Matthew Weidner

mattweidner.com

Education

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.

Research

[1] Group messaging for secure asynchronous collaboration. MPhil dissertation, 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.

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 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." *One of two recipients in 2018.*

2017 **Eric Temple Bell Undergraduate Mathematics Research Prize**, *Caltech Math Department*.
"[A]warded for the best original mathematics paper written by a Caltech junior or senior." *One of two recipients in 2017.*

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

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".