Matt Dutson

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Experience

Ubicept

Senior Software Engineer **2026-Present**

- Developing a next-generation imaging pipeline
- Thriving in a fast-paced startup environment

Research Intern, Consultant **2024-2025**

- Laid the foundations of a company-wide research codebase
- Achieved a >10× speedup in a critical image processing algorithm

WISION Lab

Research Assistant **2019-2025**

- Developed compression and reconstruction algorithms for cutting-edge sensors
- Modified state-of-the art CNNs and Transformers for efficient time-series processing
- Augmented vision systems to improve performance under adverse conditions (poor weather, low light, compression artifacts, sensor noise)
- Managed machine learning experiments with an emphasis on scientific methodology and reproducibility

Esri

Software Intern **2019**

- Implemented a novel algorithm for high-performance viewshed analysis, with support for multithreading and GPU acceleration
- Added new functionality to an industry-scale legacy codebase
- Developed an efficient solver for a challenging 3D optimization problem
- Built a deep learning application to identify building features in 3D urban environments

IM Flash Technologies

Software Intern **2017**

- Reduced process forecasting errors by 97 percent with improvements to online statistical modeling
- Created a system to automatically source defects in a manufacturing pipeline

Software Intern **2016**

- Developed computer vision software to detect equipment failures in real time

Education

University of Wisconsin-Madison

Computer Science, Doctor of Philosophy **2021-2025**

- Advised by Mohit Gupta
- Minor in electrical and computer engineering
- Emphases: computational imaging, computer vision, computer graphics, machine learning
- Thesis: Augmenting Frame-Based Vision With Temporal Context

Computer Science, Master of Science **2018-2020**

University of Utah

Physics, Honors Bachelor of Science **2013-2018**

- Magna cum laude
- Minors in computer science and mathematics
- Outstanding undergraduate sophomore in physics and astronomy, 2015
- Undergraduate Research Scholar Designation (URSD)
- Thesis: Reconstruction of Cosmic Ray Geometry Using Cherenkov Backscattering

Technical Skills

Languages

Bash, C, C#, C++, Java, LaTeX, Perl, Python, Rust, SQL

Libraries

Boost (C++ libraries), C++ standard library, CUDA, GTK, MPI, NumPy, OpenCV, OpenMP, PyTorch, Scikit-Learn, SciPy, TensorFlow

Other

Agile development, automated software testing, Amazon EC2, containerization, Docker, Git, high-performance computing (HPC), Linux, reproducible computing, Slurm workload manager

Publications

Instant Video Models: Universal Adapters for Stabilizing Image-Based Networks **2025**
Conference on Neural Information Processing Systems (NeurIPS)
Matthew Dutson, Nathan Labiosa, Yin Li, and Mohit Gupta

Streaming Quanta Sensors for Online, High-Performance Imaging and Vision **2024**
Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
Tianyi Zhang, Matthew Dutson, Vivek Boominathan, Mohit Gupta, and Ashok Veeraraghavan

Generalized Event Cameras **2024**
Conference on Computer Vision and Pattern Recognition (CVPR)
Varun Sundar*, Matthew Dutson*, Andrei Ardelean, Claudio Bruschini, Edoardo Charbon, and Mohit Gupta
*Denotes equal contribution

Eventful Transformers: Leveraging Temporal Redundancy in Vision Transformers **2023**
International Conference on Computer Vision (ICCV)
Matthew Dutson, Yin Li, and Mohit Gupta

Spike-Based Anytime Perception **2023**
Winter Conference on Applications of Computer Vision (WACV)
Matthew Dutson, Yin Li, and Mohit Gupta

Event Neural Networks **2022**
European Conference on Computer Vision (ECCV)
Matthew Dutson, Yin Li, and Mohit Gupta

Fibrillar Collagen Quantification With Curvelet Transform Based Computational Methods **2020**
Frontiers in Bioengineering and Biotechnology
Yuming Liu, Adib Keikhosravi, Carolyn Pehlke, Jeremy Bredfeldt, Matthew Dutson, Haixiang Liu, Guneet Mehta, Robert Claus, Akhil Patel, Matthew Conklin, David Inman, Paolo Provenzano, Eftychios Sifakis, Jignesh Patel, and Kevin Eliceiri

Coursework

Computer Science

Algorithms, computational modeling, computer architecture, computer graphics, computer vision, data science, data structures, data visualization, ethics in computer science, high-performance computing, image processing, linear optimization, machine learning, nonlinear optimization, object-oriented programming, operating systems, robotics, software engineering

Mathematics

Calculus, discrete mathematics, linear algebra, ordinary and partial differential equations, probability and statistics

Physics

Classical mechanics, electricity and magnetism, nuclear and particle physics, quantum mechanics, special relativity, thermodynamics

Reviewing Experience

Conference on Neural Information Processing Systems (NeurIPS) 2025
"Top reviewer" designation

Conference on Computer Vision and Pattern Recognition (CVPR) 2025

Conference on Computer Vision and Pattern Recognition (CVPR) 2024

Conference on Neural Information Processing Systems (NeurIPS) 2023

International Conference on Computational Photography (ICCP) 2023

International Conference on Computer Vision (ICCV) 2023

Conference on Computer Vision and Pattern Recognition (CVPR) 2023

Teaching Experience

University of Wisconsin-Madison

Teaching Assistant, Computer Graphics 2019
Instructor Florian Heimerl

University of Utah

Teaching Assistant, Discrete Mathematics 2017
Instructor Bei Wang

Teaching Assistant, General Physics II 2017
Instructor Ren Pankovich

Teaching Assistant, General Physics I 2016
Instructor Orest Symko

Physics Tutor 2015-2016

Volunteer Experience

University of Wisconsin-Madison

First-Year Graduate Student Mentor 2022

Student ACM Chapter

Events Committee Chair 2019-2020

- Coordinated volunteer efforts to organize department-wide student events
- Collaborated with department administrators to host a welcome event for prospective graduate students (March 2020)

Events Committee Officer 2019

Lowell Elementary School

Computer Science Club Leader 2018

Salt Lake Valley Science and Engineering Fair

Project Judge 2017

Project Judge 2016

University of Utah

Science Day Volunteer 2016

Science Day Volunteer 2015

Patents

Vision Transformers Leveraging Temporal Redundancy 2026
US 12,548,315
Issued February 10, 2026
Matthew Dutson, Mohit Gupta, and Yin Li

Systems, Methods, and Media for Generating Digital Images Using Low Bit Depth Image Sensor Data 2024
US 12,094,087
Issued September 17, 2024
Matthew Dutson and Mohit Gupta

Systems, Methods, and Media for Generating and Using Neural Networks with Improved Video Processing Performance 2025
Pending, filed December 3, 2025
Matthew Dutson, Mohit Gupta, and Yin Li

Streaming Quanta Sensors for Online, High-Performance Imaging and Vision 2024
Pending, filed May 14, 2024
Tianyi Zhang, Matthew Dutson, Vivek Boominathan, Mohit Gupta, and Ashok Veeraraghavan

Generalized Event Cameras 2024
Pending, filed April 1, 2024
Varun Sundar, Matthew Dutson, and Mohit Gupta

Systems, Methods, and Media for Generating and Using Neural Networks Having Improved Efficiency for Analyzing Video 2022
Pending, filed May 18, 2022
Matthew Dutson and Mohit Gupta

Systems, Methods, and Media for Generating and Using Spiking Neural Networks with Improved Efficiency 2021
Pending, filed April 30, 2021
Matthew Dutson and Mohit Gupta