

# Dennis Melamed

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## Experience

### Kitware, Research & Development Engineer

Aug 2021 – Present

- Trained building damage identification systems for satellite imagery, reducing training data needs 1000x.<sup>1</sup>
- Created & released open dataset for training building damage detectors<sup>2</sup>
- Designed framework to deconflict multiple object detectors using prior information and detector trust metrics<sup>3</sup>
- Architected & developed inspection tool (as lead of 5 person team) for localizing defects on large airframe to 5 cm accuracy.
- Developed pose estimation algorithms & experimental hardware for event-camera star tracking, achieving 10-20 arcsecond accuracy.

### Nextdroid Robotics, Software Intern

June 2018 – Aug 2018

- Achieved sensorless high-precision motor speed control for subsea robotic platform
- Co-developed high-accuracy image processing on military hardware for aerial scene understanding

### National Instruments, Software Intern

June 2017 – Aug 2017

- Implemented network interfaces for measurement device drivers to maintain stability on newer platforms
- Developed encryption systems to allow first-in-company secure device firmware/driver communication

### Robotic Sensor Networks Lab, University of Minnesota, Research Assistant

Feb 2015 – May 2019

- Developed GPS-denied micro-UAV platform for agriculture using ROS, C, and V-REP simulation
- Designed and trialed computer vision system for micro-UAV control using low-resolution imaging

### Dept. of Civil Engineering, University of Minnesota, Research Assistant

Oct 2015 – May 2016

- Parallelized state-of-art wave propagation algorithms to speed concrete simulations by 10x
- Designed MN Dept. of Transport user interfaces to ease ground-penetrating radar data analysis

## Education

### M.S. in Robotics

Aug 2019 – July 2021

Carnegie Mellon University, Prof. Kris Kitani

Pittsburgh, PA

- Thesis: Learnable Spatio-Temporal Map Embeddings for Deep Inertial Localization<sup>4</sup>
- Selected Coursework: Kinematics, Dynamics & Control, Localization & Mapping, Reinforcement Learning

### B.Sci. in Computer Engineering, Summa Cum Laude with Distinction

Sept 2015 – May 2019

University of Minnesota, Prof. Volkan Isler

Minneapolis, MN

- Thesis: Indoor Micro-UAV Navigation with Minimal Sensing (Profs. Volkan Isler & Derya Aksaray)
- IEEE-Eta Kappa Nu – Omicron Student Chapter – Vice President 2018-2019

## Skills

**Programming Languages:** Python, C++, Embedded C, MATLAB, Java

**Robotics Tools:** Robotics Operating System (ROS), Gazebo, V-REP

**Other Tools:** Git, Pytorch, OpenCV, scikit-learn, Linux, Latex, Windows Kernel, Blender, QGIS, ONNX, Triton, DVC

**Languages:** English (native), Russian (native), Spanish (proficient)

## Publications

### (1) Rapid Training of Artificial Intelligence Battle Damage Assessment Tools to New Conflicts

Melamed, D.; Johnson, C.; Brockman, S.; Blue, R.; Hoogs, A.; Morrone, P.; Clipp, B.  
*Proceedings of the National Security Sensor and Data Fusion Committee (NSSDF)*, 2023

### (2) Uncovering Bias in Building Damage Assessment from Satellite Imagery

Melamed, D.; Johnson, C.; Gerg, I. D.; Zhao, C.; Blue, R.; Hoogs, A.; Clipp, B.; Morrone, P.  
*IGARSS 2024 - 2024 IEEE International Geoscience and Remote Sensing Symposium*, 2024

### (3) Multi-ATR Fusion and Ontological Deconfliction for Geospatial Imagery

Davila, D.; Melamed, D.; Depauw, D.; Anderson, J.  
*Proceedings of the National Security Sensor and Data Fusion Committee (NSSDF)*, 2023

### (4) Learnable Spatio-Temporal Map Embeddings for Deep Inertial Localization

Melamed, D.; Ram, K.; Roy, V.; Kitani, K.  
*2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022

### (5) IDOL: Inertial Deep Orientation-Estimation and Localization

Sun, S.; Melamed, D.; Kitani, K.  
*Proceedings of the AAAI Conference on Artificial Intelligence*, 2021