

# Matt Dutson

CS Graduate Student at UW–Madison

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## Education

- 2018–Present **MS/PhD in Computer Science**, *University of Wisconsin–Madison*, Madison WI.  
Interests: Computer vision, computer graphics, machine learning  
Advisor: Mohit Gupta
- 2013–2018 **Honors BS in Physics**, *University of Utah*, Salt Lake City UT, *magnum cum laude*.  
Minors: Computer science, mathematics  
Thesis: Reconstruction of Cosmic Ray Geometry Using Cherenkov Backscattering

## Publications

- 2020 **Fibrillar Collagen Quantification With Curvelet Transform Based Computational Methods**  
*Frontiers in Bioengineering and Biotechnology*  
Y. Liu, A. Keikhosravi, C. Pehlke, J. Bredfeldt, **M. Dutson**, H. Liu, G. Mehta, R. Claus, A. Patel, M. Conklin, D. Inman, P. Provenzano, E. Sifakis, J. Patel, and K. Eliceiri

## Research Experience

- 2020–Present **Research Assistant**, *UW–Madison*, Advised by Mohit Gupta.  
◦ Creating image and video processing algorithms for single-photon cameras (SPADs).  
◦ Exploring theory and applications of spiking neural networks.
- 2018–2019 **Research Assistant**, *UW–Madison*, Advised by Jignesh Patel and Kevin Eliceiri.  
◦ Participated in the initial design and development of Hustle, a scalable replacement for SQLite written in Rust.  
◦ Built a Java application for generating synthetic images of biological fiber networks.
- 2016–2018 **Research Assistant**, *University of Utah*, Advised by Douglas Bergman.  
◦ Wrote C++ simulations of cosmic ray propagation and detection to test novel detection techniques.  
◦ Operated the Telescope Array observatory in Delta UT.

## Selected Coursework

- Computer Science Computer vision, computer graphics, machine learning, high performance computing, computer architecture, data visualization, nonlinear optimization, algorithms
- Mathematics Real analysis, statistics, partial differential equations, ordinary differential equations, linear algebra, calculus
- Physics Particle physics, quantum mechanics, special relativity, thermodynamics, classical physics

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## Technical Skills

Languages	<b>C++</b> , <b>Java</b> , <b>Python</b> , <b>Rust</b> , C, C#, JavaScript, Perl
Machine Learning	<b>TensorFlow</b> , PyTorch, scikit-learn
Scientific	<b>NumPy</b> , MATLAB
High Performance	CUDA, MPI, OpenMP
Other	<b>Linux</b> , <b>UNIX</b> , Git, LaTeX

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## Industry Experience

- 2019 **Map Exploration Software Intern**, *Esri*, Redlands CA.
  - Designed and implemented algorithms for high-performance viewshed analysis.
  - Built an integrated machine learning application for automatically detecting building features in 3D urban scenes.
- 2017 **Process Software Intern**, *IM Flash Technologies*, Lehi UT.
  - Improved the efficiency of wafer defect sourcing using an automated Perl pipeline.
  - Reduced errors in process time estimation by 97 percent via online statistical analysis of historical data.
- 2016 **Process Software Intern**, *IM Flash Technologies*, Lehi UT.
  - Created a C++ OpenCV computer vision application which successfully detected manufacturing equipment failures.

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## Teaching Experience

- Fall 2019 **Teaching Assistant**, *UW–Madison*, CS 559 Computer Graphics.  
Instructor: Florian Heimerl
- Fall 2017 **Teaching Assistant**, *University of Utah*, CS 2100 Discrete Structures.  
Instructor: Bei Wang
- Spring 2017 **Teaching Assistant**, *University of Utah*, PHYS 2020 General Physics II.  
Instructor: Ren Pankovich
- Fall 2016 **Teaching Assistant**, *University of Utah*, PHYS 2010 General Physics I.  
Instructor: Orest Symko
- 2015–2016 **Private Physics Tutor**, *University of Utah*.  
Courses: General Physics I and II, Physics for Scientists and Engineers I and II, Introduction to Quantum Theory and Relativity

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## Volunteer Experience

- 2019–Present **Events Committee Chair**, *Student ACM Chapter*, Madison WI.
  - Responsible for overseeing department-wide, student-organized events.
  - Coordinated with the CS department in planning and hosting the 2020 prospective graduate student welcome weekend event.
- 2019 **Events Committee Officer**, *Student ACM Chapter*, Madison WI.
- 2018 **Scratch Club Leader**, *Lowell Elementary School*, Madison WI.
- 2016, 2017 **Project Judge**, *Salt Lake Valley Science and Engineering Fair*, Salt Lake City UT.