





Jane Lange



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Research interests

- Computational learning theory 
- Sublinear algorithms 
- Property testing and reconstruction 
- Analysis of Boolean functions 

Education



- 2020 – ongoing  **Ph.D., Massachusetts Institute of Technology** in Computer Science.
Advisor: Ronitt Rubinfeld
- 2016 – 2020  **B.S.H., Stanford University** in Computer Science.
Honors thesis title: *Constructive derandomization of query algorithms*
Thesis advisor: Li-Yang Tan

Research Publications

Journal Articles

- 1 G. Blanc, J. Lange, M. Qiao, and L. Tan, “Properly learning decision trees in almost polynomial time,” *J. ACM*, vol. 69, no. 6, 39:1–39:19, 2022.
- 2 Y. Sheng, Y. Zohar, C. Ringeissen, J. Lange, P. Fontaine, and C. W. Barrett, “Polite combination of algebraic datatypes,” *J. Autom. Reason.*, vol. 66, no. 3, pp. 331–355, 2022.

Manuscripts and Preprints

- 1 G. Blanc, J. Lange, C. Pabbaraju, C. Sullivan, L. Tan, and M. Tiwari, “Harnessing the power of choices in decision tree learning,” to appear in *ICML 2023*.  URL: <https://arxiv.org/abs/2310.01551>.
- 2 J. Lange, E. Linder, S. Raskhodnikova, and A. Vasilyan, “Local Lipschitz filters for bounded-range functions with applications to arbitrary real-valued functions,” 2023.  URL: <https://arxiv.org/abs/2308.14716>.

Conference Proceedings

- 1 G. Blanc, C. Koch, J. Lange, C. Strassle, and L. Tan, “Certification with an NP oracle,” in *ITCS*, ser. LIPIcs, vol. 251, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2023, 18:1–18:22.
- 2 G. Blanc, J. Lange, A. Malik, and L. Tan, “Lifting uniform learners via distributional decomposition,” in *STOC*, ACM, 2023, pp. 1755–1767.
- 3 J. Lange and A. Vasilyan, “Agnostic proper learning of monotone functions: Beyond the black-box correction barrier,” in *FOCS*, IEEE, 2023, pp. 1149–1170.
- 4 G. Blanc, C. Koch, J. Lange, and L. Tan, “A query-optimal algorithm for finding counterfactuals,” in *ICML*, ser. Proceedings of Machine Learning Research, vol. 162, PMLR, 2022, pp. 2075–2090.
- 5 G. Blanc, C. Koch, J. Lange, and L. Tan, “The query complexity of certification,” in *STOC*, ACM, 2022, pp. 623–636.

- 6 G. Blanc, J. Lange, A. Malik, and L. Tan, “On the power of adaptivity in statistical adversaries,” in *COLT*, ser. Proceedings of Machine Learning Research, vol. 178, PMLR, 2022, pp. 5030–5061.
- 7 G. Blanc, J. Lange, A. Malik, and L. Tan, “Popular decision tree algorithms are provably noise tolerant,” in *ICML*, ser. Proceedings of Machine Learning Research, vol. 162, PMLR, 2022, pp. 2091–2106.
- 8 G. Blanc, J. Lange, and L. Tan, “Reconstructing decision trees,” in *ICALP*, ser. LIPIcs, vol. 229, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022, 24:1–24:17.
- 9 J. Lange, R. Rubinfeld, and A. Vasilyan, “Properly learning monotone functions via local correction,” in *FOCS*, IEEE, 2022, pp. 75–86.
- 10 G. Blanc, J. Lange, M. Qiao, and L. Tan, “Decision tree heuristics can fail, even in the smoothed setting,” in *APPROX-RANDOM*, ser. LIPIcs, vol. 207, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021, 45:1–45:16.
- 11 G. Blanc, J. Lange, M. Qiao, and L. Tan, “Properly learning decision trees in almost polynomial time,” in *FOCS*, IEEE, 2021, pp. 920–929.
- 12 G. Blanc, J. Lange, and L. Tan, “Provably efficient, succinct, and precise explanations,” in *NeurIPS*, 2021, pp. 6129–6141.
- 13 G. Blanc, J. Lange, and L. Tan, “Query strategies for priced information, revisited,” in *SODA*, SIAM, 2021, pp. 1638–1650.
- 14 G. Blanc, N. Gupta, J. Lange, and L. Tan, “Estimating decision tree learnability with polylogarithmic sample complexity,” in *NeurIPS*, 2020.
- 15 G. Blanc, N. Gupta, J. Lange, and L. Tan, “Universal guarantees for decision tree induction via a higher-order splitting criterion,” in *NeurIPS*, 2020.
- 16 G. Blanc, J. Lange, and L. Tan, “Top-down induction of decision trees: Rigorous guarantees and inherent limitations,” in *ITCS*, ser. LIPIcs, vol. 151, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020, 44:1–44:44.
- 17 Y. Sheng, Y. Zohar, C. Ringeissen, J. Lange, P. Fontaine, and C. W. Barrett, “Politeness for the theory of algebraic datatypes,” in *IJCAR (1)*, ser. Lecture Notes in Computer Science, vol. 12166, Springer, 2020, pp. 238–255.

Employment History

- 2023 ■ **Research intern**, Microsoft Research (Physics of AGI group).
- 2021 ■ **Research intern**, Google (Privacy group).
- 2017 – 2020 ■ **Teaching assistant**, Stanford (CS107e).

Seminar and Workshop Talks

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| CMU AI Seminar | ■ Agnostic proper learning of monotone functions |
| BU Algorithms and Theory Seminar | ■ Properly learning monotone functions via local correction |
| Workshop on Local Algorithms | ■ Properly learning monotone functions via local correction |
| MIT Theory of ML Seminar | ■ On the power of adaptivity in statistical adversaries |
| MIT Algorithms and Complexity Seminar | ■ Properly learning decision trees in almost polynomial time |