Nicholas Sharp

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Education

Carnegie Mellon University · MS & PhD in Computer Science — Pittsburgh, PA
ADVISOR: KEENAN CRANE — Aug 2021
Topics: geometry processing, computer graphics & vision, geometric learning

Virginia Tech · BS in Engineering Physics, Computer Science, Mathematics — Blacksburg, VA
TRIPLE MAJOR, *IN HONORS* — May 2015
Minors in Physics and Statistics

Work Experience

University of Toronto & Fields Institute for Mathematics — Toronto, ON
POSTDOCTORAL FELLOW — Aug 2021 - *ongoing*
Supervised by Alec Jacobson. Affiliated with the Vector Institute for AI.

Carnegie Mellon University — Pittsburgh, PA
GRADUATE RESEARCHER — Aug 2015 - Aug 2021

Oculus Research / Facebook Reality Labs — Pittsburgh, PA & Redmond, WA
RESEARCH INTERN — Summer 2015 & 2016, Fall 2018
Mentors: Yaser Sheikh, Takaaki Shiratori, Alexander Fix. Developed new methods for learned appearance modeling and temporal correspondence in 3D reconstructions. Prototyped a multicamera scanning system, including hardware and calibration.

Microsoft Silicon Valley — Mountain View, CA
SOFTWARE DEVELOPMENT INTERN — Summer 2013

Lawrence Livermore National Lab — Livermore, CA
HIGH ENERGY DENSITY PHYSICS INTERN — Summer 2012
Integrated new visualizations into a massively parallel multiphysics codebase.

Johns Hopkins University Applied Physics Lab — Laurel, MD
NASA RESEARCH INTERN — Summer 2011
Mentor: Mikhail Sitnov. Developed an empirical computer model of the terrerstial magnetosphere synthesizing first-principle techniques and data analytics.

Publications

DiffusionNet: Discretization Agnostic Learning on Surfaces
[12] Nicholas Sharp, Souhaib Attaiki, Keenan Crane, Maks Ovsjanikov
ACM Transactions on Graphics (SIGGRAPH) 2022

Integer Coordinates for Intrinsic Geometry Processing
[11] Mark Gillespie, Nicholas Sharp, Keenan Crane
ACM Transactions on Graphics (SIGGRAPH Asia) 2021

Intrinsic Triangulations in Geometry Processing
[10] Nicholas Sharp
PhD Thesis, Carnegie Mellon University

Geometry Processing with Intrinsic Triangulations
[9] Nicholas Sharp, Mark Gillespie, and Keenan Crane
ACM SIGGRAPH Courses 2021

You Can Find Geodesic Paths in Triangle Meshes by Just Flipping Edges
[8] Nicholas Sharp and Keenan Crane
ACM Transactions on Graphics (SIGGRAPH Asia) 39 (6) 2020

A Laplacian for Nonmanifold Triangle Meshes
[7] Nicholas Sharp and Keenan Crane
Symposium on Geometry Processing (SGP) 2020 - **Best Student Paper Award**

PointTriNet: Learned Triangulation of 3D Point Sets
[6] Nicholas Sharp and Maks Ovsjanikov
European Conference on Computer Vision (ECCV) 2020

Navigating Intrinsic Triangulations
[5] Nicholas Sharp, Yousuf Soliman, and Keenan Crane
ACM Transactions on Graphics (SIGGRAPH) 38 (4) 2019

The Vector Heat Method
[4] Nicholas Sharp, Yousuf Soliman, and Keenan Crane
ACM Transactions on Graphics (SIGGRAPH) 38 (4) 2019

Variational Surface Cutting
[3] Nicholas Sharp and Keenan Crane
ACM Transactions on Graphics (SIGGRAPH) 37 (4) 2018

Pathways on Demand: Automated Reconstruction of Human Signaling Networks
[2] Anna Ritz, Christopher L Poirel, Allison N Tegge, Nicholas Sharp, Kelsey Simmons, Allison Powell, Shiv D Kale, and TM Murali
npj Systems Biology and Applications 2016

Xtalk: A Path-Based Approach for Identifying Crosstalk Between Signaling Pathways
[1] Allison N Tegge, Nicholas Sharp, and TM Murali
Bioinformatics, 2016

Talks

Robust and Reliable Geometry Processing — (virtual)
STAG Graduate School (2021) — Oct 2021

Geometry Processing with Intrinsic Triangulations — (virtual)
ACM SIGGRAPH Courses (SIGGRAPH 2021) — Aug 2021

Geometry Processing with Intrinsic Triangulations — (virtual)
International Meshing Roundtable Courses (IMR 2021) — June 2021

Intrinsic Triangulations in Geometry Processing — San Diego, CA (virtual)
UCSD Visual Computing Seminar — Apr 2021

Intrinsic Triangulations in Geometry Processing — China (virtual)
GAMES Seminar — Mar 2021

Robustness in Geometry Processing: from Laplacians to Learning — Toronto, ON (virtual)
NVIDIA AI — Feb 2021

You Can Find Geodesic Paths in Triangle Meshes by Just Flipping Edges — Daegu, South Korea (virtual)
ACM SIGGRAPH Asia 2020 — Nov 2020

Intrinsic Triangulations in Geometry Processing — Stanford, CA (virtual)
Geometric Computation Group, Stanford — Nov 2020

Intrinsic Triangulations in Geometry Processing — San Jose, CA (virtual)
Adobe Research — Nov 2020

Intrinsic Triangulations in Geometry Processing — Toronto, ON (virtual)
Toronto Geometry Colloquium — Oct 2020

A Laplacian for Nonmanifold Triangle Meshes — Utrecht, NL (virtual)
SGP 2020 — July 2020

Geometric Computing with geometry-central — Utrecht, NL (virtual)
SGP 2020 Graduate School — July 2020

Robust Geometry Processing and Nonmanifold Laplacians — Cambridge, MA (virtual)
Graphics Seminar, MIT — July 2020

Intrinsic Triangulations in Geometry Processing — Paris, France
STREAM Group, LIX, École Polytechnique — Oct 2019

Navigating Intrinsic Triangulations — Los Angeles, CA
ACM SIGGRAPH 2019 — Aug 2019

The Vector Heat Method — Los Angeles, CA
ACM SIGGRAPH 2019 — Aug 2019

Variational Surface Cutting — Klosterneuburg, Austria
IST Austria — June 2018

Variational Surface Cutting — Vancouver, BC
ACM SIGGRAPH 2018 — Aug 2018

Machine Learning Models for Terrestrial Space Weather Forecasting — Chicago, IL
SIAM Annual Meeting — July 2014

Optimal Control in Time-Varying Velocity Fields using Alpha Hulls — Chicago, IL
SIAM Annual Meeting — July 2014

Awards

2020 **Best Paper Award (student paper)** Symposium on Geometry Processing 2020
2016 **NSF Graduate Research Fellowship**
2015 **Best Project Pitch** CMU Graphics Seminar
2015 **Finalist** CRA Undergraduate Researcher Award
2015 **World Finalist** ACM ICPC Competitive Programming Contest in Marrakech, Morocco
2014 **World Finalist** ACM ICPC Competitive Programming Contest in Ekaterinburg, Russia
2014 **Meritorious Winner** Mathematical Contest in Modeling

Service

Reviewer	SIGGRAPH (2020, 2021), SIGGRAPH Asia (2021), Transactions on Graphics (2021), Symposium on Geometry Processing (IPC, 2021-2022), SGP Software and Dataset Awards (2021), Eurographics (2018,2019), TVCG (2021), CGTA (2019), Graphics Interface (2020), Eurographics Short Papers (2020), Pacific Graphics (2020), Computers and Graphics (2021)
Teaching	Graduate TA at CMU
	15-462 Computer Graphics
	15-869 Discrete Differential Geometry
Departmental	Student Member, Doctoral Review Comittee
	Organizer, PhD Admissions Open House
	Organizer, Random Distance Run
Project Leader & Mentor	Summer Geometry Institute (2021)
Mentor	CMU Graduate Application Support Program (2020)
	SIGGRAPH RDRC Graduate Application Mentorship Progam (2021 x2)
Problem Author	ACM Inter-Collegiate Programming Contest (ICPC), 2017 & 2018
Organizer	Virginia High School Programming Contest, 2015

Software

Additionally, open-source code is available for all publications above at `https://github.com/nmwsharp/`.

Polyscope
Easy 3D visualization of meshes, point clouds, etc. in C++ & Python. Enables engineers, artists, and researchers to create useful, interactive visualizations with < 5 lines of code.
polyscope.run

geometry-central
A modern C++ library of data structures and algorithms for geometry processing, with a particular focus on surface meshes.
geometry-central.net

hapPLY
A header-only C++ reader/writer for .ply file format. Parse .ply happily!
github.com/nmwsharp/happly

Skills

Programming	**C++**, **Python**, Java, LaTeX, MATLAB
Technologies	PyTorch, OpenGL, Eigen, CMake
Tools	Unix/Linux, VIM, Blender, Adobe Illustrator & Photoshop

Personal

Cooking	www.nmwsharp.com/recipes
Baking	ciabatta, focaccia, pretzels, sourdough
Long Distance Running	2014 Hokie Half, 2017 Baltimore Marathon, 2019 Pittsburgh Half