Nathan King

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Education

University of Waterloo — Early 2025 (Expected)
PhD in Computer Science — *Supervisors: Christopher Batty, Steven Ruuth*

Simon Fraser University — May 2015
MSc in Applied and Computational Mathematics — *Supervisor: Steven Ruuth*

Memorial University of Newfoundland — May 2013
BSc (Hons) in Applied Mathematics and Physics — *Supervisor: Ronald Haynes*

Experience

Research Scientist Intern — Jun - Nov 2023
Meta, Reality Labs Research — *Sausalito, CA*

Research Intern — Aug 2021 - Feb 2022
Meta, Reality Labs Research — *Pittsburgh, PA (Remote)*

Sessional Instructor — May - Dec 2020
University of Waterloo, School of Computer Science — *Waterloo, ON (Remote)*

Research Assistant — Mar - Aug 2018
Simon Fraser University, Department of Mathematics — *Burnaby, BC (Remote)*

Research Scientist — Mar 2016 - Jun 2018
Rutter Inc., Department of Research and Development — *St. John's, NL*

Research Assistant — May - Aug 2012 & 2013
Memorial University of Newfoundland, Department of Mathematics and Statistics — *St. John's, NL*

Publications

Projected Walk on Spheres: A Monte Carlo Closest Point Method for Surface PDEs
[1] Ryusuke Sugimoto, Nathan King, Toshiya Hachisuka, Christopher Batty
ACM SIGGRAPH Asia 2024 (Conference Papers)

A Simple Heat Method for Computing Geodesic Paths on General Manifold Representations
[2] Nathan King, Steven Ruuth, Christopher Batty
ACM SIGGRAPH Asia 2024 Posters

Editing Fluid Flows with Divergence-Free Biharmonic Vector Field Interpolation
[3] Tümay Özdemir, Jiamin Shi, Nathan King, Christopher Batty
ACM SIGGRAPH Asia 2024 Technical Communications

A Closest Point Method for PDEs on Manifolds with Interior Boundary Conditions for Geometry Processing
[4] Nathan King, Haozhe Su, Mridul Aanjaneya, Steven Ruuth, Christopher Batty
ACM Transactions on Graphics 2024

Solving Variational Problems and PDEs that Map between Manifolds via the Closest Point Method
[5] Nathan King, Steven Ruuth
Journal of Computational Physics 2017

Invited Talks

Editing Fluid Flows with Divergence-Free Biharmonic Vector Field Interpolation
Dec 2024 ACM SIGGRAPH Asia — Tokyo, JPN

A Closest Point Method for PDEs with Interior Boundary Conditions for Geometry Processing
Aug 2025 ACM SIGGRAPH North America — Vancouver, BC
Feb 2024 UW School of Computer Science Seminar Series — Waterloo, ON (Virtual)
Mar 2023 SFU Applied and Computational Math Seminar — Burnaby, BC

Surface Partial Differential Equations with Interior Constraints
Nov 2022 FoieGraph — Montreal, QC (Virtual)
Aug 2021 UW School of Computer Science Seminar Series — Waterloo, ON (Virtual)

Intersections with Discrete Closest Point Surfaces
DEC 2021 GRAPHQUON — Montreal, QC (Virtual)

Real-Time Detection of Stationary and Moving Marine Radar Targets
NOV 2017 IEEE NL Electrical and Computer Engineering Conference — St. John's, NL

The Closest Point Method for Manifold Mapping
MAY 2016 SIAM Conference on Imaging Science — Albuquerque, NM
MAR 2016 PIMS SFU Centre for Scientific Computing Seminar — Burnaby, BC
JAN 2016 MUN Applied and Computational Mathematics Seminar — St. John's, NL

The Closest Point Method
NOV 2015 MUN Applied and Computational Mathematics Seminar — St. John's, NL

SOFTWARE

PDEs on Manifolds with Interior Boundary Conditions *C++* — JUN 2024
The Closest Point Method for Surface PDEs *C++* — FEB 2022
Harmonic Maps between Surfaces *MATLAB* — JAN 2021
Interpolation with Quadratic Curves and Patches *MATLAB* — JAN 2021
Image Segmentation using the Piecewise-Constant Mumford-Shah Functional *MATLAB* — SEP 2014
Numerical Solution of Blow-Up PDEs *MATLAB* — SEP 2014

SKILLS

Languages C++, MATLAB, LaTeX, Python
Technologies Eigen, Polyscope, Geometry Central, Blender
Other Experience Houdini, PyTorch, OpenMP, SIMD

STUDENT MENTORSHIP

Derek Wu *Undergraduate, University of Waterloo* — MAY - AUG 2023
Tümay Özdemir *Masters, University of Waterloo* — JUL 2021 - OCT 2022
Umar Ahmed *Undergraduate, University of Waterloo* — JAN - MAY 2021
Haocheng Chang *Undergraduate, University of Waterloo* — SEP - DEC 2020

LEADERSHIP

Treasurer — SEP 2019 - 2022
Math Graduate Student Association — *University of Waterloo*
Committee Member — OCT 2017 - APR 2018
Eastern Newfoundland Science Fair — *Newfoundland School District*
Treasurer — NOV 2013 - 2014
SIAM Student Chapter — *Simon Fraser University*
President — MAY 2012 - 2013
Physics and Physical Oceanography Society — *Memorial University of Newfoundland*

VOLUNTEERING

Student Volunteer — AUG 2020
ACM SIGGRAPH North America — *Virtual*
Proctor — OCT 2017
IEEEXtreme Programming Competition 11.0 — *Memorial University of Newfoundland*
Assistant — JUL 2013
Shad Valley Summer Camp — *Memorial University of Newfoundland*
Judge — APR 2012 & 2013
Eastern NL Science & Technology Fair — *Newfoundland School District*

ACHIEVEMENTS

Ontario Graduate Scholarship *Government of Ontario* — JAN - DEC 2024
QEII Graduate Scholarship in Science & Technology *Government of Ontario* — JAN - DEC 2022 & 2023
President's Graduate Scholarship *University of Waterloo* — JAN - DEC 2022, 2023, & 2024
Mathematics Domestic Doctoral Scholarship *University of Waterloo* — SEP 2018 - AUG 2020
Provost Prize of Distinction *Simon Fraser University* — SEP - DEC 2015
Special Graduate Entrance Scholarship *Simon Fraser University* — SEP - DEC 2015
Postgraduate Scholarship (Doctoral) *NSERC* — SEP 2015 - APR 2016
Canadian Graduate Scholarship (Masters) *NSERC* — MAY 2014 - APR 2015
Special Graduate Entrance Scholarship *Simon Fraser University* — SEP - DEC 2013
Undergraduate Student Research Award *NSERC* — MAY - AUG 2012 & 2013
Lou Visentin Award *Memorial University of Newfoundland* — MAY 2013