

# NICHOLAS SHARP

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## Education

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### Carnegie Mellon University · PhD in Computer Science

ADVISOR: KEENAN CRANE

- Topics: geometry processing, numerical computing, computer graphics & vision

Pittsburgh, PA

Aug 2015 - May 2021 (expected)

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

TRIPLE MAJOR, IN HONORS

- Minors in Physics and Statistics

Blacksburg, VA

Aug 2010 - May 2015

## Work Experience

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### 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

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### **Navigating Intrinsic Triangulations**

Nicholas Sharp, Yousuf Soliman, and Keenan Crane  
ACM TRANSACTIONS ON GRAPHICS 38 (4) 2019

### **The Vector Heat Method**

Nicholas Sharp, Yousuf Soliman, and Keenan Crane  
ACM TRANSACTIONS ON GRAPHICS 38 (4) 2019

### **Variational Surface Cutting**

Nicholas Sharp and Keenan Crane  
ACM TRANSACTIONS ON GRAPHICS 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

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### **Polyscope**

Easy 3D visualization of meshes, point clouds, etc. in C++. 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

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- 2016 **NSF Graduate Research Fellowship**
- 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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**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

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**Reviewer** Eurographics, CGTA

**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

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**Programming** C++, Python, Java,  $\text{\LaTeX}$ , MATLAB

**Technologies** PyTorch, OpenGL, Eigen, CMake

**Tools** Unix/Linux, VIM, Blender, Adobe Illustrator & Photoshop

## Personal

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**Cooking** [www.nmwsharp.com/recipes](http://www.nmwsharp.com/recipes)

**Baking** ciabatta, focaccia, pretzels

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