

**Kriti Sehgal**  
Preceptor in Data Science  
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**The University of Chicago**  
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**Research Interests:** Data Science, Mathematical Analysis.

**Work Experience**

**Data Science Institute, University of Chicago** . . . . . Chicago, IL, USA  
*Preceptor in Data Science* . . . . . Jul 2024 - Current

**Wolfram|Alpha** . . . . . Champaign, IL, USA  
*Scientific content development intern* . . . . . Jun 2023 - Aug 2023

**Education**

**The Ohio State University (OSU)** . . . . . Columbus, OH, USA  
*PhD Mathematics* . . . . . Aug 2018 - Apr 2024  
– Advisor: Prof. Ovidiu Costin

*MS Mathematics* . . . . . Aug 2018 - Jul 2021

**Indian Institute of Science (IISc)** . . . . . Bangalore, India  
*MS Mathematics* . . . . . Jul 2015 - Jun 2018  
– Advisor: Prof. Tirthankar Bhattacharyya

**University of Delhi (DU)** . . . . . Delhi, India  
*B.Sc. (Honors) Mathematics* . . . . . Jul 2012 - May 2015

**Research Papers**

- 1. *On the pointwise existence of Cauchy P.V. integrals*, with O. Costin and N. Castillo  
(arXiv link: <https://arxiv.org/abs/2311.13392>).
- 2. *Long time evolution of the Hénon-Heiles system for small energy*, with O. Costin and R. Costin  
(arXiv link: <https://arxiv.org/abs/2411.16071>).

**Teaching and Mentorship**

**Trainings**  
Professional development training for the City Colleges of Chicago (CCC) . . . . . Fall 2024, Spring 2025

**Instructor**  
DATA 118 - Introduction to Data Science, UChicago . . . . . Spring 2025  
Math 125 - Introduction to Statistics, Olive-Harvey College . . . . . Spring 2025

### Graduate Teaching Associate

Math 1149 - Trigonometry, OSU . . . . .	Spring 2024
Math 2173 - Calculus III (Engineering Mathematics B), OSU . . . . .	Fall 2023
Math 1131 - Calculus for Business, OSU . . . . .	Spring 2022
Math 1156 - Calculus for Biological Sciences, OSU . . . . .	Fall 2021
Math 2153 - Calculus III, OSU . . . . .	Spring 2021
Math 1172 - Calculus II (Engineering Mathematics), OSU . . . . .	Fall 2020
Math 1172 - Calculus II (Engineering Mathematics), OSU . . . . .	Spring 2020
Math 1151 - Calculus I, OSU . . . . .	Fall 2019
UM 101 - Undergraduate Analysis and Linear Algebra, IISc . . . . .	Fall 2017

### Mentorship

Mentor at Data Science for Social Impact Summer Experience, UChicago . . . . .	Summer 2025
Mentor at Data Science Clinic program, UChicago . . . . .	Fall 2024, Winter 2025, Spring 2025
Mentor at Directed reading program, OSU . . . . .	Fall 2021
One-on-one mentorship and teaching support to train new teaching associates, OSU . . . . .	Fall 2021

## Awards and Achievements

1. 2023 SIAM Student Chapter Certificate of Recognition acknowledging exceptional service to OSU's SIAM Chapter.
2. 2023 Graduate Associate Teaching Award (GATA), OSU's highest honor for exceptional graduate teaching associates.
3. 2022 Phil Huneke Distinguished Graduate Teaching Associate Award by Math department at OSU.
4. Nominated for 2021 Graduate Student Leadership Award, OSU's highest recognition for student leadership.
5. Qualified National Eligibility Test for Lectureship (NET), India in Mathematics.
6. All India Rank 05 in Joint Admission Test for M.Sc. (JAM), Mathematics, 2015.
7. First Position in undergraduate studies at University of Delhi.

## Talks

Data4All Guest Speaker (Invited talk) . . . . .	University of Chicago, IL - Nov 23, 2024
SIAM Great Lakes Conference (Invited talk) . . . . .	East Lansing, MI - Oct 14, 2023
Joint Math Meetings AWM Poster Presentation . . . . .	Online - Jan 08, 2021

## Projects

1. Mathematical problems in industry (MPI 2025): Collaborated with Kwaai, an open-source AI lab, to study privacy-preserving query methods for vector databases in Personal AI. Explored encryption techniques like dimensional scrambling, noise injection, ElGamal, and CKKS, and developed and evaluated new homomorphic encryption algorithms.

- Mathematical problems in industry (MPI 2024): Analyzed Vironix Health's de-identified datasets on disease progression during remote patient monitoring to identify positive health outcomes and predict adverse episodes, patient compliance, and engagement.
- Mathematics behind the Hénon-Heiles system: Developing a rigorous mathematical theory, using asymptotic analysis and numerical simulations, to explain the long-term dynamics of the famous astrophysics system called the Hénon-Heiles system.
- Generalization of Plemelj formula: Proving the application of Plemelj's formulas from Hölder continuous functions to the broader domain of functions.
- Erdős Institute data science boot camp Fall 2023: Built predictive models to forecast S&P 500 index behavior and compared results across stock indices.
- Wolfram|Alpha: Contributed to a project extracting and validating mathematical assertions from scientific papers, using  $\text{\LaTeX}$  parsing, pattern matching, and regular expressions.
- Mathematical problems in industry (MPI 2022): Collaborated with Vironix Health to conducted exploratory data analysis of hospital admission data to identify key features and symptoms predictive of heart failure severity.
- Graduate student math modeling camp (GSMMC 2022): Analyzed geospatial travel data to identify and model trade-offs between data transparency, privacy, and utility. Utilized statistical methods and randomization techniques to enhance privacy while preserving data usefulness.
- Erdős Institute data science boot camp May 2021: Used predictive modeling (KNN, Decision Trees, SVMs) to identify success factors in clinical trials for cancer interventions.
- M.S. thesis: Studied the notion of holomorphicity, in a general setting, for a function defined on an open subset of the complex plane and taking values in a locally convex topological vector space.

## Leadership and Service

- President, Society for industrial and applied mathematics (SIAM) chapter at OSU . . . Aug 2022 - Apr 2023
- Vice-President, Association for Women in Mathematics (AWM) chapter at OSU . . . Aug 2021 - Apr 2023
- Vice-President, Mathematics graduate student association at OSU . . . . . Aug 2020 – May 2022
- Founder and organizer, Student analysis seminar in Math department at OSU . . . . Jan 2020 – May 2022
- Ohio Union Activities Board Graduate/Professional committee member at OSU . . . Nov 2020 - Dec 2021
- Graduate student representative of the Math department's Diversity committee at OSU Aug 2020 - May 2021
- Outreach Coordinator, Society for industrial and applied mathematics chapter at IISc Aug 2017 - May 2018

## Conferences, Workshops, and Summer Schools

- National Workshop on Data Science Education: *June 24-27, 2025.*
- Mathematical Problems in Industry (MPI 2025).
- SIAM Workshop "From Machine Learning to Large Language Models - An Introduction": *October 20, 2024.*

4. Teaching In The Generative AI Landscape at University of Chicago: *September 4-5, 2024*.
5. Mathematical Problems in Industry (MPI 2024).
6. The Erdős institute Fall 2023 Data Science Boot Camp.
7. Mathematical Problems in Industry (MPI 2022).
8. Graduate Students Mathematical Modeling Camp 2022.
9. The Erdős Institute Data Science Boot Camp May 2022.
10. 55th Topology Festival held at Cornell University, USA: *May 10-12, 2019*.
11. Graduate Student Combinatorics Conference held at the Drexel University and the University of Pennsylvania, USA: *April 5- April 7, 2019*.
12. Recent advances in Functional Analysis held at the Kent State University, USA: *October 11- October 14, 2018*.
13. Instructional School for Teachers (IST) on Advanced Linear Algebra held at the Indian Institute of Technology Gandhinagar (IITGN), India: *July 10- July 22, 2017*.
14. Indian Academy of Sciences Summer Research Fellowship 2016 under the guidance of Prof. Jaydeb Sarkar at the Indian Statistical Institute (ISI), Bangalore, India: *May 02–June 27, 2016*.
15. Worked as a student volunteer in organising “2nd Residential Internship Program for Child Scientists” in the Indian Institute of Science Education and Research (IISER), Mohali, India: *June 22–July 04, 2015*.
16. Indian Institute of Science Education and Research (IISER) Mohali Summer Internship program under the guidance of Prof. I.B.S. Passi at IISER Mohali, India: *June 01–June 30, 2015*.
17. Mathematics Training and Talent Search Programme (MTTS, Level-O) at the Indian Institute of Technology Guwahati (IITG), India: *June 23–July 19, 2014*.
18. National Program on Differential Equations: Theory, Computation and Applications (NPDE-TCA) held at the Maulana Azad National Institute of Technology (MANIT), Bhopal, India: *May 26–June 14, 2014*.

## **Skills**

- Technical: Python (NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn), Wolfram Mathematica,  $\text{\LaTeX}$ , Github, MS Office.
- Soft skills: Collaboration, Leadership, Team-player, Verbal and written communication, Organization, Problem-solving.