Yanan Sui

Associate Professor
Tsinghua University
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RESEARCH APPOINTMENTS

Associate Professor 2021 - now
Tsinghua University
School of Aerospace Engineering
National Engineering Research Center of Neuromodulation

Assistant Professor 2019 - 2021
Tsinghua University
School of Aerospace Engineering
National Engineering Lab for Neuromodulation

Postdoctoral Researcher 2018 - 2019
Stanford University
Supervisor: Prof. Fei-Fei Li
Research Topic: Machine learning theory and algorithms, computer vision techniques, applications in medicine and robotics.

Postdoctoral Researcher 2016 - 2018
California Institute of Technology
Supervisors: Prof. Joel Burdick, Prof. Yisong Yue
Research Topic: Machine learning theory and algorithms and their applications in clinical therapies and robotics.

Research Assistant 2010 - 2011
Institute of Neuroscience, Chinese Academy of Sciences
Supervisors: Prof. Mu-ming Poo, Prof. Yang Dan
Research Topic: Neural plasticity of cortex at system neuroscience level.

EDUCATION

Ph.D. Computation and Neural Systems 2011 - 2016
California Institute of Technology
Minor in Applied and Computational Mathematics
Research Committee: Joel Burdick (Supervisor), Richard Murray, Pietro Perona, Yisong Yue

B.E. Biomedical Engineering 2006 - 2010
Tsinghua University

RESEARCH AREAS

Reinforcement Learning, Neuro-Musculo-Skeletal Modeling, Robotics, Brain-Machine Interface

ACADEMIC SERVICE

Program Chair:
Deep Brain Stimulation Initiative Workshop (2018)

Area Chair/Associate Editor:
AAAI Conference on Artificial Intelligence (AAAI)
International Conference on Artificial Intelligence and Statistics (AISTATS)
International Conference on Learning Representations (ICLR)
Machine Learning for Health (ML4H)
Neural Information Processing Systems (NeurIPS)
Fundamental Research
Journal of Biomedical Engineering (in Chinese)

Program Committee/Reviewer:
AAAI, AISTATS, CVPR, ECCV, ICCV, ICLR, ICML, ICRA, IJCAI, IROS, NIPS/NeurIPS, UAI, etc.
IEEE Transactions on Signal Processing
IEEE Journal of Biomedical and Health Informatics
IEEE Journal of Translational Engineering in Health and Medicine
Journal of Machine Learning Research
Machine Learning
Neural Computation

TEACHING AND MENTORSHIP

Teaching Assistant 2009
Contemporary Methods in System Neuroscience Research (Tsinghua University)
Mentoring Undergrad and Graduate Research Projects 2015 - now
Computation and Mathematical Sciences (California Institute of Technology)
Mentoring Graduate Research Projects 2018 - now
Computer Science (Stanford University)
Co-Instructor 2018 - 2019
AI-Assisted Health Care (Stanford University)
Instructor 2019 - now
AI for Health Innovation and Entrepreneurship (Tsinghua University)
Instructor 2020 - now
Human Factors and Artificial Intelligence (Tsinghua University)

PUBLICATIONS

[1] Dong Wang, Liang She, **Sui, Yanan**, Xiao-bing Yuan, Yunqing Wen, and Mu-ming Poo. Forward transport of proteins in the plasma membrane of migrating cerebellar granule cells. *Proceedings of the National Academy of Sciences*, 109(51):E3558–E3567, 2012.

[2] Jing Zhou, Yunqing Wen, Liang She, **Sui, Yanan**, Lu Liu, Linda J Richards, and Mu-ming Poo. Axon position within the corpus callosum determines contralateral cortical projection. *Proceedings of the National Academy of Sciences*, 110(29):E2714–E2723, 2013.

[3] Feng Wang, Li Zuo, Bo Hong, Dongyi Han, Ethan M Range, Lingyun Zhao, **Sui, Yanan**, Weiwei Guo, and Liangfa Liu. Tonotopic reorganization and spontaneous firing in inferior colliculus during both

short and long recovery periods after noise overexposure. *Journal of Biomedical Science*, 20(1):91, 2013.

[4] **Sui, Yanan** and Joel W. Burdick. Clinical online recommendation with subgroup rank feedback. In *ACM Conference on Recommender Systems (RecSys)*, 2014.

[5] **Sui, Yanan**, Alkis Gotovos, Joel W. Burdick, and Andreas Krause. Safe exploration for optimization with gaussian processes. In *International Conference on Machine Learning (ICML)*, 2015.

[6] **Sui, Yanan**, Vincent Zhuang, Joel w. Burdick, and Yisong Yue. Multi-dueling bandits with dependent arms. In *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2017.

[7] **Sui, Yanan**, Yisong Yue, and Joel W. Burdick. Correlational dueling bandits with application to clinical treatment in large decision spaces. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2017.

[8] **Sui, Yanan**, Kun ho Kim, and Joel W. Burdick. Quantifying performance of bipedal standing with multi-channel emg. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2017.

[9] Akifumi Wachi, **Sui, Yanan**, Yisong Yue, and Masahiro Ono. Safe exploration and optimization of constrained mdps using gaussian processes. In *AAAI Conference on Artificial Intelligence (AAAI)*, 2018.

[10] **Sui, Yanan**, Vincent Zhuang, Joel W. Burdick, and Yisong Yue. Stagewise safe bayesian optimization with gaussian processes. In *International Conference on Machine Learning (ICML)*, 2018.

[11] **Sui, Yanan**, Masrour Zoghi, Katja Hofmann, and Yisong Yue. Advancements in dueling bandits. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2018.

[12] Richard Cheng, **Sui, Yanan**, Dimitry Sayenko, and Joel W. Burdick. On muscle activation for improving robotic rehabilitation after spinal cord injury. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.

[13] Yue Chen, Chen Gong, Hongwei Hao, Yi Guo, Shujun Xu, Guoping Yin, Xin Cao, Yuhuan Zhang, Jingying Ye, Hesheng Liu, Jianguo Zhang, **Sui, Yanan***, and Luming Li*. Automatic sleep stage classification based on subthalamic local field potentials. *IEEE Trans on Neural Systems and Rehabilitation Engineering*, (* corresponding authors), 2019.

[14] Chien-Yi Chang, De-An Huang, **Sui, Yanan**, Li Fei-Fei, and Juan Carlos Niebles. D^{3}tw: Discriminative differentiable dynamic time warping for weakly supervised action alignment and segmentation. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

[15] Richard Cheng, **Sui, Yanan**, Dimitry Sayenko, and Joel W. Burdick. Motor control after human sci through activation of muscle synergies under spinal cord stimulation. *IEEE Trans on Neural Systems and Rehabilitation Engineering*, 2019.

[16] Bingquan Zhu, Hao Fang, **Sui, Yanan**, and Luming Li. Learning the critical features for paraplegic standing via epidural stimulation. *AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES)*, 2020. **Reported by *Science*** (DOI: 10.1126/science.370.6517.731).

[17] Maegan Tucker, Ellen Novoseller, Claudia Kann, **Sui, Yanan**, Yisong Yue, Joel W. Burdick, and Aaron D. Ames. Preference-based learning for exoskeleton gait optimization. *International Conference on Robotics and Automation (ICRA)*, 2020. **Best Conference Paper Award & Best Paper Award on Human-Robot Interaction**.

[18] Ellen Novoseller, Yibing Wei, **Sui, Yanan**, Joel W. Burdick, and Yisong Yue. Dueling posterior sampling for preference-based reinforcement learning. In *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2020.

[19] Akifumi Wachi and **Sui, Yanan**. Safe reinforcement learning in constrained markov decision processes. In *International Conference on Machine Learning (ICML)*, 2020.

[20] Yue Chen, **Sui, Yanan**, Chen Gong, Bozhi Ma, Hongwei Hao, and Luming Li. Chronically monitoring the deep brain rhythms: latest clinical progress. *Science Bulletin*, 65(12):965–967, 2020.

[21] Hao Fang, Chen Gong, Chen Zhang, **Sui, Yanan**, and Luming Li. Parkinsonian chinese speech analysis towards automatic classification of parkinson's disease. In *Machine Learning for Health (ML4H)*, 2020.

[22] **Sui, Yanan**, Ye Tian, Wai Kin Daniel Ko, Zhiyan Wang, Fumin Jia, Andreas Horn, Dirk De Ridder, Ki Sueng Choi, Ausaf A Bari, Shouyan Wang, et al. Deep brain stimulation initiative: toward innovative technology, new disease indications, and approaches to current and future clinical challenges in neuromodulation therapy. *Frontiers in Neurology*, 11, 2021.

[23] Kejun Li, Maegan Tucker, Erdem Bıyık, Ellen Novoseller, Joel W Burdick, **Sui, Yanan**, Dorsa Sadigh, Yisong Yue, and Aaron D Ames. Roial: Region of interest active learning for characterizing exoskeleton gait preference landscapes. *International Conference on Robotics and Automation (ICRA)*, 2021.

[24] Vincent Zhuang and **Sui, Yanan**. No-regret reinforcement learning with heavy-tailed rewards. In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2021.

[25] Yunyue Wei, Bingquan Zhu, Chen Hou, Chen Zhang, and **Sui, Yanan**. Interactive video acquisition and learning system for motor assessment of parkinson's disease. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

[26] Kuno Kim, Akshat Jindal, Yang Song, Jiaming Song, **Sui, Yanan**, and Stefano Ermon. Imitation with neural density models. *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

[27] Songyuan Zhang, Zhangjie Cao, Dorsa Sadigh, and **Sui, Yanan**. Confidence-aware imitation learning from demonstrations with varying optimality. *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

[28] Akifumi Wachi, Yunyue Wei, and **Sui, Yanan**. Safe policy optimization with local generalized linear function approximations. *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

[29] **Sui, Yanan**, Huiling Yu, Chen Zhang, Yue Chen, Changqing Jiang, and Luming Li. Deep brain–machine interfaces: sensing and modulating the human deep brain. *National Science Review*, 9(10), 2022.

[30] Chen Gong, Yue Chen, **Sui, Yanan**, and Luming Li. Automatic sleep stage classification with cross-modal self-supervised features from deep brain signals. In *2023 11th International IEEE/EMBS Conference on Neural Engineering (NER)*, pages 1–4. IEEE, 2023.

[31] Chenhui Zuo, Kaibo He, Jing Shao, and **Sui, Yanan**. Self model for embodied intelligence: Modeling full-body human musculoskeletal system and locomotion control with hierarchical low-dimensional representation. In *2024 IEEE International Conference on Robotics and Automation (ICRA)*, pages 13062–13069. IEEE, 2024.

[32] Zhengfei Zhang, Yunyue Wei, and **Sui, Yanan**. An invariant information geometric method for high-dimensional online optimization. *Learning for Dynamics Control Conference (L4DC)*, 2024.

[33] Zeji Yi, Yunyue Wei, Chu Xin Cheng, Kaibo He, and **Sui, Yanan**. Improving sample efficiency of high dimensional bayesian optimization with mcmc. *Learning for Dynamics Control Conference (L4DC)*, 2024.

[34] Akifumi Wachi, Xun Shen, and **Sui, Yanan**. A survey of constraint formulations in safe reinforcement learning. *International Joint Conference on Artificial Intelligence (IJCAI)*, 2024.

[35] Zhengfei Zhang, Kishan Panaganti, Laixi Shi, **Sui, Yanan**, Adam Wierman, and Yisong Yue. Distributionally robust constrained reinforcement learning under strong duality. *Reinforcement Learning Conference (RLC)*, 2024.

[36] Kaibo He, Chenhui Zuo, Chengtian Ma, and **Sui, Yanan**. Dynsyn: Dynamical synergistic representation for efficient learning and control in overactuated embodied systems. *International Conference on Machine Learning (ICML)*, 2024.

[37] Bingquan Zhu, Chen Zhang, **Sui, Yanan**, and Luming Li. Facemotionpreserve: a generative approach for facial de-identification and medical information preservation. *Scientific Reports*, 14(1):17275, 2024.

[38] Yunyue Wei, Zeji Yi, Hongda Li, Saraswati Soedarmadji, and **Sui, Yanan**. Safe bayesian optimization for the control of high-dimensional embodied systems. In *8th Annual Conference on Robot Learning (CoRL)*.