

# Sally Dong

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CONTACT	sallyqd@mit.edu	CITIZENSHIP: Canadian
APPOINTMENTS	<b>MIT Sloan School of Management</b> Postdoctoral researcher	Sept 2024-present
EDUCATION	<b>University of Washington, Seattle</b> Ph.D., Computer Science and Engineering  <b>Advisors:</b> Yin Tat Lee, Thomas Rothvoss <b>Dissertation:</b> Convex optimization with combinatorial characteristics: new algorithms for linear programming, min-cost flow, and other structured problems.	June 2024
	<b>University of Waterloo</b> B.Math. <i>with distinction – Dean’s Honours List (highest honours)</i> Majors: computer science, combinatorics & optimization, pure math	June 2018
WORKING PAPERS	<b>AI Assistant Redteaming as Security Games.</b> Sally Dong, Beibei Li, Ramayya Krishnan.  <b>The Quantitative Role of Ambiguity in Political Deliberations.</b> Sally Dong, Luke Thorburn, Andrew Konya, Michiel Bakker. Extended abstract presented at <i>Workshop on NLP for Democracy, Conference on Language Modeling (COLM)</i> , 2025.	
	 <b>Strategic Polarization: Political Advertising Rhetoric Across Geographic and Institutional Contexts.</b> Sally Dong. Extended abstract presented at <i>Western Political Science Association Annual Meeting</i> , 2025.	
PUBLICATIONS	 <b>Nested Dissection Meets IPMs: Planar Min-Cost Flow in Nearly-Linear Time.</b> with <sup>1</sup> Yu Gao, Gramoz Goranci, Yin Tat Lee, Richard Peng, Sushant Sachdeva, and Guanghao Ye. <i>Journal of the ACM</i> , 2025. <i>ACM-SIAM Symposium on Discrete Algorithms (SODA)</i> , 2022. <a href="https://arxiv.org/abs/2205.01562">https://arxiv.org/abs/2205.01562</a> .  <b>Faster Min-Cost Flow and Approximate Tree Decomposition on Bounded Treewidth Graphs.</b> with Guanghao Ye. <i>European Symposium on Algorithms (ESA)</i> , 2024. <a href="https://arxiv.org/abs/2308.14727">https://arxiv.org/abs/2308.14727</a> .  <b>The Extension Complexity of Polytopes with Bounded Integral Slack Matrices.</b> with Thomas Rothvoss. <i>Conference on Integer Programming and Combinatorial Optimization (IPCO)</i> , 2024. <a href="https://arxiv.org/abs/2307.16159">https://arxiv.org/abs/2307.16159</a> .	

<sup>1</sup>For theoretical computer science publications, author lists are alphabetical as is convention.

**Fast Algorithms for Separable Linear Programs.**

with Gramoz Goranci, Lawrence Li, Sushant Sachdeva, and Guanghao Ye.

*ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2024.

<https://arxiv.org/abs/2310.16351>.

**Decomposable Non-Smooth Convex Optimization with Nearly-Linear Gradient Oracle Complexity.**

with Haotian Jiang, Yin Tat Lee, Swati Padmanabhan and Guanghao Ye.

*Neural Information Processing Systems (NeurIPS)*, 2022.

<https://arxiv.org/abs/2208.03811>.

**A Nearly-Linear Time Algorithm for Linear Programs with Small Treewidth: A Multiscale Representation of Robust Central Path.**

with Yin Tat Lee and Guanghao Ye.

*ACM Symposium on Theory of Computing (STOC)*, 2021.

Invited to SICOMP Special Issue.

<https://arxiv.org/abs/2011.05365>.

**Computing Circle Packing Representations of Planar Graphs.**

with Yin Tat Lee and Kent Quanrud.

*ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2020.

<https://arxiv.org/abs/1911.00612>.

**Improved Bounds for Rota's Basis Conjecture.**

with Jim Geelen.

*Combinatorica*, 2019.

<https://arxiv.org/abs/1709.00075>. Polymath 12 discussions.

**Modeling Temporal Effects in Re-captured Video.**

Philipp Schaber, Sally Dong, Benjamin Guthier, Stefan Kopf, Wolfgang Effelsberg.

*ACM International Conference on Multimedia (ACMMM)*, 2015.

TEACHING	Introduction to Computing, University of Washington	Apr – Jun 2023
ASSISTANTSHIPS	Algorithms, University of Washington	Jan – Mar 2022, Apr – Jun 2020
	Sketching Algorithms, University of Washington	Jan – Mar 2021
	Calculus 2, University of Waterloo	Jan – Apr 2017
	Introduction to Combinatorics, University of Waterloo	May – Aug 2015
	Algebra, University of Waterloo	Sept – Dec 2014

AWARDS AND GRANTS	NSERC (Canadian NSF equivalent) Postgraduate Scholarship	2021
	NSERC Alexander Graham Bell Canada Graduate Scholarship (declined)	2021
	Financial support for PhD studies in STEM awarded to top candidates across Canada, valued at \$105,000 CAD over 3 years.	
	EECS Great Educators Fellowship, MIT (declined)	2018
	Jessie W.H. Zou Memorial Award, University of Waterloo	2018
	Awarded to one student annually in the Faculty of Math for excellence in undergraduate research (with advisor nomination).	
	NSERC Undergraduate Research Award	2016, 2017
	University of Waterloo President's Research Award	2016
	University of Waterloo President's International Experience Award	2015
	President's Scholarship of Distinction, University of Waterloo	2013
	Suncor Energy Inc. Emerging Leaders Award, University of Waterloo	2013
	Top entrance scholarship in engineering awarded to four students a year.	

INVITED TALKS	<p><b>“Fast algorithm design for structured linear programs.”</b></p> <p><i>SIAM Conference on Optimization</i>, University of Edinburgh. Jun 2026.</p> <p><i>Mixed Integer Programming Society Annual Workshop</i>, University of Connecticut. May 2026.</p> <p><i>Computer Science Seminar</i>, Brown University. Apr 2025.</p> <p><i>Discrete Optimization Session</i>, INFORMS Annual Meeting. Oct 2024.</p> <p><i>Seminar</i>, Amazon modeling and optimization group. Apr 2024.</p> <p><i>Computer Science Seminar</i>, UMass Amherst. Feb 2024.</p> <p><i>West Coast Optimization Meeting</i>. Simon Fraser University, Sep 2023.</p> <p><b>“The Extension Complexity of Polytopes with Bounded Integral Slack Matrices.”</b></p> <p><i>Workshop on Integer Programming</i>, McGill University. Jun 2025.</p> <p><i>IPCO conference presentation</i>, Jul 2024.</p> <p><b>“Faster Min-Cost Flow and Approximate Tree Decomposition on Bounded Treewidth Graphs.”</b></p> <p><i>ESA conference presentation</i>, Sep 2024.</p> <p><b>“Fast algorithms for structured linear programs.”</b></p> <p><i>SODA conference presentation</i>, Jan 2024.</p> <p><i>Optimization and Algorithms Design Workshop</i>. Simons Institute, Berkeley, Dec 2023.</p> <p><b>“Nested Dissection Meets IPMs: Planar Min-Cost Flow in Nearly-Linear Time.”</b></p> <p><i>Theory Seminar</i>. University of Washington, May 2022.</p> <p><i>Theory Seminar</i>. University of Toronto, May 2022.</p> <p><i>SODA conference presentation</i>, Jan 2022.</p> <p><i>Workshop on Continuous Approaches to Discrete Optimization</i>. Hausdorff Institute for Mathematics, University of Bonn, Oct 2021.</p> <p><b>“A Nearly-Linear Time Algorithm for Linear Programs with Small Treewidth.”</b></p> <p><i>Workshop on Parametrized Complexity</i>. Hausdorff Institute for Mathematics, University of Bonn, Dec 2021.</p> <p><b>“Computing Circle Packing Representations of Planar Graphs.”</b></p> <p><i>Theory Seminar</i>. University of Washington, Apr 2020.</p> <p><i>Theory Tea</i>. EPFL, Switzerland, Feb 2020.</p> <p><i>SODA conference presentation</i>, Jan 2020.</p> <p><b>“Improved Bounds for Rota’s Basis Conjecture.”</b></p> <p><i>Theory Lunch</i>. University of Washington, Feb 2019.</p> <p><i>Graphs and Matroids Seminar</i>. University of Waterloo, Apr 2018.</p>
SERVICE	<p>Annual reviewer for the conferences NeurIPS, STOC, FOCS, SODA, ESA, ICALP, ITCS. Reviewer for <i>IEEE Transaction on Visualization and Computer Graphics</i>, <i>Journal of Privacy and Confidentiality</i>, <i>Annals of Combinatorics</i>, <i>Graphs and Combinatorics</i>, <i>Advances in Applied Mathematics</i>.</p> <p>UW computer science department PhD applications reader.</p> <p>Waterloo CUMC Committee Co-Chair</p> <p>Secured funding, oversaw the application process, and organized the trip for 30 undergraduate students to attend the Canadian Undergraduate Math Conference.</p>

INDUSTRY EXPERIENCE	<p><b>Amazon Transportation Services</b>, Luxembourg</p> <p>Applied Scientist Intern, Algorithms and Optimization Lab</p> <p>Designed and implemented truck-scheduling algorithms for Amazon's middle-mile transportation network. My work was launched in production for the European and North American network, and led to savings in operating costs of approximately one million Euros per week in Europe.</p>	Oct 2022 – Mar 2023
	<p><b>The Voleon Group</b>, Berkeley, CA</p> <p>Quantitative Research Intern</p> <p>Built a deep-learning model using Jax to solve the optimal portfolio allocation problem.</p>	Jun – Sept 2022
	<p><b>Amazon</b>, Seattle, WA</p> <p>Software Engineering Intern</p>	Sept – Dec 2017
	<p><b>Microsoft (Intentional Software)</b>, Bellevue, WA</p> <p>Software Engineering and Programming Languages Intern</p>	Sept – Dec 2015
MISC EXPERIENCE	<p><b>AAAS Catelyzing Advocacy in Science and Engineering Workshop</b></p> <p>One of four attendees sponsored by UW to attend an annual workshop on science policy in D.C. organized by the American Association for the Advancement of Science</p>	Apr 2024
LANGUAGES	Python, PyTorch, C, C++, Java, C#, Haskell, Matlab	