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

Publications

String structures, 2-group bundles, and a categorification of the Freed-Quinn line bundle — 2021
arXiv:2110.07571, joint with D. Berwick-Evans, E. Cliff, L. Murray, and E. Phillips

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 Yearlong experience in mathematics that seeks to increase the number of graduate students in the mathematical sciences from historically underrepresented groups	2022
	Directed Reading Program, UWO, JHU · Started DRP at UWO in Fall 2019 · Organizer and mentor for DRP at JHU and UWO	2017-21

Professional Development	Faculty Forward Fellowship, JHU	2023
	Introduction to Education Research Workshop, JHU	2023
	MAA Section NExT Fellow, MD-DC-VA Section Local chapter of MAA Project NExT	2023-
	MAA Project NExT Fellow, Brown'20 cohort Professional development program for new or recent Ph.D.s in the mathematical sciences.	2020
	Math Association of America Fellow	2020-
	Teaching Academy Certification, JHU Program to help prepare for academic careers and to provide assistance in acquir- ing a foundation for the teaching responsibilities	2019
	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
Teaching Experience	Instructor, JHU AMS · Graph theory, Spring 2024 · Linear Algebra and Differential Equations, Spring 2024 · Discrete Math, Fall 2023	2023-
	Instructor, Northwestern · 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	2021-23

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

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 CMS Session on Homotopy Theory	2020
	What is a Spectrum? University of Western Ontario, Basic Notions Seminar	2020
	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 MIT Talbot Workshop	2019
	Constructing a Homotopy Type For Triply-Graded Link Homology AMS Sectional Meeting, University of Hawaii	2019
	Homotopy colimits and limits European Autumn School in Topology	2017
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