

Nathaniel Eldredge
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Education

- **University of California, San Diego** La Jolla, CA, USA
Ph.D., Mathematics 2009
M.A., Mathematics 2005
– Ph.D. advisor: Bruce K. Driver
- **Harvey Mudd College** Claremont, CA, USA
B.S., Mathematics 2003
– Graduated with High Distinction
– Departmental Honors in Mathematics and Computer Science

Academic Appointments

- **University of Northern Colorado** Greeley, CO, USA
Associate Professor of Mathematics 2018 – Present
Assistant Professor of Mathematics 2013 – 2018
– Teaching and research responsibilities.
– Teaching assignment: 5 courses per year.
– Undergraduate courses taught:
 - * Math 130 (Supplemental Calculus)
 - * Math 131 (Calculus I)
 - * Math 132 (Calculus II)
 - * Math 228 (Discrete Mathematics)
 - * Math 233 (Calculus III)
 - * Math 335 (Differential Equations I)
 - * Math 350 (Elementary Probability Theory)
- Graduate courses taught:
 - * Math 534 (Continuous Mathematics)
 - * Math 732 (Complex Variables)
 - * Math 735 (Real Analysis)
 - * Math 795 (Special Topics)
- **Cornell University** Ithaca, NY, USA
Postdoctoral Associate / Visiting Assistant Professor 2009 – 2013
– Teaching and research responsibilities. Postdoctoral advisor: [Laurent Saloff-Coste](#).
– Undergraduate courses taught:
 - * Math 1920 (Multivariable Calculus for Engineers)
 - * Math 4740 (Stochastic Processes)
- Graduate courses taught:
 - * Math 6710 (Probability Theory)
 - * Math 7770 (Topics in Probability)

- **University of California, San Diego** La Jolla, CA, USA
Associate Instructor 2008, 2009
 - Instructor with full responsibility for course; supervised teaching assistants
 - Undergraduate courses taught:
 - * Math 3C (Precalculus)
 - * Math 20A (Calculus for Science and Engineering)

- **University of California, San Diego** La Jolla, CA, USA
Teaching Assistant 2003 – 2009
 - Taught discussion sections, worked with students in office hours, graded exams, maintained grade data
 - Courses assisted:
 - * Math 10C (Calculus)
 - * Math 20ABC (Calculus for Science and Engineering)
 - * Math 240ABC (Graduate Real Analysis)
 - * Math 280ABC (Graduate Probability Theory)

Research Interests

- Probability theory and stochastic processes
- Stochastic, functional and geometric analysis
- Probability and analysis on sub-Riemannian manifolds and Lie groups
- Partial differential equations, heat kernel analysis, and functional inequalities

Peer-Reviewed Articles and Preprints

- N. Eldredge, M. Gordina and L. Saloff-Coste. Left-invariant geometries on $SU(2)$ are uniformly doubling. In press, *Geom. Funct. Anal.*
- N. Eldredge. On complex H-type Lie algebras. *Le Matematiche* **73**(1):155-160, 2018.
- N. Eldredge. Strong hypercontractivity and strong logarithmic Sobolev inequalities for log-subharmonic functions on stratified Lie groups. *Nonlinear Analysis* **168**:1–26, 2018.
- N. Eldredge, L. Gross and L. Saloff-Coste. Strong hypercontractivity and logarithmic Sobolev inequalities on stratified complex Lie groups. *Trans. Amer. Math. Soc.* **370**(9):6651–6683, 2018.
- B. K. Driver, N. Eldredge and T. Melcher. Hypoelliptic heat kernels on infinite-dimensional Heisenberg groups. *Trans. Amer. Math. Soc.* **368**(2):989–1022, 2016.
- N. Eldredge and L. Saloff-Coste. Widder’s representation theorem for symmetric local Dirichlet spaces. *J. Theoret. Probab.* **27**(4):1178–1212, 2014.
- N. Eldredge. Gradient estimates for the subelliptic heat kernel on H-type groups. *J. Funct. Anal.* **258**(2):504–533, 2010.
- N. Eldredge. Precise estimates for the subelliptic heat kernel on H-type groups. *J. Math. Pures. Appl.* **92**(1):52–85, 2009.

Other Works

- N. Eldredge. *Analysis and probability on infinite-dimensional spaces*. Lecture notes. arXiv:1607.03591
- N. Eldredge. *Hypoelliptic heat kernel inequalities on H-type groups*. Ph.D. dissertation, University of California, San Diego, 2009. arXiv:1406.1840
- N. Eldredge. *An eigenspace approach to isotypic projections for data on binary trees*. Senior thesis, Harvey Mudd College, 2003. arXiv:1406.6403

Grants and External Funding

- **Simons Foundation Collaboration Grant for Mathematicians** 2015–2020
 - Supports travel and other expenses associated with research collaboration
 - Total budget: US \$35,000

Selected Awards and Fellowships

- **Cornell University Department of Mathematics Teaching Award** 2012
- **Project NExT Fellow** 2009 – 2010
 - MAA-sponsored professional development program for early career mathematicians, focusing on new ideas for teaching.
- **NSF Graduate Research Fellowship** 2003 – 2006

Other Professional Activities

- Co-advisor of University of Northern Colorado Math Club
- Reviewer for Mathematical Reviews / MathSciNet
- Reviewer for Zentralblatt MATH
- Member of MAA Committee on George Pólya Awards (2016–2020)

Professional Memberships

- American Mathematical Society (AMS)
- Mathematical Association of America (MAA)
- Association for Women in Mathematics (AWM)
- Institute of Mathematical Statistics (IMS)
- Bernoulli Society