

Henry J. Nelson

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EDUCATION

University of Minnesota Minneapolis, MN
PhD in Computer Science

August 2017 - Present

Grinnell College Grinnell, IA
BA in Physics

August 2013 - May 2017

RESEARCH EXPERIENCE

Center for Distributed Robotics
Graduate Research Assistant

University of Minnesota
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
Student Collaborator

Brookhaven National Laboratory
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
Research Assistant

University of Minnesota
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
Research Assistant

Minneapolis VA Hospital
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. 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.

TEACHING EXPERIENCE

Department of Computer Science

Teaching Assistant

University of Minnesota

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

Teaching Assistant

Grinnell College

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	<i>May 2017</i>
Phi-Beta-Kappa	Grinnell College	<i>May 2017</i>
President of Drone Club	Grinnell College	<i>2016-2017</i>

REFEREE SERVICE

IEEE International Conference on Robotics and Automation	<i>2019-2020</i>
IEEE Transactions on Intelligent Transportation Systems	<i>2019-2020</i>
IEEE/RSJ International Conference on Intelligent Robots and Systems	<i>2019</i>

PUBLICATIONS

- Scalable Methods for Pre-Clustering Point Clouds of Crop Fields** ICRA 2021
Henry J. Nelson, and Nikolaos Papanikolopoulos *Submitted*
[Github](#)
- Learning Continuous Object Representations from Point Cloud Data** IROS 2020
Henry J. Nelson, and Nikolaos Papanikolopoulos *Published*
DOI: [10.1109/IROS45743.2020.9341765](https://doi.org/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](https://doi.org/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](https://doi.org/10.1109/MED.2019.8798582)

TALKS AND PRESENTATIONS

- Learning Continuous Object Representations from Point Cloud Data**
IROS 2020 *October 2020*
Henry Nelson, Nikolaos Papanikolopoulos
- Herbicide-Resistant Weed Identification and Classification**
IUCRC ROSEHUB, Philadelphia *November 2018*
Henry Nelson, Karthik Buddha
- Weed Identification in Aerial Images of Corn Fields**
IUCRC ROSEHUB, Minneapolis *April 2018*
Henry Nelson