

NICHOLAS SHARP

nsharp@cs.cmu.edu | www.nmwsharp.com |  nmwsharp |  Nicholas Sharp

Education

Carnegie Mellon University · MS & PhD in Computer Science

ADVISOR: KEENAN CRANE

- Topics: geometry processing, computer graphics & vision, geometric learning

Pittsburgh, PA

Fall 2019, Spring 2021 (expected)

Virginia Tech · BS in Computer Science, Engineering Physics, Mathematics

TRIPLE MAJOR, IN HONORS

- Minors in Physics and Statistics

Blacksburg, VA

Spring 2015

Work Experience

Carnegie Mellon University

GRADUATE RESEARCHER

Pittsburgh, PA

Aug 2015 - ongoing

Oculus Research / Facebook Reality Labs

RESEARCH INTERN

Mentor: Alexander Fix. Designed and implemented a new system for learned appearance modeling in 3D reconstructions using differentiable rendering.

Redmond, WA

Fall 2018

Oculus Research / Facebook Reality Labs

RESEARCH INTERN

Mentor: Takaaki Shiratori. Developed an algorithm for temporal correspondence in scan geometry. Created artist tools to process scan data.

Pittsburgh, PA

Summer 2016

Oculus Research / Facebook Reality Labs

RESEARCH INTERN

Mentor: Yaser Sheikh. Prototyped a multicamera reconstruction system, including hardware, software, calibration, and processing pipeline.

Pittsburgh, PA

Summer 2015

Microsoft Silicon Valley

SOFTWARE DEVELOPMENT INTERN

Mountain View, CA

Summer 2013

Lawrence Livermore National Lab

HIGH ENERGY DENSITY PHYSICS INTERN

Integrated new visualizations into a massively parallel multiphysics codebase. Utilized some of the nation's most powerful supercomputers.

Livermore, CA

Summer 2012

Johns Hopkins University Applied Physics Lab

NASA RESEARCH INTERN

Mentor: Mikhail Sitnov. Developed an empirical computer model of the terrestrial magnetosphere synthesizing first-principle techniques and data analytics.

Laurel, MD

Summer 2011

Publications

You Can Find Geodesic Paths in Triangle Meshes by Just Flipping Edges

Nicholas Sharp and Keenan Crane

ACM TRANSACTIONS ON GRAPHICS (SIGGRAPH ASIA) 39 (6) 2020

A Laplacian for Nonmanifold Triangle Meshes

Nicholas Sharp and Keenan Crane

SYMPOSIUM ON GEOMETRY PROCESSING (SGP) 2020 - **BEST STUDENT PAPER AWARD**

PointTriNet: Learned Triangulation of 3D Point Sets

Nicholas Sharp and Maks Ovsjanikov

EUROPEAN CONFERENCE ON COMPUTER VISION (ECCV) 2020

Navigating Intrinsic Triangulations

Nicholas Sharp, Yousuf Soliman, and Keenan Crane

ACM TRANSACTIONS ON GRAPHICS (SIGGRAPH) 38 (4) 2019

The Vector Heat Method

Nicholas Sharp, Yousuf Soliman, and Keenan Crane

ACM TRANSACTIONS ON GRAPHICS (SIGGRAPH) 38 (4) 2019

Variational Surface Cutting

Nicholas Sharp and Keenan Crane

ACM TRANSACTIONS ON GRAPHICS (SIGGRAPH) 37 (4) 2018

Pathways on Demand: Automated Reconstruction of Human Signaling Networks

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

Allison N Tegge, Nicholas Sharp, and TM Murali

BIOINFORMATICS, 2016

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](#)

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

Talks

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| A Laplacian for Nonmanifold Triangle Meshes
SGP 2020 | Utrecht, NL (virtual)
July 2020 |
| Geometric Computing with Geometry-central
SGP 2020 GRADUATE SCHOOL | Utrecht, NL (virtual)
July 2020 |
| Robust Geometry Processing and Nonmanifold Laplacians
GRAPHICS SEMINAR, MIT | Cambridge, MA (virtual)
July 2020 |
| Intrinsic Triangulations in Geometry Processing
STREAM GROUP, LIX, ÉCOLE POLYTECHNIQUE | Paris, France
Oct 2019 |
| Navigating Intrinsic Triangulations
SIGGRAPH 2019 | Los Angeles, CA
Aug 2019 |
| The Vector Heat Method
SIGGRAPH 2019 | Los Angeles, CA
Aug 2019 |
| Variational Surface Cutting
IST AUSTRIA | Klosterneuburg, Austria
June 2018 |
| Variational Surface Cutting
SIGGRAPH 2018 | Vancouver, Canada
Aug 2018 |
| Machine Learning Models for Terrestrial Space Weather Forecasting
SIAM ANNUAL MEETING | Chicago, IL
July 2014 |
| Optimal Control in Time-Varying Velocity Fields using Alpha Hulls
SIAM ANNUAL MEETING | Chicago, IL
July 2014 |

Service

Reviewer	SIGGRAPH (2020), Eurographics (2018,2019), CGTA (2019), Graphics Interface (2020), Eurographics Short Papers (2020), Pacific Graphics (2020)
Teaching	Graduate TA at CMU 15-462 Computer Graphics 15-869 Discrete Differential Geometry
Departmental	Student Member, Doctoral Review Committee Organizer, PhD Admissions Open House Organizer, Random Distance Run
Problem Author	ACM Inter-Collegiate Programming Contest (ICPC), 2017 & 2018
Organizer	Virginia High School Programming Contest, 2015

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
Long Distance Running	2014 Hokie Half, 2017 Baltimore Marathon, 2019 Pittsburgh Half