Nicholas Sharp

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Education

Spring 2020	PhD in Computer Science, **Carnegie Mellon University**
	Advisor: Keenan Crane
	Topics: Computational Geometry, Surface Reconstruction, Mesh Processing, Differential Geometry
May 2015	Bachelor of Science, **Virginia Polytechnic Institute and State University** (Virginia Tech)
	Triple Major *In Honors* — **Computer Science – Mathematics – Engineering Physics***
	Minors — Physics – Statistics
	GPA: 3.82/4.00 (CS in-major: 3.98) *within Engineering Science and Mechanics

Publications

Anna Ritz, Christopher L Poirel, Allison N. Tegge, **Nicholas Sharp**, Allison Powell, Kelsey Simmons, Shiv D. Kale, and T. M. Murali. Pathways on demand: Automated reconstruction of human signaling networks. *System Biology and Applications*, 2015 (under review).

Allison N. Tegge, **Nicholas Sharp**, and T. M. Murali. Xtalk: A path-based approach for identifying crosstalk between signaling pathways. *Bioinformatics*, 2015, in press.

Nicholas Sharp, Virginia Hagen-Gates, Evan Hemingway, Molly Syme, Juelyan Via, Jeffrey Feaster, Javid Bayandor, Sunghwan Jung, Francine Battaglia, and Andrew Kurdila. Computational analysis of undulatory batoid motion for underwater robotic propulsion. In *ASME 2014 Fluids Engineering Division Summer Meeting*. American Society of Mechanical Engineers, 2014

Conference Presentations

Machine Learning Models for Terrestrial Space Weather Forecasting. *Undergraduate Presentation*. Brendan Avent, **Nicholas Sharp**, and Dhruv Batra. SIAM Annual Meeting 2014.

Optimal Control in Time-Varying Velocity Fields using Alpha Hulls. *Undergraduate Presentation*. **Nicholas Sharp** and Shane D. Ross. SIAM Annual Meeting 2014.

Set-based optimal control in 3D current fields using alpha shapes. *Poster*. **Nicholas Sharp** and Shane D. Ross. Virginia Space Grant Consortium Research Symposium 2014.

TS07D Empirical Geomagnetic Field Model as a Space Weather Tool. *Poster*. **Nicholas Sharp**, Grant Stephens, and Mikhail Sitnov. American Geophysical Union Fall Meeting 2011.

Awards & Affiliations

Competitive Programming World Finalist
↳ Represented U.S. on Virginia Tech team at the ACM ICPC 2015 World Finals in Marrakech, Morocco
↳ Represented U.S. on Virginia Tech team at the ACM ICPC 2014 World Finals in Ekaterinburg, Russia

Theta Tau Professional Engineering Fraternity   **Mathematical Contest in Modeling**
↳ President, Dec 2011-Dec 2012   ↳ 2014 team designated Meritorious Winners

Finalist, CRA Undergraduate Researcher Award

Association for Computing Machinery   **Society for Industrial and Applied Mathematics**

VT University Honors   **McAllister Leadership Scholar**   **Upsilon Pi Epsilon**

VT Programming Team   **Torgersen Leadership Award**   **Pi Mu Epsilon**

Past Research Projects

Numerical Algorithms for Optimal Control Theory with Dr. Shane Ross   Oct 2012 - May 2015

Investigated set-based computational methods for optimal control of dynamical systems, focusing on weakly-propelled vehicles in time-varying flows. Developed a new technique using α-shapes to apply set-based control to a class of 3D problems for the first time. Successfully applied for Virginia Space Grant funding.

Graph Algorithms for Systems Biology with Dr. T. M. Murali   May 2014 - May 2015

Designed and implemented algorithms for the prediction and analysis of signaling pathways in human cells. Utilized statistical techniques to assess significance, process datasets, and quantify results.

Batoid Robot Design with Dr. Javid Bayandor   March 2013 - May 2014

Senior design project within the Engineering Science and Mechanics Department. Performed computational analysis to assess the design of underwater propulsion systems which mimic rays and skates. Constructed a prototype vehicle to demonstrate feasibility. Lead author on a paper in the ASME Fluids Engineering Division summer meeting.

Empirical Modeling of the Magnetosphere with Dr. Mikhail Sitnov   May 2011 - Dec 2011

Worked on a complex empirical model which synthesizes satellite data to forecast the response of Earth's magnetosphere to the solar wind. Re-implemented an 8000 line outdated Fortran code in modern Java, correlating functionality with published papers. Created new visualizations and investigative tools.

Computational Fluid Dynamics on GPUs with Dr. Danesh Tafti   April 2011 - May 2012

Conducted a study benchmarking performance improvements from implementing high-performance thermal fluid dynamics code on GPUs. Reported results to influence future system designs.

Work Experience

Summer 2015 | **Research Intern** at Oculus VR Research

Investigated and implemented algorithms for calibration, scanning, and reconstruction in multicamera systems.

Summer 2013 | **Software Development Intern** at Microsoft Silicon Valley

Developed massively scalable, fault tolerant automation and monitoring software for production clusters in Windows Services. Worked in a large engineering team to create deployment-ready software.

Summer 2012 | **High Energy Density Physics Intern** at Lawrence Livermore National Lab

Integrated new visualization capabilities into a massively parallel multiphysics radiation-hydrodynamics codebase. Utilized some of the nation's most powerful supercomputers.

Summer 2011 | **NASA Research Intern** at Johns Hopkins University Applied Physics Lab

Developed an empirical computer model of the terrerstial magnetosphere synthesizing first-principle techniques and data analytics. Improved model performance by a factor of 5.

Computing Proficiencies

Languages

Java*	Python*	Mathematica
Fortran	LaTeX	MATLAB
C	C#	MPI

* = considerable experience

Skills

Mathematical Modeling and Algorithm Design

Data and Algorithm Visualization

High Performance Scientific Computing

Parallel and Distributed Computation

Unix and Linux Environments