Apurva Nakade

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Experience

Postdoctoral Lecturer, Northwestern University	2021-
Postdoctoral Fellow, University of Western Ontario	2019-21
Ph.D. in Mathematics, Johns Hopkins University	2019
M.Sc. in Mathematics, Chennai Mathematical Institute	2013
Exotic Derivatives Trader, Nomura Capital India Pvt Ltd	2010
B.Tech. in Computer Science & Engineering, IIT Kanpur	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 2022
$5,000 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 graduate student who best displays love of teaching, love of mathematics, and concern for students

Finalist for the *KSAS Excellence in Teaching Awards* 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 graduate students who have exhibited extraordinary performance in teaching undergraduates

AMS Student travel grant 2019
Travel grant for giving a talk at AMS Sectional Meeting

Mentoring

Supplementary instructor for the *Causeway Program* 2022
Yearlong experience in mathematics that seeks to increase the number of graduate students in the mathematical sciences from historically underrepresented groups.

Co-coordinator for *Northwestern Emerging Scholars Program* 2022
Weekly sessions led by upper-class peers involving problem-solving and discussion centered on hand-picked advanced mathematical topics.

Directed Reading Program 2017-21

- Started DRP at UWO in Fall 2019
- Organizer and mentor for DRP at JHU and UWO

Professional Development

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

Teaching Academy's Certificate of Completion, JHU — 2019
Program to help prepare for academic careers and to provide assistance in acquiring a foundation for the teaching responsibilities

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

Projects

Formalizing Math in *Lean Theorem Prover* — 2019-
- Taught a course at Mathcamp 2020
- Contributed to Lean's surreal numbers math library
- Contributed to Lean's convex optimization library

OER textbook for Linear Algebra — 2022
- Added WeBWorK problems to a *PreTeXt* OER textbook

Course: *Introduction to Optimization*, UWO — 2022
- Created *course notes* in *Bookdown*
- Create Excel worksheet assignments for modeling scenarios

Course: *Discrete Structures for Engineering*, UWO — 2020
- Adapted the course for online asynchronous delivery
- Coded (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

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

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

Canada/USA Mathcamp courses — 2017
- Sample topics: Theorem proving in Lean, Visualizing 3-manifolds, Riemann surfaces, Crash Course on Linear Algebra, Covering Spaces, Cohomology etc.

Teaching

Instructor, Northwestern 2021-

- 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 2020
- Topics in Category Theory, Fall 2020

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