computation, Neural Networks, IEEE-TNN, etc.

Proposal Panel Review:
NSF panels 2016-present, Swiss NSF panels 2020.

Workshop Organized

WO1 Organized "Primal-dual optimization and reinforcement learning" at *INFORMS*'2020 (virtual). (with Dr. Yangyang Xu at RPI)