

# Matthew Weidner

 [mattweidner.com](http://mattweidner.com)

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## Education

- 2019-current **PhD in Computer Science**, *Carnegie Mellon University*, Pittsburgh, PA, Advisor: Heather Miller.
- 2018-2019 **MPhil in Advanced Computer Science**, *University of Cambridge*, Cambridge, UK, Pass with Distinction.
- 2014-2018 **B.S. in Mathematics with Computer Science Minor**, *California Institute of Technology*, Pasadena, CA.

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## Research

- [1] M. Weidner. Group messaging for secure asynchronous collaboration. MPhil dissertation, University of Cambridge, 2019. Advisors: A. Beresford and M. Kleppmann.
- [2] A. K. Narayanan and M. Weidner. On decoding Cohen-Haeupler-Schulman tree codes. To appear at *Symposium on Discrete Algorithms (SODA) 2020*. arXiv:1909.07413
- [3] A. K. Narayanan and M. Weidner. Subquadratic time encodable codes beating the Gilbert-Varshamov bound. *IEEE Transactions on Information Theory*, 65(10):6010–6021, July 2019.
- [4] A. Chiesa, L. Chua, and M. Weidner. On cycles of pairing-friendly elliptic curves. *SIAM Journal on Applied Algebra and Geometry*, 3(2):175–192, 2019.
- [5] M. Weidner. Pseudocharacters of Classical Groups. Submitted for publication. arXiv:1809.03644
- [6] M. Weidner. On Conjectural Rank Parities of Quartic and Sextic Twists of Elliptic Curves. To appear in *International Journal of Number Theory*.
- [7] M. Hadian and M. Weidner. On Selmer rank parity of twists. *Journal of the Australian Mathematical Society*, 102(3):316–330, June 2017.

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## Awards

- 2018-2019 **Churchill Scholarship**, *Winston Churchill Foundation of the USA*, MPhil in Advanced CS.  
“[P]rovides funding to American students for a year of Master’s study in science, mathematics, and engineering at the University of Cambridge, based at Churchill College.”
- 2018 **George W. Housner Prize for Academic Excellence and Original Research**, *Caltech Undergraduate Academic Standards and Honors Committee*.  
“[G]iven annually to a senior [or seniors] in the upper 20 percent of his or her class who has demonstrated excellence in scholarship and in the preparation of an outstanding piece of original scientific research.”

- 2017 **Eric Temple Bell Undergraduate Mathematics Research Prize**, *Caltech Math Department*.  
 “[A]warded to one or more juniors or seniors for outstanding original research in mathematics.”
- 2017 **Honorable Mention**, *2016 William Lowell Putnam Mathematical Competition*.
- 2016 **H. J. Ryser Scholarship**, *Caltech Math Department*.  
 “[A]warded to undergraduate students for academic excellence.”
- 2016 **Honorable Mention**, *2015 William Lowell Putnam Mathematical Competition*.

## Teaching

- 6/2018-8/2018 **Computer Science Teaching Assistant/Counselor**, *Pennsylvania Governor’s School for the Sciences*, Pittsburgh, PA.  
 Assisted with lecture, lab, and team project courses in computer science and served as a live-in counselor for high school science summer program.
- 9/2017-12/2017 **Ma5a (Introduction to Abstract Algebra) Teaching Assistant**, *Caltech*, Pasadena, CA.  
 Gave office hours and graded problem sets and exams for undergraduate course on group theory.
- 1/2016-3/2016; 1/2017-3/2017 **CS21 (Decidability and Tractability) Teaching Assistant**, *Caltech*, Pasadena, CA.  
 Gave office hours and graded problem sets and exams for undergraduate course on theory of computation and computational complexity.

## Talks Given

- 4/2018 **Subquadratic Time Encodable Codes Beating the Gilbert-Varshamov Bound**, *Caltech CS Theory Group Meeting*.
- 11/2017 **Algebraic Geometry Error-Correcting Codes**, *Caltech Undergraduate Math Club*.
- 4/2017 **2-Selmer Rank Parities and Quadratic Twists of Elliptic Curves**, *Caltech Langlands Program Learning Seminar*.
- 11/2015 **Mordell-Weil Groups of Elliptic Curves**, *Caltech Undergraduate Math Club*.
- 10/2015 **2-Selmer Ranks of Quadratic Twists of (Hyper)elliptic Curves**, *Caltech Number Theory Seminar*.

## Selected Coursework

- Cambridge ACS R02 **Network Architectures**.  
 Paper reading on current and alternative network architectures for: core IP layer, mobile networks, network topologies, transport services, data centers, IoT, and IPv6.
- Cambridge ACS R01 **Advanced Topics in Computer Systems**.  
 Paper reading on current and historical topics in computer systems.
- Cambridge ACS L301 **Topics in Concurrency**.  
 Models and logics for concurrent processes, model checking, cryptographic protocols, and strategies as concurrent processes.

- Cambridge **Machine Learning.**  
 ACS L42 Support vector machines, spectral clustering, experts algorithms, decision trees, and neural networks.
- Caltech **Complexity Theory.**  
 CS151 Time and space complexity, nondeterminism, circuit complexity, randomness & derandomization, alternation, and interaction.
- Caltech **Analysis and Design of Algorithms.**  
 CMS/CS139 Approximation algorithms, randomized algorithms, online algorithms, streaming algorithms, and research topics.
- Caltech **Quantum Computation.**  
 Ph/CS219ab Two terms covering quantum entanglement, quantum circuits, and quantum algorithms; quantum error-correction and fault-tolerant quantum computing.

## Activities

- 2019–current CMU Tartan Wind Ensemble.
- 2018–2019 Cambridge University Recorder Ensemble.
- 2014–2018 Caltech-Occidental Concert Band. Band Manager, 2017–2018.
- 2015–2018 Caltech Deans' Office Peer Tutor for abstract algebra and algorithms courses.
- 2016–2018 Student Waiter for dinners in Dabney House (my undergraduate residence). Co-Head Waiter, 2017–2018.
- Winter 2017 Pit Band, Caltech Theater Group production of "Company".