

# 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