

Navtej Singh

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EDUCATION **The University of Michigan**, Ann Arbor, Michigan USA
Master of Science, Pure Mathematics, September 2023-December 2024
Thesis: “The Weight-Generating Function of Closed K -theoretic k -Schur Functions”,
Advisor: Prof. George Seelinger
Involvement: Representative to the Graduate Student Advisory Committee, Mentor and Grader for the Laboratory of Geometry at Michigan, Mentor in the Peer Mentorship Program, Member of the American Mathematical Society, Member of the Sailing Team, Member of the Quiz Bowl Team

The University of Michigan, Ann Arbor, Michigan USA
Advanced Undergraduate and Graduate Coursework, Pure Mathematics, January 2018-May 2020

The University of Chicago, Chicago, Illinois USA
A.B., Economics (with Honors CS and Biology sequences), September 2009-December 2013
Involvement: Student Government Class Representative, Founder and President of Pharmakon student research organization, Vice President of The Triple Helix Journal, Chicago Area Undergraduate Research Symposium CFO and School Representative, Liaison to the Coalition of Academic Teams, Member of the College Bowl Team

HONORS AND AWARDS
The University of Michigan: Nominee and Finalist for the Dow Sustainability Fellowship, 2023
The University of Michigan: Finalist for the Center for Entrepreneurship Gen AI Competition, 2023
The University of Michigan: Finalist for the Entrepreneurial Leadership Program, 2023
The Broad Institute of MIT and Harvard: Inaugural Metcalf Research Fellowship, 2013
The University of Chicago: Quiz Bowl National Championship 1st Place Undergraduate Team, 2013
The University of Chicago: Odyssey Scholarship (full ride), 2009-2013
Fraser High School: Valedictorian, 2008

PAPERS PUBLISHED Larson S., Singh N., Maheshwari S., Stewart S., Krishnaswamy U. (2021)
Exploring Out-of-Distribution Generalization in Text Classifiers Trained on Tobacco-3482 and RVL-CDIP. In: Barney Smith E.H., Pal U. (eds) Document Analysis and Recognition ICDAR 2021 Workshops. ICDAR 2021. Lecture Notes in Computer Science, vol 12917. Springer, Cham.
https://doi.org/10.1007/978-3-030-86159-9_30 / <https://arxiv.org/abs/2108.02684>

Singh N., Sichuan E., Helzer M., Huang S., Shah U., Berger J. (2012)
Taking the A Train: Psychostimulant Abuse Potential Among College Populations
In: Scientia Undergraduate Research Journal, vol 1, Spring 2012. The Triple Helix.

PAPERS SUBMITTED Gajewski A., Goldin E., Safin J., Singh N., Zhang J.
Optimization on Symplectic Embeddings.
https://public.websites.umich.edu/~singhnav/Optimization_on_Symplectic_Embeddings.pdf

PAPERS IN PREPARATION Lerner-Brecher M., Church B., Hyungdai C., Jing M., Singh N.
On the Shioda Conjecture for Diagonal Projective Varieties over Finite Fields.
https://public.websites.umich.edu/~singhnav/Shioda_Conjecture.pdf

PATENTS PENDING **SkySync, Inc** Larson S., Singh N., Woodward S., Brazeau M. (2021)
Accessing, Classifying, and Taking Action on Documents using Natural Language Processing

RESEARCH PROJECTS **The University of Michigan**, Ann Arbor, Michigan USA
Masters Thesis (Pure Mathematics) **September-December 2024**
 Discovered the first known weight-generating function for Closed K-theoretic k -Schur Functions, developed a novel combinatorial construction regarding them, thereafter found its tableaux formulation
 Advisor: Prof. George Seelinger

Columbia University, New York City, New York USA
Research Experiences for Undergraduates (Pure Mathematics) **June 2019-August 2019**
 Applied computational theory from machine learning to create and optimize symplectic embeddings induced by time-dependent Hamiltonians from high-dimensional polytopes into balls
 Advisor: Prof. Kyler Siegel

Research Experiences for Undergraduates (Pure Mathematics) **June 2018-August 2018**
 Determined zeta functions and numerical invariants of diagonal hypersurfaces in weighted-projective space over finite fields, and discovered novel infinite families of supersingular diagonal hypersurfaces
 Advisors: Profs. Daniel Litt and Alexander Perry

The Broad Institute of MIT and Harvard, Cambridge, Massachusetts USA
Metcalf Research Fellowship (Statistical Genomics) **June 2013-August 2013**
 Statistically analyzed the strain-specificity of RTS,S/AS02, the world's first malaria vaccine
 Advisor: Prof. Daniel Neafsey

The University of Chicago, Chicago, Illinois USA
Research Assistantship (Surgery, funded by the Department of Defense) **August 2012-June 2013**
 Developed biophysical finite element method models for electroshock discharge in human tissue, and mathematically modeled the bioheat equation
 Advisor: Prof. Raphael Lee

Research Assistantship (Pharmacology) **August-December 2012**
 Helped determine genomic markers influencing glucocorticosteroid action
 Advisor: Prof. Rong Stephanie Huang

Research Assistantship (Surgery) **June 2012-August 2012**
 Described the innovation diffusion process for the Thirty Million Words project
 Advisor: Prof. Dana Suskind

Research Assistantship (Economics, funded by the Delta Institute and BFI) **June 2012-August 2012**
 Surveyed the Allais paradox in agricultural populations
 Advisor: Prof. John List

Research Manager (Pharmacology, via Pharmakon student organization) **September 2011-May 2013**
 Founded and presided over student research organization, garnered funding, obtained faculty sponsorship, maintained IRB approval (becoming first university-sanctioned undergraduate-run research project), devised research plan studying psychostimulants and their abuse potential, administered research, recruited and managed research assistants, published results, provided mentorship
 Advisors: Profs. Harriet de Wit, Khalid Afzal, Rong Stephanie Huang

Research Assistantship (Decision Research Lab) **September-December 2010**
 Assessed consumption behavior under differential product labeling for marketing research
 Advisor: Prof. Ayelet Fishbach

Research Assistantship (Neurobiology) **June 2010-August 2011**
 Assayed the role of palmitoylation in localization and recycling of Nicotinic Acetylcholine Receptors
 Advisor: Prof. William Green

CONFERENCES AND PRESENTATIONS	BUGCAT 2024 (Grad Combinatorics, Algebra, and Topology) , Binghamton, New York USA <i>Binghamton University</i> Sponsored Attendee	October 2024
	BARD4 (Bayou Arithmetic Research Days) , New Orleans, Louisiana USA <i>Tulane University</i> Speaker: will give an expository talk on “Gal(\overline{Q}/Q)-Invariants of Dessins d’Enfants”	October 2024
	Buckeye Metric Geometry Workshop , Columbus, Ohio USA <i>The Ohio State University</i> Sponsored Attendee	August 2024
	Geometry, Topology, and Algebra 2024 , Philadelphia, Pennsylvania USA <i>Temple University</i> Sponsored Attendee	June 2024
	BARD3 (Bayou Arithmetic Research Days) , Baton Rouge, Louisiana USA <i>Louisiana State University</i> Speaker: gave a talk on original research “On the Shioda Conjecture for Diagonal Projective Varieties over Finite Fields”	October 2023
	Graduate Summer School on Dynamical Systems , Evanston, Illinois USA <i>Northwestern University</i> Sponsored Attendee	June 2023
	Columbia Math REU Presentations , New York, New York USA <i>Columbia University</i> Speaker: gave a talk on original research “Optimization on Symplectic Embeddings”	August 2019
	GROW 2018 (Graduate Research Opportunities for Women) , Ann Arbor, Michigan USA <i>The University of Michigan</i> Volunteer, conducted outreach to support recruitment of historically underrepresented population	October 2018
	Columbia Math REU Presentations , New York, New York USA <i>Columbia University</i> Speaker: gave a talk on original research “On the Shioda Conjecture for Diagonal Projective Varieties over Finite Fields”	August 2018
TEACHING EXPERIENCE	The University of Michigan , Ann Arbor, Michigan USA <i>Grader, LoG(M) Laboratory of Geometry at Michigan</i> Critiqued and graded students’ final project papers	Fall 2024
PROFESSIONAL EXPERIENCE	OptImage , Ann Arbor, Michigan USA <i>Founder, Machine Learning Scientist</i> Designed and developed machine learning models for computer vision applications in fashion; Recruited sales lead from Ross School of Business at the University of Michigan; Michigan Center for Entrepreneurship Gen-AI Competition Finalist 2023 http://optimage.tech	October 2021-

Facebook, Menlo Park, California USA

Data Scientist (remote)

May 2021-October 2021

Analyzed data and developed models for the WhatsApp Business Interfaces group

SkySync, Ann Arbor, Michigan USA

Senior Machine Learning Engineer (remote)

November 2020-May 2021

Designed and developed machine learning models for document classification and other NLP tasks;

Contributed to research publications and patent applications;

Co-managed interns from University of Michigan

Zealery (later CACTIVATE), Boston, Massachusetts USA

Co-founder and Chief Scientist, then Advisor (remote)

January 2017-October 2021

Led machine learning research and development efforts at advertising technology startup company;

Hired and managed interns from Harvard and University of Washington;

Helped company close angel and seed venture capital fundraising rounds;

MassChallenge 2020 winner; company stake acquired in 2021

Infinite Analytics, Cambridge, Massachusetts USA

Data Scientist

August 2015-January 2017

Designed and trained deep neural networks for computer vision and recommendation systems; led company's deep learning research, contributed to patent application for knowledge base implementation;

Interviewed for full-time technical positions, hired and managed interns from MIT

Neumitra, Boston, Massachusetts USA

Data Scientist

May 2015-August 2015

Designed algorithms to detect galvanic skin response for a wearable device

Mojulus, Detroit, Michigan USA

Software Engineer

January 2014-May 2015

Developed distributed computing web applications

PROGRAMMING
LANGUAGES

Python, Sage, Haskell, C, R, SQL, MATLAB, Mathematica, JavaScript/Node, HTML/CSS, L^AT_EX

NATURAL
LANGUAGES

English (Native), Punjabi (Native), Hindi (Fluent), Urdu (Fluent), Spanish (Proficient)