

# Akshay Ramachandran

Email: a5ramach@uwaterloo.ca  
Address: Davis Center, 3139  
200 Ring Rd, Waterloo ON, N2L 3G1

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<b>INTERESTS</b>	Geodesic/ Riemannian Optimization, Matrix Analysis, Quantum Information Theory, Geometric Invariant Theory	
<b>EDUCATION</b>	<b>University of Waterloo</b> , Waterloo, Ontario, Canada <i>Ph.D.</i> , Computer Science <i>Advisor</i> : Lap Chi Lau	Aug 2016-Oct 2021
	<b>UC Berkeley</b> , Berkeley, CA, USA <i>B.S.</i> , Electrical Engineering and Computer Science	Aug 2012-May 2016
<b>EXPERIENCE</b>	<b>CWI / UvA</b> Post-doc in Networks and Optimization + QuSoft Amsterdam, Netherlands with Daniel Dadush and Michael Walter	October 2021-
	<b>Microsoft Research</b> Research Intern Bangalore, Karnataka, India with Navin Goyal	June-August 2016
	<b>Juniper Networks</b> Software Engineering Intern Sunnyvale, CA, USA	June-August 2014
<b>AWARDS</b>	Cheriton Scholarship (2016-2018, 2019-2020) Awarded to $\approx 60$ students based on academic excellence	CAD 10,000 per year
	Ontario Trillium (2016-2020) Nominated by Faculty based on academic merit	CAD 40,000 per year
	Eta Kappa Nu EECS Honor Society at UC Berkeley (2013)	
<b>PUBLICATIONS</b>	<i>The Paulsen Problem Revisited: Optimal Bounds via Smoothed Analysis and Scaling</i> with Lap Chi Lau In Preparation.	
	<i>Hidden convexity, optimization, and algorithms on rotation matrices</i> with Kevin Shu and Alex Wang In Submission to Mathematics of Operations Research.	
	<i>Scaling problems, algorithms and applications to computer science, functional analysis and statistics</i> with Rafael Oliveira Book Chapter in Proceedings of CBM 2021.	
	<i>Near optimal sample complexity for dense matrix and tensor normal models</i> with Cole Franks, Rafael Oliveira, Michael Walters. Under submission to Annals of Statistics.	
	<i>Spectral Analysis of Operator Scaling</i> with Tsz Chiu Kwok, Lap Chi Lau SIAM Journal on Computing, Volume 50 (2021). Preliminary version in FOCS 2019.	
	<i>The Paulsen Problem, Continuous Operator Scaling, and Smoothed Analysis</i>	

with Tsz Chiu Kwok, Lap Chi Lau, Yin Tat Lee.  
STOC 2018.

*Sandpile Prediction on Trees in near linear time*  
with A. Schild  
SODA 2016.

## TEACHING

Instructional Assistant for Continuous Optimization at Mastermath Netherlands  
Fall 2022

Instructional Assistant for CS341 (Algorithms) at UWaterloo  
Spring 2019, Fall 2019, Winter 2020

Teaching Assistant for CS70 (Discrete Math and Probability) at UC Berkeley  
Summer 2015, Fall 2015, Spring 2016

## REFERENCES

Advisor: Professor Lap Chi Lau, University of Waterloo, (lapchi@uwaterloo.ca)

Professor Daniel Dadush, Centrum Wiskunde & Informatica, (dadush@cwi.nl)

Professor Michael Walter, Ruhr University Bochum, (michael.walter@rub.de)

Professor Rafael Oliveira, University of Waterloo, (rafael@uwaterloo.ca)

## TALKS

1. Invited Participant in **AIM SQuaREs Workshop**, Mar 2023 (San Jose, CA, USA)  
Topic: Operator scaling meets non-commutative optimal transport
2. Speaker in **QuSoft Junior Meeting**, Mar 2023 (Amsterdam, Netherlands)  
Title: *Jordan's Lemma and the CS Decomposition in Quantum Algorithms*
3. Invited Speaker at **UWaterloo A&C Seminar**, Oct 2022 (Waterloo, Canada)  
Title: *The Brascamp-Lieb Polytope: Rank of Matrix Spaces and Combinatorial Optimization*
4. Invited Speaker at **Simons Workshop**, Nov 2021 (UC Berkeley, CA, USA)  
Topic: Symmetry in Optimization  
Title: *Near optimal sample complexity for matrix and tensor normal models*
5. Invited Speaker with Rafael Oliveira at **Coloquio Brasileiro de Matematica**, June 2021 (Online)  
Topic: Advanced Course in Scaling problems, algorithms, and applications
6. Participant in **BIRS Workshop**, Online Oct 2020  
Topic: Combinatorial and Geometric Discrepancy
7. Speaker in **CWI Reading Group**, Spring-Fall 2020 (Online)  
Topic: Geodesic Convex Optimization  
Talk Title: *Continuous scaling by gradient flow*
8. Invited Speaker at **FOCS 2019** (Baltimore, MD, USA)  
Title: *Spectral analysis of matrix and operator scaling*
9. Speaker in **UWaterloo CO Reading group** (Canada), Fall 2019  
Topic: Submodular Function Maximization  
Talk Title: *Submodular Maximization over Multiple Matroids via Generalized Exchange Properties* by Jon Lee, Maxim Sviridenko, Jan Vondrak
10. Speaker in **UWaterloo CO Reading group**, (Canada), Spring 2019  
Topic: Stable Matching  
Talk Title: *A Fixed-Point Approach to Stable Matchings* by Tamas Fleiner
11. Invited speaker at **FOCS 2018 Workshop** (Paris, France)  
Topic: Scaling Algorithms and Applications  
Title: *The Paulsen Problem, Continuous Operator Scaling, and Smoothed Analysis*

12. Speaker in **UWaterloo CO Reading group** (Canada), Fall 2018  
Topic: Clustering  
Talk Title: *Local Search for Capacitated Facility Location*
13. Speaker in **UWaterloo CO Reading group** (Canada), Spring 2018  
Topic: Multiplicative Weight Update  
Talk Title: *Entropy, Information and Other Interpretations*
14. Speaker in **UWaterloo CO Reading group** (Canada), Winter 2018  
Topic: Stable Polynomials  
Talk Title: *Multivariate Stable Polynomials: Theory and Applications* by D. Wagner
15. Speaker in **UWaterloo CO Reading group** (Canada), Spring 2017  
Topic: Travelling Salesman  
Talk Title: *An  $O(\log n / \log \log n)$ -approximation Algorithm for the Asymmetric Traveling Salesman Problem* by Arash Asadpour, Michel Goemans, Aleksander Madry, Shayan Oveis Gharan, and Amin Saberi
16. Speaker in **UC Berkeley Topics Course** (USA), Fall 2015  
Topic: Geometry of Polynomials  
Talk Title: *Ramanujan graphs from the matching polynomial*

## OTHER

Citizenship: USA  
Hobbies:  
Languages: