

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
- 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

Technical Skills

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

Selected Coursework

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

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.

Research Experience

- 2020–Present **Research Assistant**, *UW-Madison*, Advised by Mohit Gupta.
- Creating image and video processing algorithms for single-photon visual sensors.
 - 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 in order to test new detection techniques.
 - Operated the Telescope Array observatory in Delta UT.

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

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.