

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

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| 2023 - Present | Doctor of Philosophy, Computer Science
<i>The University of Sydney, Supervisors: Clément Canonne and Sasha Rubin</i> |
| 2022 | Bachelor of Science (Computer Science Honours) Honours Class I
<i>The University of Sydney, Supervisor: Clément Canonne</i>
Thesis: "Differential Privacy in the Group Shuffle Model." |
| 2018 - 2021 | Bachelor of Science (Computer Science) (Philosophy)
<i>The University of Sydney</i> |

Professional Experience

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| 2022 - 2023 | KG2 Agricultural Data Platform
<i>Lead Researcher</i>
Led a small team to develop an geo-spatial machine learning classification platform. Improved and maintained pipelines for Australia's largest farmer database. |
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Publications

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

- C. L. Canonne, **A. Gentle** and V. Singhal, "Uniformity Testing under User-Level Local Privacy." **17th Innovations in Theoretical Computer Science Conference** (ITCS 2026).
- A. Gentle**, "Necessity of Block Designs for Optimal Locally Private Distribution Estimation." **IEEE Information Theory Workshop** (ITW 2025).
- 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).
- 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

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| 2025 | IEEE Information Theory Workshop , Sydney, Australia
<i>Necessity of Block Designs for Optimal Locally Private Distribution Estimation</i> |
| 2024 | Simons Institute for the Theory of Computing , University of California, Berkeley
<i>Hidden Gems: Kearns Saul's Inequality</i>
For the Sublinear Algorithms Summer Research Program |

Institutional Talks and Reading Groups

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| 2024 | Simons Institute for the Theory of Computing , University of California, Berkeley
<i>Differential Privacy Reading Group (Organiser)</i>
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
<i>SACT Seminar</i>
Seminars on "Locally Private Histograms in All Privacy Regimes" and "Lightweight Protocols for Distributed Private Quantile Estimation." |