Changlong Wu

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Employment History

Visiting Assistant Professor, Department of Computer Science — West Lafayette, USA
Purdue University — Oct. 2023– present

Postdoctoral Research Associate, NSF Center for Science of Information — West Lafayette, USA
Purdue University, Hosts: Prof. Wojciech Szpankowski and Prof. Ananth Grama — Oct. 2021– Oct. 2023

Education

Ph.D. in Electrical Engineering — Honolulu, USA
University of Hawaii at Manoa, Advisor: Prof. Narayana P. Santhanam — 2015–2021

– Dissertation: "Online learning and prediction with eventual almost sure guarantees"

B.Eng. in Computer Science — Wuhan, China
Wuhan University (HongYi Honor College) — 2011–2015

Research Interests

My research is primarily centered on theoretical machine learning, and its interactions with information theory, statistics, and their application domains. Currently, my research focuses on understanding the algorithmic and statistical foundations of *online learning*, *estimation theory* and the *trustworthy machine learning*.

Publications

Note: $*$ indicates co-first author and † indicates corresponding author. Machine Learning conferences: COLT, ICML, NeurIPS, AISTATS, ALT; Journals: TIT, TMLR; Info. Theory conferences: ISIT, ICASSP, CISS.

Journal and Selective Conference Papers

[S1] C. Wu†, Y. Wang, and A. Grama, "A theory of fault-tolerant learning", in *International Conference on Machine Learning (**ICML**)*, 2024. (**Spotlight, acceptance rate 3.5%**).

[S2] C. Wu†, J. Sima, and W. Szpankowski, "Oracle-efficient hybrid online learning with unknown distribution", in *Annual Conference on Learning Theory (**COLT**)*, PMLR 247, 2024, pp. 4992–5018.

[S3] J. Sima*, C. Wu*†, O. Milenkovic, and W. Szpankowski, "Online distribution learning with local privacy constraints", in *International Conference on Artificial Intelligence and Statistics (**AISTATS**)*, PMLR 238, 2024, pp. 460–468.

[S4] C. Wu†, A. Grama, and W. Szpankowski, "Online learning in dynamically changing environments", in *Annual Conference on Learning Theory (**COLT**)*, PMLR 195, 2023, pp. 325–358.

[S5] C. Wu†, M. Heidari, A. Grama, and W. Szpankowski, "Regret bounds for log-loss via bayesian algorithms", *IEEE Transactions on Information Theory (**TIT**)*, vol. 69, no. 9, pp. 5971–5989, 2023.

[S6] C. Wu†, M. Heidari, A. Grama, and W. Szpankowski, "Expected worst case regret via stochastic sequential covering", *Transactions on Machine Learning Research (**TMLR**)*, 2023, ISSN: 2835-8856.

[S7] C. Wu†, Y. Wang, A. Grama, and W. Szpankowski, "Learning functional distributions with private labels", in *International Conference on Machine Learning (**ICML**)*, PMLR 202, 2023, pp. 37728–37744.

[S8] C. Wu†, M. Heidari, A. Grama, and W. Szpankowski, "Precise regret bounds for log-loss via a truncated bayesian algorithm", in *Annual Conference on Neural Information Processing Systems (**NeurIPS**)*, 2022, pp. 26903–26914. (**Oral, acceptance rate 1.8%**).

[S9] C. Wu† and N. Santhanam, "Non-uniform consistency of online learning with random sampling", in *International Conference on Algorithmic Learning Theory (**ALT**)*, PMLR 132, 2021, pp. 1265–1285.

[S10] C. Wu† and N. Santhanam, "Prediction with finitely many errors almost surely", in *International Conference on Artificial Intelligence and Statistics (**AISTATS**)*, PMLR 130, 2021, pp. 3223–3231.

Refereed (Short) Conference Papers

[C1] M. Drmota, P. Jacquet, C. Wu, and W. Szpankowski, "Minimax regret with unbounded weights", in *2024 IEEE International Symposium on Information Theory (**ISIT**)*, To appear, 2024.

[C2] C. Wu, M. Heidari, A. Grama, and W. Szpankowski, "Sequential vs. fixed design regrets in online learning", in *2022 IEEE International Symposium on Information Theory (**ISIT**)*, IEEE, 2022, pp. 438–443.

[C3] C. Wu and N. Santhanam, "Estimating properties of dynamic graphical models", in *2021 IEEE International Symposium on Information Theory (**ISIT**)*, IEEE, 2021, pp. 391–395.

[C4] C. Wu and N. Santhanam, "Entropy property testing with finitely many errors", in *IEEE International Symposium on Information Theory (**ISIT**)*, IEEE, 2020, pp. 2568–2573.

[C5] C. Wu and N. P. Santhanam, "Almost uniform sampling from neural networks", in *54th Annual Conference on Information Sciences and Systems (**CISS**)*, IEEE, 2020, pp. 1–6.

[C6] C. Wu and N. Santhanam, "Being correct eventually almost surely", in *IEEE International Symposium on Information Theory (**ISIT**)*, IEEE, 2019, pp. 1989–1993.

[C7] C. Wu, W. Chen, and J. Zhang, "Greedy algorithm with approximation ratio for sampling noisy graph signals", in *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, IEEE, 2018, pp. 4654–4658.

[C8] C. Wu, M. Hosseini, and N. Santhanam, "Redundancy of unbounded memory markov classes with continuity conditions", in *2018 IEEE International Symposium on Information Theory (**ISIT**)*, IEEE, 2018, pp. 211–215.

[C9] K. Oshiro*, C. Wu*, and N. P. Santhanam, "Jackknife estimation for markov processes with no mixing constraints", in *2017 IEEE International Symposium on Information Theory (**ISIT**)*, IEEE, 2017, pp. 3020–3024.

Preprints

[P1] C. Wu, A. Grama, and W. Szpankowski, "Robust online classification: From estimation to denoising", 2024, Preprint; available from arXiv:2309.01698.

[P2] C. Wu and N. Santhanam, "Prediction with eventual almost sure guarantees", 2024, Preprint; available from arXiv:2001.03710v2.

Professional Services

- **Journal Reviewer**: IEEE Transactions on Information Theory, 2018-present.
- **Conference Reviewer and PC member**: ISIT 2018-2021, 2023-2024; AISTATS 2021; TheWebConf 2023; NeurIPS 2023-2024; ALT 2024-2025; ICLR 2024; ICML 2024.

Invited Talks

- *Oracle-Efficient Hybrid Online Learning with Unknown Distribution* Feb. 2024
  2024 Information Theory and Applications (ITA) Workshop (**Invited**), San Diego.
- *Universal Stochastic Online Learning, Mixability, and Denoising* Sep. 2023
  University of Illinois at Urbana-Champaign, ECE Department, SINE Seminar Series.
- *Precise Regret Bounds for Log-loss via a Truncated Bayesian Algorithm* Nov. 2022
  NeurIPS 2022 featured paper panel, i.e., the virtual **oral presentation** due COVID-19.
- *Prediction and Learning with eventual almost sure guarantees* Mar. 2021
  Purdue University, CS Department, CSoI Seminar Series (Online due to COVID-19).

Honors and Awards

- UH Manoa, EE Department Research Excellence Award ($1000). 2019
- ISIT 2019 Student Travel Grant ($500). 2019