Da Wei (David) Zheng

+1 650-898-3069

https://zhengdw.github.io/

dwzheng2@illinois.edu

PhD candidate researching algorithms and data structures involving geometry and graphs.

Education

- **University of Illinois Urbana-Champaign** — Champaign, IL
  PhD Computer Science (Theory) — *Aug 2020 - (expected) May 2025*
  Advisor: Timothy M. Chan
  Thesis: From Geometry to Graphs: Geometric data structures and Graph Tools

- **University of British Columbia** — Vancouver, BC
  MSc Computer Science (Theory) — *Sep 2018 - Aug 2020*
  Advisor: William Evans
  Thesis: Scheduling queries to moving entities to certify many are distant from a region

- **University of British Columbia** — Vancouver, BC
  BSc Combined Honours Mathematics and Computer Science — *Sep 2014 - May 2018*

Internships

- **Nuro** — Mountain View, CA
  PhD Intern, "Occlusion-aware autonomous driving" — *May 2022 - Aug 2022*
- **Google LLC** — Mountain View, CA
  Software Engineering Intern, "Querying payments change history" — *May 2018 - Aug 2018*
- **Facebook Inc.** — Menlo Park, CA
  Software Engineering Intern, "Integrating VMs in container service" — *Jun 2017 - Sep 2017*
- **Dr. Daniel Coomb's Applied Mathematics Lab** — University of British Columbia
  USRA Intern, "Graph based clustering for biological data analysis" — *May 2016 - Aug 2016*

Publications

Note that it is standard for papers in theoretical computer science to list authors in alphabetical order.

16. (*Manuscript*) **Da Wei Zheng**. "A Simple Approximation Scheme for Bipartite Geometric Many-to-Many Matching". In: (2024). In submission.

15. (*To appear in* **SODA 2025**) Adam Karczmarz and **Da Wei Zheng**. Subquadratic algorithms in minor-free digraphs: (weighted) distance oracles, decremental reachability, and more.

14. (**ESA 2024**) Elfarouk Harb, Zhengcheng Huang, and **Da Wei Zheng**. Shortest Path Separators in Unit Disk Graphs. *32nd Annual European Symposium on Algorithms (ESA 2024)*. Vol. 308. 66:1–66:14.

13. (**ESA 2024**) Chandra Chekuri, Rhea Jain, Shubhang Kulkarni, **Da Wei Zheng**, and Weihao Zhu. From Directed Steiner Tree to Directed Polymatroid Steiner Tree in Planar Graphs. *32nd Annual European Symposium on Algorithms (ESA 2024)*. Vol. 308. 42:1–42:19.

12. (**CCCG 2024**) Eliot W. Robson, Jack Spalding-Jamieson, and **Da Wei Zheng**. Carving Polytopes with Saws in 3D. *Proceedings of the 36th Canadian Conference on Computational Geometry, CCCG 2024, Brock University, St. Catherines, Ontario, Canada, July 17 - July 19, 2024*. Pp. 145–151.

11. (**SoCG 2024**) Timothy M. Chan, Pingan Cheng, and **Da Wei Zheng**. Semialgebraic Range Stabbing, Ray Shooting, and Intersection Counting in the Plane. *40th International Symposium on Computational Geometry, SoCG 2024, June 11-14, 2024, Athens, Greece*. Vol. 293. 33:1–33:15.

10. (**SODA 2024**) Timothy M. Chan, Pingan Cheng, and **Da Wei Zheng**. An Optimal Algorithm for Higher-Order Voronoi Diagrams in the Plane: The Usefulness of Nondeterminism. *Proceedings of the 2024 ACM-SIAM Symposium on Discrete Algorithms, SODA 2024, Alexandria, VA, USA, January 7-10, 2024*. Pp. 4451–4463.

9. (**SODA 2024**) Yi-Jun Chang and **Da Wei Zheng**. Fully Scalable Massively Parallel Algorithms for Embedded Planar Graphs. *Proceedings of the 2024 ACM-SIAM Symposium on Discrete Algorithms, SODA 2024, Alexandria, VA, USA, January 7-10, 2024*. Pp. 4410–4450.

8. (**ICALP 2023**) Monika Henzinger, Paul Liu, Jan Vondrák, and **Da Wei Zheng**. Faster Submodular Maximization for Several Classes of Matroids. *50th International Colloquium on Automata, Languages, and Programming, ICALP 2023, July 10-14, 2023, Paderborn, Germany*. Vol. 261. 74:1–74:18.

7. (**IPCO 2023**) **Da Wei Zheng** and Monika Henzinger. Multiplicative Auction Algorithm for Approximate Maximum Weight Bipartite Matching. *Integer Programming and Combinatorial Optimization - 24th International Conference, IPCO 2023, Madison, WI, USA, June 21-23, 2023, Proceedings*. Vol. 13904. Pp. 453–465.

6. (**SODA 2023**) Timothy M. Chan and **Da Wei Zheng**. Simplex Range Searching Revisited: How to Shave Logs in Multi-Level Data Structures. *Proceedings of the 2023 ACM-SIAM Symposium on Discrete Algorithms, SODA 2023, Florence, Italy, January 22-25, 2023*. Pp. 1493–1511.

5. (**SODA 2023**) Sariel Har-Peled and **Da Wei Zheng**. Halving by a Thousand Cuts or Punctures. *Proceedings of the 2023 ACM-SIAM Symposium on Discrete Algorithms, SODA 2023, Florence, Italy, January 22-25, 2023*. Pp. 1385–1397.

4. (**SoCG 2022**) Jack Spalding-Jamieson, Brandon Zhang, and **Da Wei Zheng**. Conflict-Based Local Search for Minimum Partition into Plane Subgraphs. *38th International Symposium on Computational Geometry (SoCG 2022)*. Vol. 224. 72:1–72:6.

3. (**SODA 2022**) Timothy M. Chan and **Da Wei Zheng**. Hopcroft's Problem, Log-Star Shaving, 2D Fractional Cascading, and Decision Trees. *Proceedings of the 2022 ACM-SIAM Symposium on Discrete Algorithms, SODA 2022, Virtual Conference / Alexandria, VA, USA, January 9 - 12, 2022*. Pp. 190–210.

2. (**SoCG 2021**) Paul Liu, Jack Spalding-Jamieson, Brandon Zhang, and **Da Wei Zheng**. Coordinated Motion Planning Through Randomized k-Opt (CG Challenge). *37th International Symposium on Computational Geometry, SoCG 2021, June 7-11, 2021, Buffalo, NY, USA (Virtual Conference)*. Vol. 189. 64:1–64:8.

1. (**SoCG 2020**) **Da Wei Zheng**, Jack Spalding-Jamieson, and Brandon Zhang. Computing Low-Cost Convex Partitions for Planar Point Sets with Randomized Local Search and Constraint Programming (CG Challenge). *36th International Symposium on Computational Geometry, SoCG 2020, June 23-26, 2020, Zürich, Switzerland*. Vol. 164. 83:1–83:7.

Awards

- NSERC PGS-D Scholarship 2022-2025
- NSERC Undergrad Summer Research Award 2016
- Trek Excellence Scholarship 2015
- Stanley M Grant Scholarship in Mathematics 2015

- Chancellor's Scholar Award 2014
- BC Provincial Scholarship 2014

Teaching

- **Department of Computer Science** University of Illinois Urbana-Champaign
  Teaching Assistant
  - CS 374 - Algorithms and Models of Computation *Aug 2021 - Apr 2022*
- **Department of Computer Science and Mathematics** University of British Columbia
  Instructor
  - CPSC 490 - Problem Solving in Computer Science *Jan 2017 - Apr 2017*

  Teaching Assistant
  - CPSC 420 - Advanced Algorithms and Data Structures *Sep 2018 - May 2019*
  - CPSC 221 - Algorithms and Data Structures *Jun 2016 - Apr 2017*
  - MATH 180 - Differential Calculus with Physical Applications *Sep 2015 - Dec 2015*

Other

- **Competitive Programming** University of Illinois Urbana-Champaign
  Coach
  - *Coach* - Ran local practices, problem discussion, and coached teams. *Aug 2022 - now*
    - Coached teams to Mid Central USA regional 1st (2022), 1st (2023), 2nd (2024), North American Championship 2nd (2023), ICPC World Finals 63rd (2022), 51st (2023).
- **Competitive Programming Club** University of British Columbia
  Coach and Participant
  - *Coach* - Ran local practices, problem discussion, and coached teams. *Sep 2017 - Dec 2020*
    - Coached teams to PacNW 1st (2019), 2nd (2020), ICPC World Finals 25th (2020), Honorable mention (2021).
    - Created questions and hosted the UBC Programming Contest 2019 and 2020.
  - *Participant* - Worked as a team of three in competitions. *Jan 2015 - Jul 2019*
    - 1st place in PacNW 2018 and 41st place in ICPC World Finals 2019 in Porto.
    - 3rd place in PacNW 2017 and 56th place in ACM-ICPC World Finals 2018 in Beijing.
- **UBC Math Circle** University of British Columbia
  Organizer - weekly lectures and problems for high school students. *Sep 2017 - Nov 2017*
- **Capture the Flag (CTF) Competitions** Maple Bacon (UBC) & SIGPwny (UIUC)
  Participant *Aug 2021 - Sept 2022*