Henry J. Nelson

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EDUCATION

University of Minnesota Minneapolis, MN — *August 2017 - Present*
PhD in Computer Science

Grinnell College Grinnell, IA — *August 2013 - May 2017*
BA in Physics

RESEARCH EXPERIENCE

Center for Distributed Robotics — University of Minnesota
Graduate Research Assistant — *May-August 2018, January 2020-present*

Various projects including point cloud segmentation, 3D model learning, non-ridged 3D reconstructions from agricultural fields and endoscopic videos, and species identification of weeds in aerial crop imagery. (PI: Nikolaos Papanikolopoulos, PhD)

Electronic Detector Group — Brookhaven National Laboratory
Student Collaborator — *May 2016-August 2016*

Characterization and measurement of quantum yield for novel scintillating liquids to evaluate their effectiveness as a detection medium for large scale detectors. (PIs: David Jaffe, PhD. Lindsey Bignell, PhD)

Scientific Computing Lab — University of Minnesota
Research Assistant — *May-August 2014 and 2015*

Development and testing of novel machine learning algorithms for pattern recognition in images using wavelets, estimation of large matrix properties, and graph-based dimension reduction methods in an academic research lab. (PI: Yousef Saad, PhD)

Rehabilitation Engineering Research Lab — Minneapolis VA Hospital
Research Assistant — *July-August 2014*

Software development for interfacing with medical equipment as well as prototype medical device development, eye-tracking systems development, virtual reality graphics programming, and Android app development. (PI: John E. Ferguson, PhD)

INDUSTRY EXPERIENCE

Sentera
Computer Vision Engineer — *May 2019-present*

Deep learning infrastructure and model development and deployment. Algorithm development for automatic analysis and interpretation of drone imagery for applications in precision agriculture. Using both traditional computer vision (3D geometry and image processing) and machine learning approaches.

LANGUAGE AND FRAMEWORK PROFICIENCY

Fluent with Python, C/C++, and MATLAB. Extensive experience with Git, OpenCV, Point Cloud Library (PCL), Tensorflow, and PyTorch. Working knowledge of Julia, Docker, and AWS (S3, Sagemaker).

TEACHING EXPERIENCE

Department of Computer Science University of Minnesota
Teaching Assistant *August 2017-December 2019*

Preparing and giving weekly lectures, managing other TAs, grading, and office hours. For both undergraduate and graduate level courses. Courses: Automata and Formal Languages; Computer Vision; Artificial Intelligence; and Algorithms and Data Structures.

Department of Computer Science, Department of Physics Grinnell College
Teaching Assistant *August 2015-May 2017*

Instruction of introductory, intermediate, and upper level students in course content, lab preparation, experiment execution, and data analysis in classroom, tutoring, and laboratory settings Courses: Automata, Formal Languages, and Computational Complexity; Mechanics; and Introduction to Electrostatics.

AWARDS AND LEADERSHIP

H. George Apostle Prize in Physics	Grinnell College Department of Physics	*May 2017*
Phi-Beta-Kappa	Grinnell College	*May 2017*
President of Drone Club	Grinnell College	*2016-2017*

REFEREE SERVICE

IEEE International Conference on Robotics and Automation	*2019-2021*
IEEE Transactions on Intelligent Transportation Systems	*2019-2021*
IEEE/RSJ International Conference on Intelligent Robots and Systems	*2019-2021*

PUBLICATIONS

Scalable Methods for Pre-Clustering Point Clouds of Crop Fields
Henry J. Nelson, and Nikolaos Papanikolopoulos *Submitted*

arXiv and Github

Learning Continuous Object Representations from Point Cloud Data IROS 2020
Henry J. Nelson, and Nikolaos Papanikolopoulos *Published*

DOI: 10.1109/IROS45743.2020.9341765

A Methodology for the Detection of Nitrogen Deficiency in Corn Fields Using High Resolution RGB Imagery IEEE TASE
Dimitris Zermas, Henry J. Nelson, Panagiotis Stanitsas, Vassilios Morellas, David J. Mulla, and Nikolaos Papanikolopoulos *Published*

DOI: 10.1109/TASE.2020.3022868

Weed Detection and Classification in High Altitude Aerial Images for Robot-Based Precision Agriculture MED 2019
Karthik Buddha, Henry J. Nelson, Dimitris Zermas, and Nikolaos Papanikolopoulos *Published*

DOI: 10.1109/MED.2019.8798582

TALKS AND PRESENTATIONS

A Methodology for the Detection of Nitrogen Deficiency in Corn Fields Using High Resolution RGB Imagery CASE 2021
Dimitris Zermas, Henry J. Nelson, Panagiotis Stanitsas, Vassilios Morellas, David J. Mulla, and Nikolaos Papanikolopoulos *August 2021*

Learning Continuous Object Representations from Point Cloud Data IROS 2020
Henry Nelson, Nikolaos Papanikolopoulos *October 2020*

Herbicide-Resistant Weed Identification and Classification IUCRC ROSEHUB Philadelphia
Henry Nelson, Karthik Buddha *November 2018*

Weed Identification in Aerial Images of Corn Fields IUCRC ROSEHUB Minneapolis
Henry Nelson *April 2018*