Thomas Steinke

Research Scientist
Google Brain

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Research Interests

Broadly, my research interests lie in computer, information, and data science. More specifically, my current research focuses are data privacy (namely, differential privacy) and its connection to machine learning (specifically, generalization in the adaptive setting).

Employment & Education

Google, Mountain View, CA, USA, 2020–present.

Senior Research Scientist, Brain Team. 2020–present.

IBM Almaden Research Center, San Jose, CA, USA, 2016–2020.

Research Staff Member. 2018–2020.
Postdoctoral Researcher. 2016–2018.

Harvard University, Cambridge, MA, USA, 2010–2016.

PhD in Computer Science.

Thesis: Upper and Lower Bounds for Privacy and Adaptivity in Algorithmic Data Analysis.
Advisor: Prof. Salil P. Vadhan.

SM in Computer Science.

University of Canterbury, Christchurch, New Zealand, 2007–2010.

MSc in Mathematics.

Thesis: Constructive Notions of Compactness in Apartness Spaces.
Supervisor: Prof. Douglas S. Bridges.

BSc(Hons) in Mathematics and Computer Science.

Visiting Positions

Simons Institute for the Theory of Computing, University of California, Berkeley, CA, USA.

Patrick J. McGovern Research Fellow, *Data Privacy: Foundations and Applications*, 2019.
Visiting Scientist, *Pseudorandomness*, 2017.

Department of Computer Science, Stanford University, Palo Alto, CA, USA.

Exchange student, 2011–2012.

Manuscripts

Florian Tramer, Andreas Terzis, Thomas Steinke, Shuang Song, Matthew Jagielski, Nicholas Carlini. *Debugging Differential Privacy: A Case Study for Privacy Auditing.* 2022.
`https://arxiv.org/abs/2202.12219`

Peer-Reviewed Publications

On most of my publications, authors are listed in alphabetical order (rather than by contributions).

Ehsan Amid, Arun Ganesh, Rajiv Mathews, Swaroop Ramaswamy, Shuang Song, Thomas Steinke, Vinith M. Suriyakumar, Om Thakkar, Abhradeep Thakurta. *Public Data-Assisted Mirror Descent for Private Model Training* ICML 2022.
`https://arxiv.org/abs/2112.00193`

Gautam Kamath, Argyris Mouzakis, Vikrant Singhal, Thomas Steinke, Jonathan Ullman. *A Private and Computationally-Efficient Estimator for Unbounded Gaussians.* COLT 2022.
`https://arxiv.org/abs/2111.04609`

Nicolas Papernot, Thomas Steinke. *Hyperparameter Tuning with Renyi Differential Privacy.* ICLR 2022 (oral).
`https://arxiv.org/abs/2110.03620`
ICLR Outstanding paper award.

Vikrant Singhal, Thomas Steinke. *Privately Learning Subspaces.* NeurIPS 2021.
`https://arxiv.org/abs/2106.00001`

Peter Grünwald, Thomas Steinke, Lydia Zakynthinou. *PAC-Bayes, MAC-Bayes and Conditional Mutual Information: Fast rate bounds that handle general VC classes.* COLT 2021.
`https://arxiv.org/abs/2106.09683`

Peter Kairouz, Ziyu Liu, Thomas Steinke. *The Distributed Discrete Gaussian Mechanism for Federated Learning with Secure Aggregation.* ICML 2021.
`https://arxiv.org/abs/2102.06387`

Terrance Liu, Giuseppe Vietri, Thomas Steinke, Jonathan Ullman, Zhiwei Steven Wu. *Leveraging Public Data for Practical Private Query Release.* ICML 2021.
`https://arxiv.org/abs/2102.08598`

Shuang Song, Thomas Steinke, Om Thakkar, Abhradeep Thakurta. *Evading the Curse of Dimensionality in Unconstrained Private GLMs.* The 24th International Conference on Artificial Intelligence and Statistics (AISTATS) 2021.
`https://arxiv.org/abs/2006.06783`

Clément Canonne, Gautam Kamath, Thomas Steinke. *The Discrete Gaussian for Differential Privacy.* 34th Conference on Neural Information Processing Systems (NeurIPS) 2020.
`https://arxiv.org/abs/2004.00010`

Thomas Steinke, Lydia Zakynthinou. *Reasoning About Generalization via Conditional Mutual Information.* 33rd Annual Conference on Learning Theory (COLT) 2020.
`https://arxiv.org/abs/2001.09122`

Giuseppe Vietri, Grace Tian, Mark Bun, Thomas Steinke, Steven Wu. *New Oracle-Efficient Algorithms for Private Synthetic Data Release.* 37th International Conference on Machine Learning (ICML) 2020. (Poster at PriML 2019 workshop, part of NeurIPS 2019.)
`https://arxiv.org/abs/2007.05453`

Mark Bun, Thomas Steinke. *Average-Case Averages: Private Algorithms for Smooth Sensitivity and Mean Estimation.* 33rd Conference on Neural Information Processing Systems (NeurIPS) 2019.
`https://arxiv.org/abs/1906.02830`

Mark Bun, Gautam Kamath, Thomas Steinke, Zhiwei Steven Wu. *Private Hypothesis Selection.* 33rd Conference on Neural Information Processing Systems (NeurIPS) 2019. (Poster at Fifth Workshop on the Theory and Practice of Differential Privacy (TPDP) 2019.)
`https://arxiv.org/abs/1905.13229`

Mark Bun, Jarosław Błasiok, Aleksandar Nikolov, Thomas Steinke. *Towards Instance-Optimal Private Query Release.* ACM-SIAM Symposium on Discrete Algorithms (SODA) 2019. (Poster at Third Workshop on the Theory and Practice of Differential Privacy (TPDP) 2017.)
`https://arxiv.org/abs/1811.03763`

Kobbi Nissim, Adam Smith, Thomas Steinke, Uri Stemmer, Jonathan Ullman. *The Limits of Post-Selection Generalization .* 32nd Conference on Neural Information Processing Systems (NeurIPS) 2018.
`https://arxiv.org/abs/1806.06100`

Vitaly Feldman, Thomas Steinke. *Calibrating Noise to Variance in Adaptive Data Analysis.* 31st Annual Conference on Learning Theory (COLT) 2018.
`https://arxiv.org/abs/1712.07196`

Mark Bun, Cynthia Dwork, Guy N. Rothblum, Thomas Steinke. *Composable and Versatile Privacy via Truncated CDP.* 50th Annual ACM Symposium on the Theory of Computing (STOC) 2018. (Poster at Third Workshop on the Theory and Practice of Differential Privacy (TPDP) 2017.)

Thomas Steinke, Jonathan Ullman. *Tight Lower Bounds for Differentially Private Selection.* 58th Annual IEEE Symposium on Foundations of Computer Science (FOCS) 2017.
`https://arxiv.org/abs/1704.03024`

Vitaly Feldman, Thomas Steinke. *Generalization for Adaptively-Chosen Estimators via Stable Median.* 30th Annual Conference on Learning Theory (COLT) 2017.
`https://arxiv.org/abs/1706.05069`

Mark Bun, Thomas Steinke, Jonathan Ullman. *Make Up Your Mind: The Price of Online Queries in Differential Privacy.* ACM-SIAM Symposium on Discrete Algorithms (SODA) 2017.
`https://arxiv.org/abs/1604.04618`

Mark Bun, Thomas Steinke. *Concentrated Differential Privacy: Simplifications, Extensions, and Lower Bounds.* Theory of Cryptography Conference (TCC) 2016.
`https://arxiv.org/abs/1605.02065`

Raef Bassily, Kobbi Nissim, Adam Smith, Thomas Steinke, Uri Stemmer, Jonathan Ullman. *Algorithmic Stability for Adaptive Data Analysis.* SIAM Journal on Computing, 2021. (Originally appeared in 48th ACM Annual Symposium on the Theory of Computing (STOC) 2016.)
`http://arxiv.org/abs/1511.02513`
     Invited to special issue.

Cynthia Dwork, Adam Smith, Thomas Steinke, Jonathan Ullman, Salil Vadhan. *Robust Traceability from Trace Amounts.* 56th Annual IEEE Symposium on Foundations of Computer Science (FOCS) 2015.
`http://ieeexplore.ieee.org/document/7354420`

Thomas Steinke, Jonathan Ullman. *Between Pure and Approximate Differential Privacy.* Journal of Privacy and Confidentiality 2017. (Presented at First Workshop on the Theory and Practice of Differential Privacy (TPDP) 2015.)
`http://arxiv.org/abs/1501.06095`

Mark Bun, Thomas Steinke. *Weighted Polynomial Approximations: Limits for Learning and Pseudorandomness.* 19th International Workshop on Randomization and Computation (RANDOM) 2015.
http://arxiv.org/abs/1412.2457

Thomas Steinke, Jonathan Ullman. *Interactive Fingerprinting Codes and the Hardness of Preventing False Discovery.* 28th Annual Conference on Learning Theory (COLT) 2015.
http://arxiv.org/abs/1410.1228

Thomas Steinke, Salil Vadhan, Andrew Wan. *Pseudorandomness and Fourier Growth Bounds for Width 3 Branching Programs.* Theory of Computing 2017. (Originally appeared in 18th International Workshop on Randomization and Computation (RANDOM) 2014.)
http://theoryofcomputing.org/articles/v013a012/
    Invited to special issue.

Omer Reingold, Thomas Steinke, Salil Vadhan. *Pseudorandomness for Regular Branching Programs via Fourier Analysis.* 17th International Workshop on Randomization and Computation (RANDOM) 2013.
http://arxiv.org/abs/1306.3004

Michael Mitzenmacher, Justin Thaler, Thomas Steinke. *Hierarchical Heavy Hitters with the Space Saving Algorithm.* Algorithm Engineering and Experiments (ALENEX) 2012.
http://arxiv.org/abs/1102.5540

Varun Kanade, Thomas Steinke. *Learning Hurdles for Sleeping Experts.* ACM Transactions on Computation Theory 2014. (Originally appeared in Innovations in Theoretical Computer Science (ITCS) 2012.)
http://eccc.hpi-web.de/report/2011/115/
    Invited to special issue.

Raazesh Sainudiin, Thomas Steinke. *A Rigorous Extension of the Schönhage-Strassen Integer Multiplication Algorithm Using Complex Interval Arithmetic.* Reliable Computing 2013. (Presented at Seventh International Conference Computability and Complexity in Analysis (CCA) 2010.)
http://arxiv.org/abs/1006.0405

Theses & Surveys

Thomas Steinke. *Upper and Lower bounds for Privacy and Adaptivity in Algorithmic Data Analysis.* PhD Thesis, Harvard University 2016.
http://nrs.harvard.edu/urn-3:HUL.InstRepos:33840662

Kobbi Nissim, Aaron Bembenek, Alexandra Wood, Mark Bun, Marco Gaboardi, Urs Gasser, David R. O'Brien, Thomas Steinke, Salil Vadhan. *Bridging the Gap Between Computer Science and Legal Approaches to Privacy.* Harvard Journal of Law & Technology 2018.
https://jolt.law.harvard.edu/assets/articlePDFs/v31/02.-Article-Wood-7.21.pdf

Cynthia Dwork, Adam Smith, Thomas Steinke, Jonathan Ullman. *Exposed! A Survey of Attacks on Private Data.* Annual Review of Statistics and Its Application 2017.
http://www.annualreviews.org/doi/abs/10.1146/annurev-statistics-060116-054123

Alexandra Wood, Micah Altman, Aaron Bembenek, Mark Bun, Marco Gaboardi, James Honaker, Kobbi Nissim, David R. O'Brien, Thomas Steinke, Salil Vadhan. *Differential Privacy: A Primer for a Non-Technical Audience.* Vanderbilt Journal of Entertainment & Technology Law 2018. (Abstract presented at Privacy Law Scholars Conference. Berkeley, CA, USA, June 2017.)
http://www.jetlaw.org/wp-content/uploads/2018/12/4_Wood_Final.pdf

Thomas Steinke. *Constructive Notions of Compactness in Apartness Spaces.* Masters Thesis, University of Canterbury 2011.
`https://ir.canterbury.ac.nz/handle/10092/5682`

Other Research Articles

Florian Tramer, Andreas Terzis, Thomas Steinke, Shuang Song, Matthew Jagielski, Nicholas Carlini. *Debugging Differential Privacy: A Case Study for Privacy Auditing.* 2022.
`https://arxiv.org/abs/2202.12219`

Zeyu Ding, Daniel Kifer, Sayed M. Saghaian N. E., Thomas Steinke, Yuxin Wang, Yingtai Xiao, Danfeng Zhang. *The Permute-and-Flip Mechanism is Identical to Report-Noisy-Max with Exponential Noise.* 2021.
`https://arxiv.org/abs/2105.07260`

Thomas Steinke. *Multi-Central Differential Privacy.* 2020.
`https://arxiv.org/abs/2009.05401`

Thomas Steinke, Jonathan Ullman. *Subgaussian Tail Bounds via Stability Arguments.* 2017.
`https://arxiv.org/abs/1701.03493`

Thomas Steinke. *Pseudorandomness for Branching Programs Without the Group Theory.* 2012.
`http://eccc.hpi-web.de/report/2012/083/`

Teaching

2020: Mentor for summer interns Vikrant Singhal and Lydia Zakynthinou.

2019: Mentor for summer intern Lydia Zakynthinou.

2015: Teaching Fellow at Harvard University, Pseudorandomness (CS225).
Awarded Certificate of Distinction for Teaching.

2015: Advised undergraduate summer students Ally Kaminsky and Jimmy Jiang as part of NSF Privacy Tools for Sharing Research Data project.

2014: Advised undergraduate summer student Sitan Chen. Project title: Pseudorandomness for Read-Once, Constant-Depth Formulas.

2013: Teaching Fellow at Harvard University, Algorithms for Big Data (CS229r).

2013–2016: Non-resident tutor in Lowell House at Harvard University.

2013: Tutor and lecturer at the New Zealand Olympiad Informatics (NZOI) camp in Auckland, New Zealand. (This is a training camp for high school students who will represent New Zealand at the International Olympiad in Informatics (IOI).)

2012: Head Teaching Fellow at Harvard University, Introduction to the Theory of Computation (CS121).
Awarded Certificate of Distinction for Teaching.

2010: Mathematics Tutor at the University of Canterbury, second-year real analysis and calculus (MATH243, MATH264).

2010: Mentor for Jamie McCloskey and Logan Glasson, who both won bronze medals for New Zealand at the IOI, in Waterloo, Canada.

2010: Tutor and lecturer at the NZOI camp in Auckland, New Zealand.

2009: Mathematics Tutor at the University of Canterbury, second-year calculus and linear algebra (MATH254, MATH264).

2009: Tutor at the NZOI camp in Auckland, New Zealand.

2008: Mathematics Tutor at the University of Canterbury, first-year calculus and linear algebra (MATH108, MATH109).

2008: Tutor at NZOI camp in Christchurch, New Zealand.

Research Talks

NeurIPS 2021. *Privately Learning Subspaces*. Online, December 2021. https://neurips.cc/virtual/2021/poster/2850

Boston-area Data Privacy Seminar. *Hyperparameter Tuning with Renyi Differential Privacy*. Online, October, 2021. (Invited talk.) https://youtu.be/TIDYKOfzBYk

ITR3 Workshop at ICML 2021. *Generalization via Conditional Mutual Information*. Online, July 2021. https://icml.cc/virtual/2021/workshop/8365#wse-detail-10777

Johns Hopkins University Machine Learning Seminar. *Reasoning about Generalization via Conditional Mutual Information*. Online, March 2021.

Harvard University Differential Privacy Reading Group. *The Discrete Gaussian for Differential Privacy*. Online, December 2020.

University of Colorado, Boulder Theory of Computing Seminar. *Reasoning about Generalization via Conditional Mutual Information*. Online, November 2020.

Harvard University Differential Privacy Reading Group. *Multi-Central Differential Privacy*. Online, October 2020. (Invited talk.)

TCS+. *Reasoning About Generalization via Conditional Mutual Information*. Online, March 2019. (Invited talk.)

Instititute for Mathematics and its Applications. *Average-Case Averages: Private Algorithms for Smooth Sensitivity and Mean Estimation*. Minneapolis, MN, USA, June 2019. (Invited talk.)

Simons Institute for the Theory of Computing. *Smooth Sensitivity, Revisited*. Berkeley, CA, USA, April 2019. (Invited talk.)
https://simons.berkeley.edu/talks/tbd-47

Privacy in Graphs Workshop. *Composition of Privacy*. Santa Cruz, CA, USA, November 2018. (Invited talk.)

Simons Adaptive Data Analysis Workshop. *Generalization for Adaptively-chosen Estimators via Stable Median*. Berkeley, CA, USA, July 2018. (Invited talk.)

Banff International Research Station. *Concentrated Differential Privacy*. Banff, AB, Canada, April 2018. http://www.birs.ca/events/2018/5-day-workshops/18w5189/videos

University of Waterloo. *Protecting Privacy and Guaranteeing Generalization by Controlling Information*. Waterloo, ON, Canada, April 2018. (Invited talk.)

University of Maryland. *Protecting Privacy and Guaranteeing Generalization by Controlling Information.* College Park, MD, USA, April 2018. (Invited talk.)

Georgetown University. *Protecting Privacy and Guaranteeing Generalization by Controlling Information.* Washington, DC, USA, April 2018. (Invited talk.)

University of Massachusetts. *Protecting Privacy and Guaranteeing Generalization with Algorithmic Stability.* Amherst, MA, USA, February 2018. (Invited talk.)

North Carolina State University. *Protecting Privacy and Guaranteeing Generalization with Algorithmic Stability.* Raleigh, NC, USA, February 2018. (Invited talk.)

Ohio State University. *Protecting Privacy and Guaranteeing Generalization with Algorithmic Stability.* Columbus, OH, USA, January 2018. (Invited talk.)

Boston University. *Protecting Privacy and Guaranteeing Generalization with Algorithmic Stability.* Boston, MA, USA, January 2018. (Invited talk.)

Harvard differential privacy research group meeting. *Relaxing differential privacy for adaptive data analysis.* Cambridge, MA, USA, January 2018. (Invited talk.)

Theory of Computing Affiliated - Silicon Valley (TOCA-SV) workshop. *Less is more: Limiting information to guarantee generalization in adaptive data analysis.* Stanford, CA, USA, January 2018. (Invited talk.)

IPAM workshop on Algorithmic Challenges in Protecting Privacy for Biomedical Data. *How well does privacy compose?* Los Angeles, CA, USA, January 2018. (Invited talk.)
http://www.ipam.ucla.edu/abstract/?tid=15037&pcode=PBD2018

Simons Institute for the Theory of Computing. *Preventing Overfitting in Adaptive Data Analysis via Stability.* Berkeley, CA, USA, December 2017. (Invited talk.)
https://simons.berkeley.edu/talks/thomas-steinke-12-1-17

Theory and Practice of Differential Privacy Workshop (part of ACM CCS 2017). *Concentrating on the Foundations of Differential Privacy.* Dallas, TX, USA, October 2017. (Invited speaker.)

IEEE Symposium on Foundations of Computer Science (FOCS) 2017. *Tight Lower Bounds for Differentially Private Selection.* Berkeley, CA, USA, October 2017.

Conference on Learning Theory 2017. *Generalization for Adaptively-chosen Estimators via Stable Median.* Amsterdam, Netherlands, July 2017.
https://webcolleges.uva.nl/Mediasite/Play/6123f099ac8c45c4939a93230a85aaf61d

Simons Institute for the Theory of Computing. *Pseudorandom Generators for Small Space via Fourier Analysis.* Berkeley, CA, USA, March 2017. (Invited talk.)
https://simons.berkeley.edu/talks/thomas-steinke-2017-03-09

University of Oxford. *Generalisation for Adaptive Data Analysis.* Oxford, UK, November 2016. (Invited talk.)

Isaac Newton Institute, University of Cambridge. *Generalisation for Adaptive Data Analysis.* Cambridge, UK, November 2016. (Invited talk.)
https://www.newton.ac.uk/seminar/20161122153016302

Theory of Cryptography Conference (TCC) 2016-B. *Concentrated Differential Privacy, Simplifications, Extensions, and Lower Bounds.* Beijing, China, November 2016.

World Congress on Probability and Statistics. *Robust Traceability from Trace Amounts.* Toronto, Canada, July 2016. (Invited talk.)

ACM Symposium on the Theory of Computing (STOC) 2016. *Algorithmic Stability for Adaptive Data Analysis.* Cambridge, MA, USA, June 2016.

Information Theory and Applications Workshop (ITA) 2016. *Interactive Fingerprinting Codes and the Hardness of Preventing False Discovery.* San Diego, CA, USA, February 2016. (Invited talk.)

The Chinese University of Hong Kong. *The Power of Adaptivity in Data Analysis.* Hong Kong, January 2016. (Invited talk.)

IEEE Symposium on Foundations of Computer Science (FOCS) 2015. *Robust Traceability from Trace Amounts.* Berkeley, CA, USA, October 2015.
http://techtalks.tv/beta/talks/robust-traceability-from-trace-amounts/62042/

Academia Sinica. *On the Power of Adaptivity in Data Analysis.* Taipei, Taiwan, August 2015. (Invited talk.)

China Theory Week 2015. *On the Power of Adaptivity in Data Analysis.* Shanghai, China, August 2015. (Invited talk.)

Conference on Learning Theory (COLT) 2015. *Interactive Fingerprinting Codes and the Hardness of Preventing False Discovery.* Paris, France, July 2015.
http://videolectures.net/colt2015_steinke_false_discovery/

Theory and Practice of Differential Privacy (TPDP) 2015. *Between Pure and Approximate Differential Privacy.* London, UK, April 2015.

Workshop on Randomization and Computation (RANDOM) 2014. *Pseudorandomness and Fourier Growth Bounds for Width 3 Branching Programs.* Barcelona, Spain, September 2014.

MIT Algorithms & Complexity Seminar. *Pseudorandomness for Regular Branching Programs via Fourier Analysis.* Cambridge, MA, USA December 2013. (Invited talk.)

Workshop on Randomization and Computation (RANDOM) 2013. *Pseudorandomness for Regular Branching Programs via Fourier Analysis.* Berkeley, CA, USA, August 2013.

Microsoft Research Silicon Valley Theory Seminar. *Pseudorandomness for Regular Branching Programs via Fourier Analysis.* Mountain View, CA, USA, August 2013. (Invited talk.)

Algorithm Engineering and Experiments (ALENEX) 2012. *Hierarchical Heavy Hitters with the Space Saving Algorithm.* Kyoto, Japan, January 2012.

Stanford Theory Seminar. *Learning Hurdles for Sleeping Experts*, Stanford, CA, USA, November 2011.

Computability and Complexity in Analysis (CCA) 2011. *Constructive Notions of Compactness in Apartness Spaces.* Cape Town, South Africa, January 2011.

Computability and Complexity in Analysis (CCA) 2010. *A Rigorous Extension of the Schönhage-Strassen Integer Multiplication Algorithm Using Complex Interval Arithmetic.* Zhenjiang, China, June 2010.

Miscellaneous

Reviewer for: IEEE Symposium on Foundations of Computer Science (FOCS), IEEE Transactions on Neural Networks and Learning Systems, SIAM Journal on Computing, ACM Symposium on the Theory of Computing (STOC), Conference and Workshop on Neural Information Processing Systems (NIPS/NeurIPS), IEEE Transactions on Information Theory, Conference on Learning Theory (COLT), Algorithms and Data Structures Symposium (WADS), Journal of Machine Learning Research (JMLR), International Conference on the Theory and Applications of Cryptographic Techniques (EUROCRYPT), U.S. National Science Foundation (NSF), International Conference on Learning Representations (ICLR), International Conference on Machine Learning (ICML), ACM Symposium on Principles of Database Systems (PODS), European Research Council (ERC), Theory and Practice of Differential Privacy workshop (TPDP), Symposium on Discrete Algorithms (SODA), International Symposium on Algorithms and Computation (ISAAC), Algorithmic Learning Theory (ALT), Israel Science Foundation (ISF), International Colloquium on Automata, Languages and Programming (ICALP).

2022: Co-Organizer of workshop on Differential Privacy and Statistical Data Analysis at Fields Institute in Toronto.

2021: Co-Organizer of NIII Shonan meeting on Differential Privacy and its Applications.

2021: Sponsorships Co-Chair for Conference on Learning Theory (COLT).

2018: Co-Organizer of workshop on Mathematical Foundations of Data Privacy at the Banff International Research Station, Banff, Canada. `http://www.birs.ca/events/2018/5-day-workshops/18w5189`

2014–2016: Co-Organizer of Harvard Theory of Computing Seminar.

2016: Nominated by department for Derek C. Bok Award for Excellence in Graduate Student Teaching of Undergraduates.

2010–2013: Lord Rutherford Memorial Research Fellowship.

2010: ACM International Collegiate Programming Contest (ACM-ICPC) in Harbin, China. Qualified for world finals as New Zealand champions and second in the south pacific region (Australia & New Zealand).

2009: ACM-ICPC in Stockholm, Sweden. New Zealand Champions and second in the south pacific region.

2007: Member of New Zealand International Olympiad in Informatics (IOI) team that went to to Zagreb, Croatia.

Programming: C++, Python.

Languages: English (fluent), German (working knowledge).

Last updated: May 16, 2022