Matt Dutson

CS Graduate Student at UW—Madison

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Research Interests

Computer vision, computer graphics, machine learning

Education

2018—Present **MS/PhD in Computer Science**, UW—Madison
Advisor: Mohit Gupta

2013—2018 **Honors BS in Physics**, University of Utah
Magnum cum laude
Minors: Computer science and 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, **Matthew Dutson**, H. Liu, G. Mehta, R. Claus, A. Patel, M. Conklin, D. Inman, P. Provenzano, E. Sifakis, J. Patel, and K. Eliceiri

Technical Skills

Languages **C++**, **Java**, **Python**, C, C#, JavaScript, MATLAB, Perl, Rust

Frameworks **TensorFlow**, **NumPy**, CUDA, MPI, OpenMP, PyTorch, scikit-learn

Other **Linux**, **UNIX**, Git, LaTeX

Research Experience

2020—Present **Research Assistant**, UW—Madison, 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, 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, Douglas Bergman
Wrote C++ simulations of cosmic ray propagation and detection to test novel detection techniques.
Operated the Telescope Array observatory in Delta, UT.

Industry Experience

2019 **Max Exploration Software Intern**, Esri

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

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

Created a C++ OpenCV computer vision application which successfully detected manufacturing equipment failures.

Teaching Experience

2019 Fall **Teaching Assistant**, UW—Madison, Computer Graphics

Instructor: Florian Heimerl

2017 Fall **Teaching Assistant**, University of Utah, Discrete Mathematics

Instructor: Bei Wang

2017 Spring **Teaching Assistant**, University of Utah, General Physics II

Instructor: Ren Pankovich

2016 Fall **Teaching Assistant**, University of Utah, 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

Coursework

CS	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

Volunteer Experience

2019—Present **Events Committee Chair**, UW—Madison Student ACM Chapter

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**, UW-Madison Student ACM Chapter

2018 **Scratch Club Leader**, Lowell Elementary School

2017 **Project Judge**, Salt Lake Valley Science and Engineering Fair

2016 **Project Judge**, Salt Lake Valley Science and Engineering Fair