Apurva Nakade

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Education

Ph.D. in Mathematics, Johns Hopkins University	2019
M.Sc. in Mathematics, Chennai Mathematical Institute	2013
B.Tech. in Computer Science & Engineering, IIT Kanpur	2010

Experience

Senior Lecturer, Johns Hopkins University	2023-
Postdoctoral Lecturer, Northwestern University	2021-23
Instructor for the Causeway Postbaccalaureate Program, NU	2022
Postdoctoral Fellow, University of Western Ontario	2019-21
Academic Coordinator, Canada/USA Mathcamp	2018
Mentor, Canada/USA Mathcamp	2017-20
Organizer, Mentor, Directed Reading Program, UWO, JHU	2017-21
Exotic Derivatives Trader, Nomura Capital India Pvt Ltd	2010

Teaching Experience

UG Research Coordinator, JHU AMS 2025-

Instructor, JHU AMS 2023-

- Mathematical Foundations of AI, Summer 2025
- Intermediate Probability and Statistics, Summer 2025
- Discrete Math, Spring 2025
- Intermediate Probability and Statistics, Spring 2025
- Monte Carlo Methods, Spring 2025
- Honors Algebra II, Spring 2025
- Exploring Engineering Innovation, Summer 2024
- Monte Carlo Methods, Fall 2024
- Discrete Math, Fall 2024
- Graph theory, Spring 2024
- Linear Algebra and Differential Equations, Spring 2024
- Discrete Math, Fall 2023

Instructor, Northwestern 2021-23

- MENU Linear Algebra and Multivariable Calculus, (Coordinator) 2022-23
- Introduction to Optimization, Winter, Spring 2022
- Single Variable Calculus, Fall 2021
- MENU Linear Algebra and Multivariable Calculus, 2021-22
- Foundations of Mathematics, Winter 2023
- Elementary Differential Equations, Spring 2023

Instructor, UWO 2019-21

- Algebraic Topology (graduate level), Winter 2021
- Topology Bootcamp, Fall 2020
- Discrete Structures for Engineering, Fall 2020
- Calculus II for Mathematical and Physical Sciences, Winter 2020
- Calculus I for Mathematical and Physical Sciences, Fall 2019
- Topics in Category Theory, Fall 2019

Instructor, JHU 2014-18
- Honors Single Variable Calculus, Fall 2018, 2017
- Symmetries & Polynomials, Intersession 2018
- Hitchhikers Guide to Algebraic Topology, Intersession 2017
- Differential Equations with Applications, Summer 2017, 2015
- Online Linear Algebra, Summer 2014

Academic Co-coordinator, Canada/USA Mathcamp 2018
- Planned the five week academic schedule
- Part of the mentor hiring committee
- Invited visiting speakers

Mentor/Staff, Canada/USA Mathcamp 2017-20
- Designed and taught a variety of undergraduate-level courses
- Was residential and academic advisor at camp
- Part of the mentor hiring committee

Publications

Flat principal 2-group bundles and flat string structures 2025
Daniel Berwick-Evans, Emily Cliff, Laura Murray, Apurva Nakade, Emma Phillips, Quantum Symmetries, Contemporary Mathematics, vol. 813, Amer. Math. Soc., Providence, RI, 2025, pp. 257-301.

Manifold Calculus and the h-principle 2019
The Journal of Homotopy and Related Structures

Effect of increasing the energy gap between the two lowest energy states on the mixing time of the Metropolis algorithm (with Somenath Biswas) 2012
Information Processing Letters, IPL4801 (2012.08.012)

Grants & Awards

Open Educational Resources Faculty Grant (joint with Aaron Greicius), NU 2022
$10000 to develop, use, and publish OER for a Northwestern undergraduate course

William Kelso Morrill Award for Excellence in Mathematics, JHU 2019
Awarded each year to the math graduate student who best displays love of teaching, love of mathematics, and concern for students

Finalist for the KSAS Excellence in Teaching Awards, JHU 2019
The award honors the best graduate TAs in the School of Arts and Sciences for the care and concern they take with their subject and their students.

Prof. Joel Dean Award for Excellence in Teaching in Mathematics, JHU 2016
Annual award to recognize math graduate students who have exhibited extraordinary performance in teaching undergraduates

AMS Graduate Student Travel Grant 2019
$250 travel grant for giving a talk at AMS Sectional Meetings

Service

Judge for poster presentations at MAA MD-DC-VA Section Fall Meeting — 2024

Supplementary Instructor for the Causeway Postbaccalaureate Program, NU — 2022
Yearlong experience in mathematics that seeks to increase the number of graduate students in the mathematical sciences from historically underrepresented groups

Directed Reading Program, UWO, JHU — 2017-21
- Started DRP at UWO in Fall 2019
- Organizer and mentor for DRP at JHU and UWO

Professional Development

Faculty Forward Fellowship, JHU — 2023

Introduction to Education Research Workshop, JHU — 2023

MAA Section NExT Fellow, MD-DC-VA Section — 2023-
Local chapter of MAA Project NExT

MAA Project NExT Fellow, Brown'20 cohort — 2020
Professional development program for new or recent Ph.D.s in the mathematical sciences.

Math Association of America Fellow — 2020-

Teaching Academy Certification, JHU — 2019
Program to help prepare for academic careers and to provide assistance in acquiring a foundation for the teaching responsibilities

Several workshops by the Center of Teaching & Learning at UWO — 2019-20
MSRI Critical Issues in Mathematics Education Workshop — 2022
MAA Modeling Inspiration for Differential Equations Workshop — 2022
Mastery Grading Workshop — 2019
Science of Learning Symposium, JHU — 2014-18

Projects

Math Formalizaion in Lean Theorem Prover — 2019-
- Contributed to Lean's surreal numbers math library
- Contributed to Lean's convex optimization math library

Open Educational Resources Textbook for Linear Algebra — 2022
- Added WeBWorK problems to a Linear Algebra PreTeXt OER textbook

Course Development: Introduction to Optimization, UWO — 2022
- Restructured the course to include applications and modeling
- Created course notes in RMarkdown
- Created Excel worksheet assignments for modeling scenarios

Course Development: Discrete Structures for Engineering, UWO — 2020
- Adapted the course for online asynchronous delivery
- Helped code (in a team) hundreds of problems on WeBWork
- Made short weekly video lectures to support the course text
- Maintained an active discussion forum on Piazza
- Gave a talk about the Course Development at a conference on E-Assessment in Mathematical Sciences

Course Development: Honors Single Variable Course (IBL), JHU — 2017-18
- Designed and taught a semester long course structured in a flipped classroom format for two semesters

Course Development: Intersession courses, JHU — 2017-18
- Designed and taught a 2-week course titled Symmetries & Polynomials introducing Galois theory to non-math majors
- Designed and taught a 2-week course Hitchhiker's Guide to Algebraic Topology introducing algebraic topology to non-math majors

Course Development: Canada/USA Mathcamp courses — 2017
- Designed and taught several week-long math courses to advanced high-school students
- Course topics: Theorem proving in Lean, Visualizing 3-manifolds, Riemann surfaces, Crash Course on Linear Algebra, Covering Spaces, Cohomology etc.

Talks

Discrete Chern–Simmons via 2-group bundles on elliptic curves — 2020
CMS Session on Homotopy Theory

What is a Spectrum? — 2020
University of Western Ontario, Basic Notions Seminar

Manifold calculus and the h-principle — 2017-19
- University of Regina, Geometry & Topology Seminar, 2019
- University of Western Ontario, Geometry & Topology Seminar, 2019
- University of Rochester, Topology Seminar, 2019
- Workshop on Functor Calculus, Ohio State University, 2019
- Spaces of Embeddings, BIRS, Banff, 2019
- AMS Special Session in Homotopy Theory, UC Riverside, 2017

Weiss fibration sequence — 2019
MIT Talbot Workshop

Constructing a Homotopy Type For Triply-Graded Link Homology — 2019
AMS Sectional Meeting, University of Hawaii

Homotopy colimits and limits — 2017
European Autumn School in Topology

Conferences Attended

MAA MD-DC-VA Section Spring Meeting — 2024
MAA MD-DC-VA Section Fall Meeting — 2023
United States Conference on Teaching Statistics — 2023

MSRI CIME Workshop	2022
Project NExT at MAA Mathfest, Online	2021
Lean for the curious mathematician	
Spaces of Embeddings, BIRS, Banff	2019
MSRI Summer School, Cortona, Italy	
MRC Workshop, Providence RI	
MIT Talbot Workshop, Austin TX	
Workshop on Functor Calculus, Ohio State University	
AMS Sectional Meeting, University of Hawaii	
Arizona Winter School, Arizona State University	
Joint Mathematical Meetings, Baltimore	
Symplectic Geometry and Homotopy Theory, UCLA	2018
MSRI Summer School, Fields Institute, Toronto	
Graduate Student Conference, Temple University	
AMS Sectional Meeting, UC Riverside	2017
European Autumn School in Topology, Netherlands	
Topology Festival, Cornell University	
Georgia International Topology Conference, University of Georgia	
Alpine Algebraic & Applied Topology Conference, Switzerland	2016
WCATSS, University of Oregon, Eugene	
GSTSC, Indiana University, Bloomington	
Mid-Atlantic Topology Conference, Johns Hopkins University	
Midwest Topology Seminar, Northwestern University	
Geometry and Topology Conference, Lehigh University	2015
Mid-Atlantic Topology Conference, University of Virginia	
Midwest Topology Seminar, University of Illinois Chicago	
Midwest Topology Seminar, Northwestern University	
Modular invariants in Topology and Analysis, Regensburg	
WCATSS on Field theories, UBC	
Introductory Workshop on Algebraic Topology, MSRI	
Joint Mathematical Meetings, Baltimore	
Classification of Manifolds, NEHU	2013
H-principle, Chennai Mathematical Institute	2012
Groups and geometries, ISI, Bangalore	
String Topology, Vivekananda University	
Kervaire Invariant One, ISI, Kolkata	
Number Theory workshop, Tezpur University	2011
Lie algebras and their representations, CMI	
Nurture camp, Institute of Mathematical Sciences	2007