

# Nathaniel Merrill

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## Education

- 2019–Present **PhD Computer Science**, *University of Delaware*, Newark, DE,  
Advisor: Guoquan (Paul) Huang  
Expected Graduation: May 2024.
- 2015–2019 **BS Computer Science**, *University of Delaware*, Newark, DE, .

## Vocational Experience

- 2022–Present **Research Assistant**, *University of Delaware*, Newark, DE.
- Summer 2022 **Research Scientist Intern**, *Reality Labs*, Redmond, WA.
- 2019–2022 **Research Assistant**, *University of Delaware*, Newark, DE.
- 2019–2020 **Teaching Assistant**, *University of Delaware*, Newark, DE.
- Summer 2017 **JPSS Flight Intern**, *NASA Goddard Space Flight Center*, Greenbelt, MD.
- 2016–2019 **Undergraduate Research Assistant**, *University of Delaware*, Newark, DE.
- 2016–2019 **Undergraduate Teaching Assistant**, *University of Delaware*, Newark, DE.

## Publications

**Note:** † denotes equal contribution.

### Conference Papers

- [9] **N. Merrill**, P. Geneva, S. Katragadda, C. C. Chen, and G. Huang. “Fast Monocular Visual-Inertial Initialization Leveraging Learned Single-View Depth”. In: *Proc. of Robotics: Science and Systems (RSS)*. (**Best Student Paper Award finalist**). Daegu, Republic of Korea, July 2023.
- [8] X. Zuo, N. Yang, **N. Merrill**, B. Xu, and S. Leutenegger. “Incremental Dense Reconstruction from Monocular Video with Guided Sparse Feature Volume Fusion”. In: *IEEE Robotics and Automation Letters* (2023).
- [7] **N. Merrill**, Y. Guo, X. Zuo, X. Huang, S. Leutenegger, X. Peng, L. Ren, and G. Huang. “Symmetry and Uncertainty-Aware Object SLAM for 6DoF Object Pose Estimation”. In: *2022 Conference on Computer Vision and Pattern Recognition (CVPR)*. New Orleans, USA, June 2022.
- [6] **N. Merrill**<sup>†</sup>, P. Geneva<sup>†</sup>, and G. Huang. “Robust Monocular Visual-Inertial Depth Completion for Embedded Systems”. In: *2021 IEEE International Conference on Robotics and Automation (ICRA)*. Xi’an, China, Oct. 2021.
- [5] X. Zuo<sup>†</sup>, **N. Merrill**<sup>†</sup>, W. Li, Y. Liu, M. Pollefeys, and G. Huang. “CodeVIO: Visual-Inertial Odometry with Learned Optimizable Dense Depth”. In: *2021 IEEE International Conference on Robotics and Automation (ICRA)*. (**Robot Vision Award finalist**). Xi’an, China, Oct. 2021.

- [4] P. Geneva<sup>†</sup>, **N. Merrill<sup>†</sup>**, Y. Yang, C. Chen, W. Lee, and G. Huang. "Versatile 3D Multi-Sensor Fusion for Lightweight 2D Localization". In: *2020 International Conference on Intelligent Robots and Systems (IROS)*. Las Vegas, USA, Oct. 2020.
- [3] K. Eickenhoff, P. Geneva, **N. Merrill**, and G. Huang. "Schmidt-EKF-based Visual-Inertial Moving Object Tracking". In: *2020 IEEE International Conference on Robotics and Automation (ICRA)*. Paris, France, May 2020.
- [2] **N. Merrill** and G. Huang. "CALC2.0: Combining Appearance, Semantic and Geometric Information for Robust and Efficient Visual Loop Closure". In: *2019 International Conference on Intelligent Robots and Systems (IROS)*. Macau, China, Nov. 2019.
- [1] **N. Merrill** and G. Huang. "Lightweight Unsupervised Deep Loop Closure". In: *Proc. of Robotics: Science and Systems (RSS)*. Pittsburgh, PA, June 2018.

## Open Source

SUO-SLAM **Symmetry and Uncertainty-Aware Object SLAM**, *CVPR 2022*.  
[https://github.com/rpng/suo\\_slam](https://github.com/rpng/suo_slam)

CALC **Deep Learning for Loop Closure**, *RSS 2018, IROS 2019*.  
<https://github.com/rpng/calc>  
<https://github.com/rpng/calc2.0>

scikit-cuda **GPU Computation in Python**, *Contributed the PCA module*.  
<https://github.com/lebedov/scikit-cuda>

## Invited Talks

- [7] *Robust and Efficient VIO-Aided Deep Depth Estimation*. University of California, Los Angeles, July 2021.
- [6] *Modern Deep Learning: Tips, Tools and Tricks*. University of Delaware, Apr. 2020.
- [5] *Combining Appearance, Semantic and Geometric Information for Robust and Efficient Visual Loop Closure*. Macau, China, Nov. 2019.
- [4] *Image Classification and VAE Tutorial in Tensorflow*. University of Delaware, Apr. 2019.
- [3] *Lightweight Unsupervised Deep Loop Closure*. Carnegie Mellon University, June 2018.
- [2] *Lightweight Unsupervised Deep Loop Closure*. University of Delaware, May 2018.
- [1] *Deep Learning Tutorial in Tensorflow*. University of Delaware, Oct. 2018.

## Awards and Honors

- 2019 **AAUP-UD Award**, *University of Delaware*.
- 2017 **First Place Intern Poster Award**, *NASA Goddard Space Flight Center*.
- 2015 **UD Trustee Scholarship**, *University of Delaware*.

## Academic Services

**Reviewer:**

- Journals TRO (IEEE Transactions on Robotics)  
IJRR (International Journal of Robotics Research)  
RAS (Robotics and Autonomous Systems)  
TNNLS (IEEE Transactions on Neural Networks and Learning Systems)
- Conferences ICRA (IEEE International Conference on Robotics and Automation)  
IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems)

## Professional Membership

ASME  
IEEE

## Teaching

- Fall 2019 **UD CISC275 Honors: Introduction to Software Engineering, TA.**
- Spring 2019 **UD CISC181 Honors: Introduction to Computer Science II, TA.**
- Fall 2018 **UD CISC106: Introduction to Computer Science for Engineers, TA.**
- Fall 2018 **UD EGGG101: Introduction to Engineering, TA.**
- Spring 2018 **UD CISC106: Introduction to Computer Science for Engineers, TA.**
- Fall 2017 **UD MEEG211: Dynamics, TA.**
- Fall 2017 **UD EGGG101: Introduction to Engineering, TA.**
- Spring 2017 **UD MEEG112: Statics, TA.**
- Spring 2017 **UD CISC106: Introduction to Computer Science for Engineers, TA.**
- Fall 2016 **UD EGGG101: Introduction to Engineering, TA.**