Abigail Gentle

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Summary

My work aims to understand the limits of statistical inference under Differential Privacy, the gold-standard for privacy enhancing technology. I work primarily in the local model, where data is made private before it is collected and stored. To this end, I have had the pleasure of working on fundamental problems such as quantiles (ICML 2025), hypothesis testing (ITCS 2026), and histograms, where I have taken part in proving both novel error bounds (ITCS 2025) and, in independent work, a deep connection between optimal algorithms and a special class of combinatorial objects (ITW 2025). I am broadly interested in collaborations in privacy, property testing, and applied problems of statistics and the application of privacy enhancing technologies to the social sciences.

Education

2023 - Present | **Doctor of Philosophy, Computer Science**
The University of Sydney, *Supervisors:* Clément Canonne *and* Sasha Rubin

2022 - 2023 | **Bachelor of Science (Computer Science Honours) Honours Class I**
The University of Sydney, *Supervisor*: Clément Canonne
Thesis: "Differential Privacy in the Group Shuffle Model."

2018 - 2022 | **Bachelor of Science (Computer Science) (Philosophy)**
The University of Sydney

Professional Experience

2023 - 2024 | **KG2 Agricultural Data Platform**
Lead Researcher
Led a small team to develop a geo-spatial satellite machine learning platform. Improved and maintained pipelines for Australia's largest farmer database.

Publications

Authors are listed in alphabetical order, with equal contribution from each.

1. C. L. Canonne, **A. Gentle** and V. Singhal, "Uniformity Testing under User-Level Local Privacy." **17th Innovations in Theoretical Computer Science Conference** (ITCS 2026).
2. **A. Gentle**, "Necessity of Block Designs for Optimal Locally Private Distribution Estimation." **IEEE Information Theory Workshop** (ITW 2025).
3. A. Aamand, F. Boninsegna, **A. Gentle**, J. Imola, and R. Pagh, "Lightweight Protocols for Distributed Private Quantile Estimation." **Forty-second International Conference on Machine Learning** (ICML 2025).
4. C. L. Canonne and **A. Gentle**, "Locally Private Histograms in All Privacy Regimes." **16th Innovations in Theoretical Computer Science Conference** (ITCS 2025).

Invited & Conference Talks

2025 | **IEEE Information Theory Workshop**, Sydney, Australia
Necessity of Block Designs for Optimal Locally Private Distribution Estimation

2024 | **Simons Institute for the Theory of Computing**, University of California, Berkeley
Hidden Gems: Kearns Saul's Inequality
For the Sublinear Algorithms Summer Research Program

Institutional Talks and Reading Groups

2024 | **Simons Institute for the Theory of Computing**, University of California, Berkeley
Differential Privacy Reading Group (Organiser)
A weekly differential privacy reading group for the Sublinear Algorithms Summer Research Program. Gave the introductory talk on differential privacy, a focused talk on shuffle differential privacy, and arranged speakers.

2024 - 2025 | **Sydney Algorithms and Computational Theory Group**, University of Sydney
SACT Seminar
Seminars on "Locally Private Histograms in All Privacy Regimes" and "Lightweight Protocols for Distributed Private Quantile Estimation."