





# NATHAN KING | Curriculum Vitae

nathandking.github.io   
n5king@uwaterloo.ca   
nathandavidking   
nathandking 

## EDUCATION

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| DEC 2024<br>(expected) | PHD IN COMPUTER SCIENCE<br><i>University of Waterloo</i>                                     | Supervisors: Christopher Batty<br>Steven Ruuth |
| MAY 2015               | MSC IN APPLIED AND COMPUTATIONAL MATHEMATICS<br><i>Simon Fraser University</i>               | Supervisor: Steven Ruuth                       |
| MAY 2013               | BSc (HONS.) IN APPLIED MATHEMATICS AND PHYSICS<br><i>Memorial University of Newfoundland</i> | Supervisor: Ronald Haynes                      |

## EXPERIENCE

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|------------------------------|---|
| JUNE–NOV 2023                | <b>Research Scientist Intern</b> at META<br><i>Reality Labs Research</i>  |
| SEPT 2018–DEC 2022           | <b>Teaching Assistant</b> at UNIVERSITY OF WATERLOO<br><i>Cheriton School of Computer Science</i>                   |
| AUG 2021–FEB 2022            | <b>Research Intern</b> at META<br><i>Reality Labs Research</i>  |
| MAY–DEC 2020                 | <b>Sessional Instructor</b> at UNIVERSITY OF WATERLOO<br><i>Cheriton School of Computer Science</i>                 |
| MAR–AUG 2018                 | <b>Research Assistant</b> at SIMON FRASER UNIVERSITY<br><i>Department of Mathematics</i>                            |
| MAR 2016–JUNE 2018           | <b>Research Scientist</b> at RUTTER INC.<br><i>Department of Research and Development</i>                           |
| MAY–AUG 2013<br>MAY–AUG 2012 | <b>Research Assistant</b> at MEMORIAL UNIVERSITY OF NEWFOUNDLAND<br><i>Department of Mathematics and Statistics</i> |

## SCHOLARLY CONTRIBUTIONS

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| <i>Publications</i> | 1 . <b>Nathan King</b> , Haozhe Su, Mridul Aanjaneya,<br>Steven Ruuth, and Christopher Batty<br>“A closest point method for PDEs on manifolds with interior boundary<br>conditions for geometry processing.”<br>ACM TRANSACTIONS ON GRAPHICS | JUNE 3, 2024 |
|                     | 2 . <b>Nathan King</b> and Steven Ruuth<br>“Solving variational problems and partial differential equations that map<br>between manifolds via the closest point method.”<br>JOURNAL OF COMPUTATIONAL PHYSICS                                 | MAR 2, 2017  |

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| Conference<br>Talks | 3 . “Surface partial differential equations with interior constraints”<br>FOIEGRAPH, <i>Universite de Montreal</i>   | NOV 11, 2022  |
|                     | 4 . “Intersections with discrete closest point surfaces”<br>GRAPHQUON, <i>McGill University</i>  | DEC 10, 2020  |
|                     | 5 . “Real-time detection of stationary and moving marine radar targets”<br>NL ELECTRICAL AND COMPUTER ENGINEERING CONFERENCE<br><i>IEEE Newfoundland and Labrador Section</i>              | NOV 15, 2017  |
|                     | 6 . “The closest point method for manifold mapping”<br>CONFERENCE ON IMAGING SCIENCE<br><i>Society for Applied and Computational Mathematics</i>   | MAY 23, 2016  |
| Invited<br>Talks    | 7 . “A closest point method for PDEs on manifolds with interior boundary conditions for geometry processing”<br>SCHOOL OF COMPUTER SCIENCE SEMINAR SERIES<br><i>University of Waterloo</i> | FEB 27, 2024  |
|                     | 8 . “A closest point method with interior boundary conditions for geometry processing”<br>SFU APPLIED AND COMPUTATIONAL MATH SEMINAR<br><i>Simon Fraser University</i>                     | MAR 24, 2023  |
|                     | 9 . “Closest point method with interior constraints”<br>SCHOOL OF COMPUTER SCIENCE SEMINAR SERIES<br><i>University of Waterloo</i>   | AUG 12, 2021  |
|                     | 10 . “The closest point method for manifold mapping”<br>PIMS-CSC SEMINAR<br><i>Simon Fraser University</i>   | MAR 18, 2016  |
|                     | 11 . “The closest point method for manifold mapping”<br>APPLIED AND COMPUTATIONAL MATHEMATICS SEMINAR<br><i>Memorial University of Newfoundland</i>  | JAN 15, 2016  |
|                     | 12 . “The closest point method”<br>APPLIED AND COMPUTATIONAL MATHEMATICS SEMINAR<br><i>Memorial University of Newfoundland</i>   | NOV 6, 2015   |
| Code                | 13 . C++ code for PDEs on manifolds with interior boundary conditions  | JUNE 12, 2024 |
|                     | 14 . C++ code for the closest point method for PDEs on surfaces  | FEB 18, 2022  |
|                     | 15 . Matlab code for computing harmonic maps between surfaces  | JAN 22, 2021  |
|                     | 16 . Matlab code for interpolation with quadratic curves and patches   | JAN 19, 2021  |
|                     | 17 . Matlab code for image compression   | SEPT 23, 2014 |
|                     | 18 . Matlab code for image segmentation  | SEPT 23, 2014 |
|                     | 19 . Matlab code for the numerical solution of blow-up PDEs  | SEPT 23, 2014 |

## SKILLS

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| LANGUAGES        | C++, Matlab, Python                         |
| TECHNOLOGIES     | Eigen, Polyscope, Geometry Central, Blender |
| OTHER EXPERIENCE | Houdini, PyTorch, OpenMP, SIMD              |

## STUDENT MENTORSHIP

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|--------------------|--|
| MAY 2023–AUG 2023  | Derek Wu, Undergraduate, University of Waterloo (with Christopher Batty)   |
| JULY 2021–OCT 2022 | Tümay Özdemir, Masters, University of Waterloo (with Christopher Batty)    |
| JAN–MAY 2021       | Umar Ahmed, Undergraduate, University of Waterloo (with Christopher Batty) |
| SEPT–DEC 2020      | Haocheng Chang, Undergraduate, University of Waterloo                      |

## LEADERSHIP

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|--------------------|--|
| SEPT 2019–AUG 2022 | <b>Treasurer</b> , MATH GRADUATE STUDENT ASSOCIATION<br><i>University of Waterloo</i>                      |
| OCT 2017–APR 2018  | <b>Committee Member</b> , EASTERN NEWFOUNDLAND SCIENCE FAIR<br><i>Newfoundland School District</i>         |
| NOV 2013–2014      | <b>Treasurer</b> , SIAM STUDENT CHAPTER<br><i>Simon Fraser University</i>                                  |
| MAY 2012–APR 2013  | <b>President</b> , PHYSICS AND PHYSICAL OCEANOGRAPHY SOCIETY<br><i>Memorial University of Newfoundland</i> |

## VOLUNTEERING

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|                 |   |
|-----------------|---|
| AUG 2020        | <b>Student Volunteer</b> , SIGGRAPH 2020<br><i>ACM, Virtual Conference</i>                                    |
| OCT 2017        | <b>Proctor</b> , IEEEEXTREME PROGRAMMING COMPETITION 11.0<br><i>IEEE, Memorial University of Newfoundland</i> |
| JULY 2013       | <b>Assistant</b> , SHAD VALLEY SUMMER CAMP<br><i>Memorial University of Newfoundland</i>                      |
| APR 2012 & 2013 | <b>Judge</b> , EASTERN NL SCIENCE & TECHNOLOGY FAIR<br><i>NL School District</i>                              |

## CONFERENCES

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|                  |   |                   |
|------------------|---|-------------------|
| JUL 2024         | ACM SIGGRAPH  | Denver, CO        |
| NOV 2022         | FoieGraph   | Virtual           |
| 2020, 2021, 2022 | ACM Symposium on Computer Animation                         | Virtual           |
| 2020, 2021, 2022 | ACM SIGGRAPH  | Virtual           |
| 2020, 2021, 2022 | ACM Symposium on Geometry Processing                        | Virtual           |
| DEC 2020         | GRAPHQUON   | Virtual           |
| APR 2018         | IEEE Radar Conference                                       | Oklahoma City, OK |
| NOV 2017         | Newfoundland Electrical and Computer Engineering Conference | St. John's, NL    |
| MAY 2017         | IEEE Radar Conference                                       | Seattle, WA       |

## ACHIEVEMENTS

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|      |               |   |       |
|------|---------------|---|-------|
|      | JAN–DEC 2024  | Ontario Graduate Scholarship                      | UW    |
|      | JAN–DEC 2024  | President's Graduate Scholarship                  | UW    |
|      | JAN–DEC 2023  | QEII Graduate Scholarship in Science & Technology | UW    |
|      | JAN–DEC 2023  | President's Graduate Scholarship                  | UW    |
|      | JAN–DEC 2022  | QEII Graduate Scholarship in Science & Technology | UW    |
|      | JAN–DEC 2022  | President's Graduate Scholarship                  | UW    |
| SEPT | 2018–AUG 2020 | Mathematics Domestic Doctoral Scholarship         | UW    |
|      | SEPT–DEC 2015 | Provost Prize of Distinction                      | SFU   |
|      | SEPT–DEC 2015 | Special Graduate Entrance Scholarship             | SFU   |
| SEPT | 2015–APR 2016 | Postgraduate Scholarship Doctoral                 | NSERC |
|      | MAY 2013–2014 | Canadian Graduate Scholarship Masters             | NSERC |
|      | MAY–AUG 2014  | Graduate Fellowship                               | SFU   |
|      | SEPT–DEC 2013 | Special Graduate Entrance Scholarship             | SFU   |
|      | MAY–AUG 2013  | Undergraduate Student Research Award              | NSERC |
|      | MAY 2013      | Lou Visentin Award                                | MUN   |
|      | MAY–AUG 2012  | Undergraduate Student Research Award              | NSERC |