Sen Lin, Ph.D.

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Academic Experience

- **University of Houston** — Columbus, OH
  Assistant Professor in Computer Science — *Aug 2023 – Present*

- **The Ohio State University** — Columbus, OH
  Postdoc at NSF AI-EDGE Institute — *Jul 2022 – Aug 2023*
  - **Advisor**: Prof. Ness Shroff
  - **Research focus**: Building theoretic foundation and designing efficient algorithms for continual learning and online bilevel optimization
  - **Research experience**: Build theoretical understanding of continual learning; Investigate new frameworks of bilevel optimization; Develop continual meta-reinforcement learning in dynamic graphs for Edge-AI; Apply bi-level optimization in adversarial learning; Study privacy in offline multi-agent reinforcement learning

- **Arizona State University** — Tempe, AZ
  Postdoc — *Oct 2021 – Jun 2022*
  - **Advisor**: Prof. Junshan Zhang
  - **Research focus**: Designing efficient algorithms for continual learning and offline reinforcement learning
  - **Research experience**: Design efficient continual learning algorithms for Edge-AI; Theoretically investigate warm-start reinforcement learning for Edge-AI; Design efficient algorithms for offline planning; Leverage reinforcement learning to solve real-time scheduling; Design efficient online meta-learning algorithms

- **Arizona State University** — Tempe, AZ
  Graduate Research Assistant — *Aug 2015 – Oct 2021*
  - **Research focus**: Investigating meta-learning in distributed edge learning and model-based reinforcement learning
  - **Research experience**: Design efficient federated meta-learning and online meta-learning algorithms for Edge-AI; Investigate offline meta-reinforcement learning for Edge-AI; Design efficient reinforcement learning algorithms to mitigate overestimation; Apply machine learning algorithms in various Edge-AI applications

Education

- **Arizona State University** — Tempe, AZ
  Ph.D. in Electrical Engineering — *Aug 2015 – Oct 2021*
  - **Advisor**: Prof. Junshan Zhang and Prof. Lei Ying
  - **Dissertation**: Meta-Learning in Edge Networks: Model-Based Reinforcement Learning and Distributed Edge Learning
  - **Dissertation Committee**: Prof. Junshan Zhang; Prof. Lei Ying (UMich); Prof. Dimitri Bertsekas (MIT & ASU); Prof. Angelia Nedich (ASU); Prof. Weina Wang (CMU)

- **The Hong Kong University of Science and Technology** — Hong Kong
  M.Sc. in Telecommunications — *Sep 2013 – Jul 2014*
  - **Thesis**: Advanced Interference Mitigation Techniques in LTE-A
  - **Thesis Advisor**: Prof. Vincent Lau

- **Zhejiang University** — HangZhou, China
  B.E. in Electrical Engineering — *Sep 2009 – Jul 2013*

Teaching

- **COSC4368 Fundamentals of Artificial Intelligence** — University of Houston
  Instructor — *2023 Fall*

- **Senior Design Laboratory II** — Arizona State University
  Teaching Assistant — *2021 Spring*
  - **Duty**: Guidance on project progress; Lab assistance; Referee on final project presentation

- **Digital Design Fundamentals** — Arizona State University
  Teaching Assistant — *2016 Spring*

- **Duty**: Assisting students during office hours; Lab instruction on software digital design; Report grading

- **Digital Design Fundamentals** Arizona State University
  Teaching Assistant *2015 Fall*
  - **Duty**: Assisting students during office hours; Lab instruction on hardware digital design; Report grading

Research Interests

- **Current interests**:
  - Continual Learning, Meta-Learning, Reinforcement Learning, Edge Computing, Bilevel Optimization, Distributed Learning, Wireless Networks, Security and Privacy in AI, Edge-AI Applications, Interdisciplinary Research

Research Project

- **Scalable Continual Meta-Reinforcement Learning for Dynamic Graphs ($200,106)**:
  - **Team members**: Professor Anish Arora (PI), **Sen Lin**, Yung-Fu Chen, Salil Reddy
  - **Duration**: November 1, 2022 - October 31, 2023
  - **Funding agency**: Cisco Systems, Inc.
  - **Focus**: Develop a scalable continual meta-reinforcement learning framework that adapts continually to the new task at hand without forgetting previously learned knowledge, and apply the proposed algorithms in edge applications on dynamic graphs

Teaching Interests

- **Current interests**:
  - Machine Learning, Wireless Networks, Edge Computing, Security Analytics, Probability, Signal Processing, and other courses as required

Publications

We are actively publishing at the most prestigious venues in machine learning area (e.g., NeurIPS, ICML, ICLR, AAMAS) and computer networks (e.g., Mobihoc, INFOCOM, ICDCS)

- **Book**

1. Edge intelligence in the making: optimization, deep learning, and applications
   S. Lin, Z. Zhou, Z. Zhang, X. Chen and J. Zhang
   A Publication in the Morgan & Claypool Publishers series.

- **Conference Paper**

1. Warm-Start Actor-Critic: From Approximation Error to Sub-optimality Gap
   H. Wang, **S. Lin** and J. Zhang
   Accepted by *Fortieth International Conference on Machine Learning (ICML)*, 2023. (**Oral**)
2. Theory on Forgetting and Generalization of Continual Learning
   S. Lin, P. Ju, Y. Liang and N. Shroff
   Accepted by *Fortieth International Conference on Machine Learning (ICML)*, 2023.
3. CLARE: conservative model-based reward learning for offline inverse reinforcement learning
   S. Yue, G. Wang, W. Shao, Z. Zhang, **S. Lin**, J. Ren and J. Zhang
   In *International Conference on Learning Representations (ICLR)*, 2023.
4. Leveraging synergies between AI and networking to build next generation edge networks
   S. Lin, Ming Shi, and All NSF AI-EDGE Faculty Member
   In *The 8th IEEE International Conference on Collaboration and Internet Computing (CIC)*, 2022.
   (Invited Paper)
5. Beyond not-forgetting: continual learning with backward knowledge transfer
   S. Lin, L. Yang, D. Fan and J. Zhang
   In *Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS)*, 2022.

6. CL-LSG: continual learning via learnable sparse growth
   L. Yang, **S. Lin**, J. Zhang and D. Fan
   In *NeurIPS Memory in Artificial and Real Intelligence workshop*, 2022.
7. Federated learning based demand reshaping for electric vehicle charging
   M. Dedeoglu, **S. Lin**, Z. Zhang and J. Zhang
   In *IEEE Global Communications Conference (GLOBECOM)*, 2022.
8. TRGP: trust region gradient projection for continual learning
   S. Lin, L. Yang, D. Fan and J. Zhang
   In *The Tenth International Conference on Learning Representations (ICLR)*, 2022. **(Spotlight, top 5% of all submissions)**
9. Model-based offline meta-reinforcement learning with regularization
   S. Lin, J. Wan, T. Xu, Y. Liang and J. Zhang
   In *The Tenth International Conference on Learning Representations (ICLR)*, 2022.
10. Adaptive ensemble q-learning: minimizing estimation bias via error feedback
    H. Wang, **S. Lin** and J. Zhang
    In *35th Conference on Neural Information Processing Systems (NeurIPS)*, 2021.
11. MetaGater: fast learning of conditional channel gated networks via federated meta-learning
    S. Lin, L. Yang, Z. He, D. Fan and J. Zhang
    In *The 18th IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS)*, 2021. (Invited Paper)
12. Accelerating distributed online meta-learning via multi-agent collaboration under limited communication
    S. Lin, M. Dedeoglu and J. Zhang
    In *Proceedings of the 22th International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc)*, 2021.
13. Inexact-ADMM based federated meta-learning for fast and continual edge learning
    S. Yue, J. Ren, J. Xin, **S. Lin** and J. Zhang
    In *Proceedings of the 22th International Symposium on Theory, Algorithmic Foundations, and Protocal Design for Mobile Networks and Mobile Computing (MobiHoc)*, 2021.
14. Distributed q-learning with state tracking for multi-agent networked control
    H. Wang, **S. Lin**, H. Jafarkhani and J. Zhang
    In *Proceedings of the 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2021.
15. A collaborative learning framework via federated meta-learning
    S. Lin, G. Yang and J. Zhang
    In *2020 40th IEEE International Conference on Distributed Computing Systems (ICDCS)*, Nov 2020.
16. Data-driven distributionally robust optimization for edge intelligence
    Z. Zhang, **S. Lin**, M. Dedeoglu, K. Ding and J. Zhang
    In *2020 IEEE Computer Communications (INFOCOM)*, Jul 2020.
17. Waze-inspired spectrum discovery via smartphone sensing data fusion
    S. Lin, J. Zhang and L. Ying
    In *2018 16th International Symposium on Modeling and Optimization inMobile, Ad Hoc, and Wireless Networks (WiOpt)*, pages 18, May 2018. (**Best Student Paper Award**)

- **Journal Paper**

1. Scheduling real-time wireless traffic: A network-aided offline reinforcement learning approach
   J. Wan, **S. Lin**, Z. Zhang, J. Zhang and T. Zhang
   Accepted by *IEEE Internet of Things Journal*, 2023.
2. Adaptive coalescence of generative models: from wasserstein-1 barycenter to fast edge learning
   M. Dedeoglu, **S. Lin**, Z. Zhang and J. Zhang
   In *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*, 2023.

3. Crowdsensing for spectrum discovery: a waze-inspired design via smartphone sensing
   S. Lin, J. Zhang and L. Ying
   In *IEEE/ACM Transactions on Networking*, Volume: 28, Issue: 2, April 2020.

- **Under Review**

1. Learning from a single graph is all you need for near-shortest path routing in wireless networks
   Y. Chen, **S. Lin** and A. Arora
   Submitted, under review, 2023.
2. Generalization performance of transfer learning: overparameterized and underparameterized regimes
   P. Ju, **S. Lin**, M. Squillante, Y. Liang and N. Shroff
   Submitted, under review, 2023.
3. L-MBOP-E: latent-model based offline planning with extrinsic policy guided exploration
   I. Adham, H. Wang, **S. Lin** and J. Zhang
   Submitted, under review, 2023.
4. Doubly robust instance reweighted adversarial training
   D. Sow, **S. Lin**, Z. Wang and Y. Liang
   Submitted, under review, 2023.
5. Non-convex bilevel optimization with time-varying objective functions
   S. Lin, D. Sow, K. Ji, Y. Liang and N. Shroff
   Submitted, under review, 2023.
6. AdaProx: a novel method for bilevel optimization under pessimistic framework
   Z. Guan, D. Sow, **S. Lin** and Y. Liang
   Submitted, under review, 2023.
7. Lightweight yet more efficient algorithms for online meta-learning in dynamic environment
   D. Sow, **S. Lin**, Y. Liang and J. Zhang
   Submitted, under review, 2023.
8. Efficient self-supervised continual learning with layer-wise weight freezing
   L. Yang, **S. Lin**, J. Zhang and D. Fan
   Submitted, under review, 2023.
9. System identification via meta-learning in linear time-varying environments
   S. Lin, H. Wang and J. Zhang
   Submitted to *Journal of Machine Learning Research (JMLR)*, under review.

Invited Talks and Presentations

- **Leveraging synergies between AI and networking to build next generation edge networks**:
  - at The 8th IEEE International Conference on Collaboration and Internet Computing, December 2022
- **Beyond not-forgetting: continual learning with backward knowledge transfer**:
  - at Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS), November 2022 (Poster presentation)
- **Task-agnostic online meta-learning in non-stationary environments**:
  - at AI-Edge and IBM workshop, June 2022
- **Model-based offline meta-reinforcement learning with regularization**:
  - at AI TIME PhD-ICLR hosted by Tsinghua University, June 2022
- **Model-based offline meta-reinforcement learning with regularization**:
  - at Tenth International Conference on Learning Representations (ICLR), April 2022 (Poster presentation)
- **TRGP: trust region gradient projection for continual learning**:
  - at Tenth International Conference on Learning Representations (ICLR), April 2022 (Poster presentation)
- **TRGP: trust region gradient projection for continual learning**:

- at ReadPaper of International Digital Economy Academy, March 2022

- **MetaGater: fast learning of conditional channel gated networks via federated meta-learning**:
  - at The 18th IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS), October 2021

- **Accelerating distributed online meta-learning via multi-agent collaboration under limited communication**:
  - at Proceedings of the 22th International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc), July 2021

- **A collaborative learning framework via federated meta-learning**:
  - at 40th IEEE International Conference on Distributed Computing Systems (ICDCS), December 2020

- **Waze-inspired spectrum discovery via smartphone sensing data fusion**:
  - at 16th International Symposium on Modeling and Optimization inMobile, Ad Hoc, and Wireless Networks (WiOpt), May 2018

References

- **Dr. Junshan Zhang**
  - Professor of ECE
  - University of California, Davis
  - Email: jazh@ucdavis.edu
  - Phone: (480) 678-0300

- **Dr. Ness Shroff**
  - Chaired Professor of ECE and CSE
  - The Ohio State University
  - Email: shroff.11@osu.edu
  - Phone Number: (614) 961-2909

- **Dr. Yingbin Liang**
  - Professor of ECE
  - The Ohio State University
  - Email: yingbinliang@gmail.com
  - Phone Number: (609) 658-1330

- **Dr. Anish Arora**
  - Professor and Chair of CSE
  - The Ohio State University
  - Email: anish@cse.ohio-state.edu
  - Phone Number: (614) 292-1836

Hornors

- **ICML Oral**: 2023
- **ICLR Spotlight**: 2022
- **University Graduate Fellowship**: 2015, 2021
- **Best Student Paper Award in WiOpt 2018**: 2018
- **Third-Class Scholarship for Outstanding Merits of Zhejiang University**: 2012
- **Third-Class Scholarship for Outstanding Students of Zhejiang University**: 2012
- **Excellent Student Awards of Zhejiang University**: 2012
- **Third Prize of the National Talents Training Base**: 2012

Activities

- **Conference Service**:
  - PC member of PhD Student Symposium for ICDCS 2023
- **Journal Reviewer**:
  - IEEE Wireless Communications Magazine
  - IEEE/ACM Transactions on Networking
  - IEEE Transactions on Wireless Communications
  - IEEE Internet of Things Journal
  - IEEE Transactions on Cloud Computing
  - ACM Transactions on Knowledge Discovery from Data
  - IEEE Computational Intelligence Magazine
  - IEEE Transactions on Neural Networks and Learning Systems
  - China Communications
- **Conference Reviewer**:
  - Conference on Neural Information Processing Systems (NeurIPS) 2022, 2023
  - International Conference on Machine Learning (ICML) 2023
  - The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2023
  - International Conference on Computer Vision (ICCV) 2023
  - ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS) 2023
  - IEEE International Conference on Sensing, Communication and Networking (SECON)
  - International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc)
  - IEEE Global Communications Conference (Globecom)

Additional Information

- **Skills**: Matlab, Python, C, Ruby, Verilog