

# Jane Lange

✉ janeclange@gmail.com      🌐 <https://janeclange.github.io>

🏠 32 Vassar Street 32-G630, Cambridge, MA 02141

## Research interests

Computational learning theory      📖  
Sublinear algorithms      📖  
Property testing and reconstruction      📖

## Education

- 2020 – 2026      📖 **Ph.D., Massachusetts Institute of Technology** in Computer Science.  
Thesis title: *Learning interpretable and reliable classifiers using local algorithms*  
Advisor: Ronitt Rubinfeld
- 2020 – 2025      📖 **S.M., Massachusetts Institute of Technology** in Computer Science.  
Thesis title: *Explaining black-box classifiers by implicitly learning decision trees*  
Thesis 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 J. Lange and A. Vasilyan, “Agnostic proper learning of monotone functions: Beyond the black-box correction barrier,” *SIAM Journal on Computing*, no. 0, FOCS23–1, 2025.
- 2 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.
- 3 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.

### Selected Conference Proceedings

- 1 G. Blanc, C. Koch, J. Lange, C. Strassle, and L. Tan, “Samplability makes learning easier,” in *17th Innovations in Theoretical Computer Science Conference, ITCS 2026, Bocconi University, Milan, Italy, January 27–30, 2026*, S. Saraf, Ed., ser. LIPIcs, vol. 362, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2026, 20:1–20:12.
- 2 J. Lange and M. Qiao, “Limitations of membership queries in testable learning,” in *17th Innovations in Theoretical Computer Science Conference, ITCS 2026, Bocconi University, Milan, Italy, January 27–30, 2026*, S. Saraf, Ed., ser. LIPIcs, vol. 362, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2026, 91:1–91:23.
- 3 G. Blanc, J. Lange, C. Strassle, and L. Tan, “A distributional-lifting theorem for PAC learning,” in *The Thirty Eighth Annual Conference on Learning Theory, 30–4 July 2025, Lyon, France*, ser. Proceedings of Machine Learning Research, vol. 291, PMLR, 2025, pp. 375–379.
- 4 S. Chen, J. de Dios Pont, J. Hsieh, H. Huang, J. Lange, and J. Li, “Predicting quantum channels over general product distributions,” in *The Thirty Eighth Annual Conference on Learning Theory, 30–4 July 2025, Lyon, France*, ser. Proceedings of Machine Learning Research, vol. 291, PMLR, 2025, pp. 986–1007.

- 5 J. Lange, E. Linder, S. Raskhodnikova, and A. Vasilyan, “Local lipschitz filters for bounded-range functions with applications to arbitrary real-valued functions,” in *Proceedings of the 2025 Annual ACM-SIAM Symposium on Discrete Algorithms, SODA 2025, New Orleans, LA, USA, January 12-15, 2025*, 2025.
- 6 J. Lange and A. Vasilyan, “Robust learning of halfspaces under log-concave marginals,” in *Advances in Neural Information Processing Systems 38: Annual Conference on Neural Information Processing Systems 2025, NeurIPS 2025, San Diego, CA, USA, December 2-7, 2025 / Mexico City, Mexico, November 30 - December 5, 2025*, D. Belgrave et al., Eds., 2025.
- 7 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.
- 8 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.
- 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, and L. Tan, “Provably efficient, succinct, and precise explanations,” vol. 34, 2021, pp. 6129–6141.
- 11 G. Blanc, J. Lange, and L. Tan, “Query strategies for priced information, revisited,” in *Proceedings of the 2021 ACM-SIAM Symposium on Discrete Algorithms (SODA)*, SIAM, 2021, pp. 1638–1650.
- 12 G. Blanc, N. Gupta, J. Lange, and L. Tan, “Universal guarantees for decision tree induction via a higher-order splitting criterion,” in *Advances in Neural Information Processing Systems*, vol. 33, 2020, pp. 9475–9484.
- 13 G. Blanc, J. Lange, and L. Tan, “Top-down induction of decision trees: Rigorous guarantees and inherent limitations,” in *11th Innovations in Theoretical Computer Science Conference (ITCS 2020)*, ser. LIPIcs, vol. 151, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020, 44:1–44:44.

## Employment History

- 2024      **Teaching assistant**, MIT (Sublinear algorithms).
- 2023      **Research intern**, Microsoft Research (Physics of AGI group).
- 2021      **Research intern**, Google (Privacy group).
- 2017 – 2020      **Teaching assistant**, Stanford (CS107e).

## Selected Seminar and Workshop Talks

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|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cornell Junior Theorists' Workshop    |  Limitations of membership queries in testable learning (2026)       |
| Workshop on Local Algorithms          |  Robustly learning halfspaces under log-concave distributions (2025) |
| Simons Graph Simplification Workshop  |  Agnostic proper learning of monotone functions (2024)               |
| UMass Amherst Theory Seminar          |  Lifting uniform learners via distributional decomposition (2024)    |
| CMU AI Seminar                        |  Agnostic proper learning of monotone functions (2023)               |
| MIT Theory of ML Seminar              |  On the power of adaptivity in statistical adversaries (2023)        |
| MIT Algorithms and Complexity Seminar |  Properly learning decision trees in almost polynomial time (2022)   |