Kriti Sehgal
Preceptor in Data Science
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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

Professional Development

Trainings

- Professional development training with the City Colleges of Chicago (CCC): Fall 2024 - Spring 2026.
  (It is a comprehensive faculty development program focused on evidence-based pedagogy, inclusive teaching practices, classroom action research, and reflective practice in preparation for a career in higher education)

Curriculum development

- **Textbook Development:** Authored and edited multiple chapters for UChicago's Introduction to Data Science textbook, including Neural Networks and Deep Learning, Introduction to Machine Learning, DataFrames; currently developing chapter on Decision Trees.
  (Textbook available at: textbook-datascience-1-dev.vercel.app/)
- **Pedagogical Research:** Facilitated weekly laboratory and recitation sessions for DATA 119 (Fall 2025) as part of a teaching research initiative examining the impact of mandatory lab components on student learning outcomes in data science courses; contributed to refinement of lab curriculum.

- **Community College Partnership and Course Design:** Collaborating with Olive-Harvey College (City Colleges of Chicago) to develop and propose a data science course sequence at the community college level; will lead instruction upon approval to expand access to data science education in Chicago.

Teaching and Mentorship

Instructor

- DATA 231 - Introduction to Machine Learning, UChicago *(upcoming)* . . . . . Spring 2026
- DATA 119 - Introduction to Data Science II, UChicago *(upcoming)* . . . . . Winter 2026
- DATA 119 Recitations - Introduction to Data Science II, UChicago . . . . . Fall 2025
- DATA 118 - Introduction to Data Science I, 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 . . . . . Spring 2020, Fall 2020
- Math 1151 - Calculus I, OSU . . . . . Fall 2019
- UM 101 - Undergraduate Analysis and Linear Algebra, IISc . . . . . Fall 2017

Mentorship

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

Research Projects

Publications and Thesis

1. Long time evolution of the Hénon-Heiles system for small energy, *Journal of Mathematical Physics 66, no.9, 2025*, O. Costin, R. Costin, K.Sehgal.
2. On the pointwise existence of Cauchy P.V. integrals, (*Under Peer Review*, arXiv), N. Castillo, O. Costin, K. Sehgal.

3. PhD thesis: Dynamics Of The Hénon-Heiles System And Generalizing The Sokhotski-Plemelj Formula.
4. M.S. thesis: Duality for Spaces of Holomorphic Functions into a Locally Convex Topological Vector Space.

Projects in Data Science Workshops

1. Data Science for Social Impact Summer 2025: Supervised an undergraduate project on developing a Chatbot (called *Seedbot*) that parses legal documents and answers questions about seed laws of 78 countries in simplified language; *poster published, paper in preparation*.
2. 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.
3. 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 participation.
4. Erdős Institute data science boot camp Fall 2023: Built predictive models to forecast S&P 500 index behavior and compared results across stock indices.
5. Wolfram|Alpha: Contributed to a project extracting and validating mathematical assertions from scientific papers, using LaTeX parsing, pattern matching, and regular expressions.
6. Mathematical problems in industry (MPI 2022): Collaborated with Vironix Health to perform an exploratory data analysis of hospital admission data to identify key features and symptoms predictive of the severity of heart failure.
7. 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.
8. 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.

Awards and Achievements

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

Leadership and Service

- Teaching Assistant (Volunteer), Statistics for Machine Learning, Data Science, and Artificial Intelligence training program for undergraduates . . . . . Oct 11 - Nov 8, 2025
- 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

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

Conferences, Workshops, and Summer Schools

1. National Workshop on Data Science Education: *June 24- 27, 2025*.
2. Mathematical Problems in Industry (MPI 2025): *June 9- 13, 2025*.
3. 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): *June 25- 29, 2024*.
6. The Erdős Institute Fall 2023 Data Science Boot Camp: *Aug- Dec, 2023*.
7. Mathematical Problems in Industry (MPI 2022): *June 13- 17, 2022*.
8. Graduate Students Mathematical Modeling Camp 2022: *June 8- 11, 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- 7, 2019*.
12. Recent advances in Functional Analysis held at the Kent State University, USA: *October 11- 14, 2018*.

13. Instructional School for Teachers (IST) on Advanced Linear Algebra held at the Indian Institute of Technology Gandhinagar (IITGN), India: *July 10- 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 organizing "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

- Soft skills: Collaboration, Leadership, Team-player, Verbal and written communication, Organization, Problem-solving.
- Technical: Python, R (beginner), Wolfram Mathematica, LaTeX, Github, MS Office.