Nicholas Sharp

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Education

Carnegie Mellon University · MS & PhD in Computer Science   Pittsburgh, PA
ADVISOR: KEENAN CRANE   Fall 2019, Spring 2021 *(expected)*
- Topics: geometry processing, computer graphics & vision, geometric learning

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

Work Experience

Carnegie Mellon University   Pittsburgh, PA
GRADUATE RESEARCHER   Aug 2015 - *ongoing*

Oculus Research / Facebook Reality Labs   Redmond, WA
RESEARCH INTERN   Fall 2018
Mentor: Alexander Fix. Designed and implemented a new system for learned
appearance modeling in 3D reconstructions using differentiable rendering.

Oculus Research / Facebook Reality Labs   Pittsburgh, PA
RESEARCH INTERN   Summer 2016
Mentor: Takaaki Shiratori. Developed an algorithm for temporal correspondence in
scan geometry. Created artist tools to process scan data.

Oculus Research / Facebook Reality Labs   Pittsburgh, PA
RESEARCH INTERN   Summer 2015
Mentor: Yaser Sheikh. Prototyped a multicamera reconstruction system, including
hardware, software, calibration, and processing pipeline.

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.
Utilized some of the nation's most powerful supercomputers.

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

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

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

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

Navigating Intrinsic Triangulations
Code release for [Sharp et. al. 2019]. Offers black-box robust geometry processing for existing algorithms via a simple data structure.
github.com/nmwsharp/navigating-intrinsic-triangulations-demo

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

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 Comittee
	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