PEIZHONG JU

PARTICULARS

Current Position

Postdoctoral Scholar — Columbus, OH, USA
ECE department at **The Ohio State University** — *2021 - present*
NSF AI Institute on Future Edge Networks and Distributed Intelligence

Education

Purdue University — West Lafayette, IN, USA
Ph. D. in Electrical and Computer Engineering — *2016 - 2021*

Peking University — Beijing, China
B. Sc. in Electrical Engineering — *2012 - 2016*

Research Interests

My research interests span the areas of machine learning, smart grid, and wireless communication. My current research topics are about analyzing the performance of various machine learning models and designing new machine learning algorithms for multi-agent systems.

ACADEMIC HONORS

- Best Paper Award, 13^{th} ACM International Conference on Future Energy Systems (ACM e-Energy 2022)
- The Bilsland Dissertation Fellowship, Purdue University, 2021
- Best Paper Award Finalist of 9^{th} ACM International Conference on Future Energy Systems (ACM e-Energy 2018)
- Outstanding Graduate Award of EE department of Peking University, 2016 (the only one that year)
- IEEE Student Grant, 2015
- Research Excellence Award, Peking University, 2015
- China National Scholarship, 2015
- Samsung Scholarship, 2014
- EMC Scholarship, 2013

RESEARCH EXPERIENCE

- **Postdoctoral Scholar, the Ohio State University**, supervisor: Prof. Ness B. Shroff.
  - Multi-agent Reinforcement Learning, Multi-task supervised learning, Generalization Performance Analysis. (Oct. 2021 - Present)
- **Research Assistant, Purdue University**, advisor: Prof. Xiaojun Lin.
  - Overfitting in Machine Learning (Oct. 2019 - Sept. 2021)
  - Market Design for Renewable in Power Distribution Level (Aug. 2018 - Oct. 2019)
  - Voltage Control in Power Grid with Renewable (Aug. 2016 - Aug. 2018)
- **Undergraduate Research Assistant, Peking University, China**, advisor: Prof. Xiang Cheng.
  - Antenna Grouping for Massive MIMO (Sep. 2015 - June 2016)
  - Self-Interference Cancellation for Full-Duplex (Oct. 2013 - Sep. 2015)

PUBLICATIONS

Conference Papers

1. Sen Lin, **Peizhong Ju (co-first author)**, Yingbin Liang, and Ness B. Shroff, "Theory on Forgetting and Generalization of Continual Learning," 40^{th} *International Conference on Machine Learning (ICML'23)*.

2. **Peizhong Ju**, Yingbin Liang, and Ness B. Shroff, "Theoretical Characterization of the Generalization Performance of Overfitted Meta-Learning," 11^{th} *International Conference on Learning Representations (ICLR'23)*.

3. **Peizhong Ju**, Xiaojun Lin, and Ness B. Shroff, "On the Generalization Power of Overfitted Three-Layer Neural Tangent Kernel Model," 36^{th} *Conference on Neural Information Processing Systems (NeurIPS'22)*.

4. **Peizhong Ju**, Xiaojun Lin, and Jianwei Huang, "Distribution-Level Markets under High Renewable Energy Penetration," *Proceedings of the* 13^{th} *ACM International Conference on Future Energy Systems (e-Energy'22)* (**Best Paper Award**).

5. **Peizhong Ju**, Xiaojun Lin, and Ness B. Shroff, "On the Generalization Power of Overfitted Two-Layer Neural Tangent Kernel Models," *Proceedings of the* 38^{th} *International Conference on Machine Learning (ICML'21)*, (**spotlight** presentation), PMLR 139:5137-5147, 2021.

6. **Peizhong Ju**, Xiaojun Lin, and Jia Liu, "Overfitting Can Be Harmless for Basis Pursuit, But Only to a Degree," accepted as **spotlight** presentation at 34^{th} *Conference on Neural Information Processing Systems (NeurIPS'20)* (acceptance rate: 20%, spotlight presentations: 3%).

7. **Peizhong Ju**, and Xiaojun Lin, "Adversarial Attacks to Distributed Voltage Control in Power Distribution Networks with DERs," best paper award finalist, *Proceedings of the* 9^{th} *International Conference on Future Energy Systems (e-Energy'18)*, pp. 291-302, Karlsruhe, Germany, June 12-15, 2018.

8. **Peizhong Ju**, Meng Zhang, Xiang Cheng, and Liuqing Yang, "Generalized spatial modulation with transmit antenna grouping for massive MIMO," *Proceedings of 2017 IEEE International Conference on Communications (ICC'17)*, Paris, France, May 21-25, 2017.

9. **Peizhong Ju**, Meng Zhang, Xiang Cheng, Cheng-Xiang Wang, and Liuqing Yang, "Generalized spatial modulation with transmit antenna grouping for correlated channels," *Proceedings of 2016 IEEE International Conference on Communications (ICC'16)*, Kuala Lumpur, Malaysia, May 22-27, 2016.

10. **Peizhong Ju**, Miaowen Wen, Xiang Cheng, and Liuqing Yang, "An Effective Self-Interference Cancellation Scheme for Spatial Modulated Full Duplex Systems," *Proceedings of 2015 IEEE International Conference on Communications (ICC'15)*, London, UK, June 8-12, 2015.

Journal Papers

11. **Peizhong Ju**, Miaowen Wen, Xiang Cheng, and Liuqing Yang, "Achievable-Rate-Enhancing Self-Interference Cancellation for Full-Duplex Communications," *IEEE Transactions on Wireless Communications*, vol. 17 no. 12, pp. 8473-8484, 2018.

12. Weilin Qu, Meng Zhang, Xiang Cheng, and **Peizhong Ju**, "Generalized Spatial Modulation With Transmit Antenna Grouping for Massive MIMO," *IEEE Access*, vol. 5, pp. 26798-26807, 2017.

Pending Papers

13. **Peizhong Ju**, Haibo Yang, Jia Liu, Yingbin Liang, Ness B. Shroff, "Understanding the Theoretical Generalization Performance of Federated Learning."

14. **Peizhong Ju**, Arnob Ghosh, and Ness B. Shroff, "Achieving Fairness in Multi-Agent Markov Decision Processes Using Reinforcement Learning," *arXiv preprint arXiv:2306.00324 (2023)*.

15. **Peizhong Ju**, Sen Lin, Mark S. Squillante, Yingbin Liang, and Ness B. Shroff, "Generalization Performance of Transfer Learning: Overparameterized and Underparameterized Regimes," *arXiv preprint arXiv:2306.04901 (2023)*.

16. Yining Li, **Peizhong Ju**, and Ness B. Shroff, "Achieving Sample and Computational Efficient Reinforcement Learning by Action Space Reduction via Grouping," *arXiv preprint arXiv:2306.12981 (2023)*.

17. Chengzhang Li, **Peizhong Ju**, Atilla Eryilmaz, and Ness B. Shroff, "Distributed Linear Dimensionality Reduction Assisted by Centralized NN for Classification."

18. **Peizhong Ju**, Chengzhang Li (co-first author), Yingbin Liang, and Ness B. Shroff (the last two authors represent the entire AI-EDGE faculty team), "AI-EDGE: An NSF AI Institute for Future Edge Networks and Distributed Intelligence."

Book Chapters

1. **Peizhong Ju**, Xiaojun Lin, and Ness B. Shroff, "On the Generalization Power of Overfitted Two-Layer Neural Tangent Kernel Models," Chapter 3 of *Artificial Intelligence for Edge Computing*, Springer Nature. (Ongoing)

Patents

1. Xiang Cheng, **Peizhong Ju**, and Miaowen Wen, "A method of self-interference cancellation scheme for full duplex systems," 2015100550190, State Intellectual Property Office of the People's Republic of China.

INVITED TALKS

1. "On the Generalization Power of the Overfitted Three-Layer Neural Tangent Kernel Model"
   The 15^{th} International Conference of the ERCIM WG on Computational and Methodological Statistics (CM-Statistics 2022), King's College London, 17-19 December 2022.

2. "Distribution Level Markets under High Renewable Energy Penetration"
   AIRS in the AIR Academic Series, Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS), Shenzhen, China, August 23, 2022.

3. "On the Generalization Power of Overfitted Two-Layer Neural Tangent Kernel Models"
   Long Feng Science Forum, CUHK-Shenzhen, August 19, 2022.

4. "On the Generalization Power of Overfitted Two-Layer Neural Tangent Kernel Models"
   Joint Workshop between AI-EDGE and IBM, the Ohio State University, Columbus, June 15, 2022.

5. "On the Generalization Power of Overfitted Two-Layer Neural Tangent Kernel Models"
   TDAI deep learning summer school, the Ohio State University, Columbus, June 3, 2022.

MEDIA COVERAGE

- **The Ohio State University News** (Jul 20, 2023), "Future AI algorithms have potential to learn like humans, say researchers." A research by Sen Lin, Peizhong Ju, Yingbin Liang, and Ness Shroff on "continual learning" will be presented at the 40^{th} International Conference on Machine Learning, Honolulu, Hawaii.

TEACHING & MENTORING EXPERIENCE

- **Secondary Instructor.** CSE-ECE 6461/6101: Introduction to Computer Communication Networks, Prof. Ness B. Shroff, Fall 2023, the Ohio State University.
- **Mentoring** a female PhD student under the supervision of Prof. Ness B. Shroff at the Ohio State University (Oct. 2021 - present).
- **Mentoring** an undergraduate student in Minority Serving Institutions (MSI) summer internships for AI-EDGE, Summer 2022.
- **Teaching Assistant.** ECE 368: Data Structures, Prof. Cheng-Kok Koh, Spring 2020, Purdue University.
- **Teaching Assistant.** ECE 547: Introduction to Computer Communication Networks, Prof. Xiaojun Lin, Fall 2018 and Fall 2020, Purdue University.
- **Undergraduate Teaching Assistant.** Introduction to Computation, Prof. Yafei Dai, Fall 2012, Peking University, China.

SERVICE

- **Reviewer (Journals)**
  - Transactions on Machine Learning Research (TMLR)
  - IEEE Transactions on Vehicular Technology (TVT)
  - IEEE Transactions on Wireless Communications (TWC)
  - IEEE Journal of Selected Topics in Signal Processing (J-STSP)
  - IEEE Transactions on Sustainable Computing (TSUSC)
  - IEEE Access
  - IEEE/ACM Transactions on Networking (TON)
  - Networks and Spatial Economics (NETS)
  - Internet Technology Letters
  - Transactions on Mobile Computing (TMC)
  - Frontiers of Information Technology & Electronic Engineering
- **Reviewer (Conferences)**
  - 12^{th} International Conference on Learning Representations (ICLR'24)
  - 37^{th} Conference on Neural Information Processing Systems (NeurIPS'23)
  - 40^{th} International Conference on Machine Learning (ICML'23)
  - 11^{th} International Conference on Learning Representations (ICLR'23)
  - 36^{th} Conference on Neural Information Processing Systems (NeurIPS'22)
  - 39^{th} International Conference on Machine Learning (ICML'22)
  - 10^{th} International Conference on Learning Representations (ICLR'22)
  - 35^{th} Conference on Neural Information Processing Systems (NeurIPS'21)
  - 2021 National Conference on Communications (NCC'21)
  - 38^{th} International Conference on Machine Learning (ICML'21)
  - IEEE Vehicular Technology Conference (VTC2015-Spring)
  - IEEE International Conference on Communications (ICC'16)

LANGUAGES

Proficient in English and Mandarin Chinese.