

# BARDIENUS PIETER DUISTERHOF

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Website ♦ Google Scholar

## EDUCATION

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**Carnegie Mellon University, Pittsburgh, PA**

*Aug 2021 - Fall 2026 (expected)*

PhD candidate in the Robotics Institute.

- 2023-Present: Working on 4D (3D + dynamics) perception for robot manipulation and digital twins. Advisor: Jeffrey Ichnowski. Collaborators: Deva Ramanan, Bowen Wen, Stan Birchfield.
- 2021-2023: Worked on perception for resource-constrained aerial vehicles, with a special focus on geometric camera calibration. Led effort on an open-source toolbox TartanCalib. Advisor: Sebastian Scherer.

**Delft University of Technology, Delft, the Netherlands**

*Sept 2015 – Dec 2020*

M.Sc. Control and Simulation, Aerospace Engineering - GPA 8.8/10.0 (Cum Laude)

- Coursework in computer vision, control theory, flight dynamics, human-machine interaction and autonomous systems.

**Georgia Institute of Technology, Atlanta, GA**

*Aug - Dec 2017*

Exchange Student, Computer Science and Mechanical Engineering – GPA 4.0/4.0

- Exchange semester at Georgia Tech, coursework in algorithm design, robotics, computer vision, mobile and ubiquitous computing.

## PROFESSIONAL EXPERIENCE

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**NAVER Labs Europe, Grenoble, France**

*Jul 2024 - Dec 2024*

Research Intern

- **DUST3R Team:** Geometric Deep Learning Group for sparse structure from motion and novel view synthesis.

**Prime Vision, Delft, the Netherlands**

*Feb 2021 - Jul 2021*

Robotics Engineer

- **Motion planning team:** automation of postal sorting processes using a swarm of 25+ robots avoiding each other and obstacles. My job was to develop C++ code to run onboard the robots for robust and efficient motion planning.

**Delft University of Technology, Delft, the Netherlands**

*Jul 2016 - Jan 2021*

Undergraduate/Graduate Student

- **M.Sc. thesis** on evolutionary robotics for collaborative gas seeking with a swarm of nano quadcopters. Designed the full stack: hardware, software, simulator, algorithm.  
**Graded: 9.5/10.0, PI: Guido de Croon.**
- Participated in the **2018 IMAV autonomous drone race** in Melbourne, Australia. Developed efficient visual servoing algorithms for autonomous flight of a flapping-wing drone.
- Organized a study tour to Tokyo for a group of 20 students.

**Harvard University, Cambridge, MA**

*May - Dec 2019*

Visiting Research Fellow

- Developed a **fully autonomous source-seeking nano quadcopter using RL**. Studied various machine learning techniques for deployment under stringent resource constraints.

**European Space Agency (ESA), Delft, the Netherlands**

*Mar - Jul 2018*

Design Synthesis Exercise

- Designed an experimental orbital re-entry vehicle for the European Space Agency. Vehicle design included but was not limited to, thermal design, orbital trajectory design, and control system design. I was the lead for the control system design.

## PUBLICATIONS

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- 2025 ‘**RaySt3R: Predicting Novel Depth Maps for Zero-Shot Object Completion**’, Bardienus Pieter Duisterhof, Jan Oberst, Bowen Wen, Stan Birchfield, Deva Ramanan, Jeffrey Ichnowski – *NeurIPS (Main Track) 2025*
- 2024 ‘**MASt3R-SfM: a Fully-Integrated Solution for Unconstrained Structure-from-Motion**’, Bardienus Pieter Duisterhof, Lojze Zust, Philippe Weinzaepfel, Vincent Leroy, Yohann Cabon, Jerome Revaud – *International Conference on 3D Vision (3DV) 2025*, **Oral, Best Student Paper**
- 2024 ‘**DynOMo: Online Point Tracking by Dynamic Online Monocular Gaussian Reconstruction**’, Jenny Seidenschwarz, Qunjie Zhou, Bardienus Pieter Duisterhof, Deva Ramanan, Laura Leal-Taixé - *International Conference on 3D Vision (3DV) 2025*
- 2024 ‘**DeformGS: Scene Flow in Highly Deformable Scenes for Deformable Object Manipulation**’, Bardienus Pieter Duisterhof, Zhao Mandi, Yunchao Yao, Jia-Wei Liu, Jenny Seidenschwarz, Mike Zheng Shou, Deva Ramanan, Shuran Song, Stan Birchfield, Bowen Wen, Jeffrey Ichnowski – *WAFR 2024 - Project Page*
- 2024 ‘**Cloth-Splatting: 3D State Estimation from RGB Supervision for Deformable Objects**’, Alberta Longhini, Marcel Büsching, Bardienus Pieter Duisterhof, Jens Lundell, Jeffrey Ichnowski, Mårten Björkman, Danica Kragic – *CoRL 2024 - Project Page*
- 2024 ‘**Residual-NeRF: Learning Residual NeRFs for Transparent Object Manipulation**’, Bardienus P. Duisterhof, Yuemin Mao, Si Heng Teng, Jeffrey Ichnowski – *ICRA 2024 - Project Page*
- 2024 ‘**Hearing the Slide: Acoustic-Guided Constraint Learning for Fast Non-Prehensile Transport**’, Yuemin Mao, Bardienus Pieter Duisterhof, Moonyoung Lee, Jeffrey Ichnowski – *CASE 2025 - Project Page*
- 2024 ‘**Focus Bug: An RL-Based Environment-aware Approach for Mapless Navigation**’, Charles Dansereau, Bardienus Pieter Duisterhof, Gabriela Nicolescu – *IROS 2025*
- 2023 ‘**MD-Splatting: Learning Metric Deformation from 4D Gaussians in Highly Deformable Scenes**’, Bardienus P. Duisterhof, Mandi Zhao, Yunchao Yao, Jia-Wei Liu, Mike Zheng Shou, Shuran Song, Jeffrey Ichnowski – *arXiv - Project Page*
- 2022 ‘**TartanCalib: Iterative Wide-Angle Lens Calibration using Adaptive SubPixel Refinement of AprilTags**’, Bardienus P. Duisterhof, Yaoyu Hu, Si Heng Teng, Michael Kaess, Sebastian Scherer - *Project Page*
- 2022 ‘**Tiny Robot Learning: Challenges and Directions for Machine Learning in Resource-Constrained Robots**’, Sabrina M. Neuman, Brian Plancher, Bardienus P. Duisterhof, Srivatsan Krishnan, Colby Banbury, Mark Mazumder, Shvetank Prakash, Jason Jabbour, Aleksandra Faust, Guido C.H.E. de Croon, Vijay Janapa Reddi – *IEEE 4th International Conference on Artificial Intelligence Circuits and Systems (AICAS 2022) - Paper*
- 2022 ‘**The Role of Compute in Autonomous Micro Aerial Vehicles: Optimizing for Mission Time and Energy Efficiency**’, Behzad Boroujerdian, Hasan Genc, Srivatsan Krishnan, Bardienus Pieter Duisterhof, Brian Plancher, Kayvan Mansoorshahi, Marcelino Almeida, Wenzhi Cui, Aleksandra Faust, Vijay Janapa Reddi – *ACM Transactions on Computer Systems (TOCS 2022)*
- 2021 ‘**Sniffy Bug: A Fully Autonomous Swarm of Gas-Seeking Nano Quadcopters in Cluttered Environments**’, Bardienus P. Duisterhof, Shushuai Li, Javier Burgués, Vijay Janapa Reddi, Guido C.H.E. de Croon – *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021) - Video*
- 2021 ‘**Tiny Robot Learning (tinyRL) for Source Seeking on a Nano Quadcopter**’, Bardienus P. Duisterhof, Srivatsan Krishnan, Jonathan J. Cruz, Colby R. Banbury, William Fu, Aleksandra Faust, Guido C. H. E. de Croon, Vijay Janapa Reddi – *IEEE International Conference on Robotics and Automation (ICRA 2021) - Video*
- 2019 ‘**A Tailless Flapping Wing MAV Performing Monocular Visual Servoing Tasks**’, D.A. Olejnik, B.P. Duisterhof, M. Karásek, K.Y.W. Scheper, T. van Dijk and G.C.H.E. de Croon – *11th International Micro Air Vehicle (IMAV) Competition and Conference, Unmanned Systems Journal 2020 - Video*

## AWARDS AND FELLOWSHIPS

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- Best student paper award for MAST3R-SfM. **Paper**
- CMU Center for Machine Learning and Health (CMHL) Generative AI in Healthcare Fellowship. Full funding (stipend + tuition + misc) for 2025. **Article**
- CMU Center for Machine Learning and Health (CMHL) Fellowship in Digital Health. Full funding (stipend + tuition + misc) for 2023-2024 academic year.
- Best Graduate in Engineering (1/3,983), TU Delft, 2021. **Video**.
- Best Graduate in Aerospace Engineering, TU Delft, 2021. **Video**.
- **IMAV 2018 Autonomous Drone Race**: Innovation award in indoor competition with DelFly Nimble for visual servoing with a 30-gram flapping wing MAV.
- IMAV Conference 2019: **Best paper award nominee**, top 6 papers.

## SELECTED MEDIA COVERAGE

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- **Forbes**: ‘Watch This Autonomous Microdrone Swarm Sniff Out A Gas Leak’
- **Robohub**: ‘Sniffy Bug: A Fully Autonomous Swarm of Gas-Seeking Nano Quadcopters in Cluttered Environments’
- **Bitcraze Blog**: ‘Sniffy Bug: A Fully Autonomous Swarm of Gas-Seeking Nano Quadcopters in Cluttered Environments’

## TEACHING

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- 16-720 at CMU: Computer vision with Deva Ramanan. Gave a guest lecture on object detection using HOG and SIFT features.
- 16-820 at CMU: Advanced Computer Vision. Designed a new homework on segmentation from scratch, held office hours, and graded assignments.
- AE2235 at TU Delft: Aerospace Systems & Control Theory. Supported undergraduate students in help sessions and developed Python learning tools for an improved remote learning experience during covid.

## SERVICE

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### CMU Robotics Institute DEI and Climate Committee

- This committee focuses on creating a more diverse, inclusive and enjoyable working environment for students and faculty. During my two-year tenure, I focused on studying the recruitment and admissions process, especially from a diversity and inclusion perspective.

### RoboOrg Leadership

- Part of the RoboOrg leadership, organizing events and initiatives with two other students to improve the student experience. My responsibility was to lead large events, such as a boat party with 200 attendees (summer 2022 and 2023), and a ski trip with 85 attendees (spring 2023).

### Paper Reviewing

- Reviewed papers for conferences and journals in robotics, CV and ML including: RA-L, ICRA, IROS, CORL, NeurIPS, ECCV, CVPR, and AAAI.