BARDIENUS PIETER DUISTERHOF

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Website ◇ Google Scholar

EDUCATION

Carnegie Mellon University, Pittsburgh, PA *Aug 2021 - Present*
PhD candidate in the Robotics Institute.

- 2023-Present: Advised by Jeffrey Ichnowski, working on perception, machine learning and optimization for agile manipulation of deformable objects. Focus on **applications in health care**.
- 2021-2023: Advised by Sebastian Scherer in the AirLab. Worked on perception for resource-constrained aerial vehicles, with a special focus on geometric camera calibration. Contributed widely adopted open-source toolbox TartanCalib.

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.

EXPERIENCE

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. Responsible for control system.

PUBLICATIONS

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 – *Under review* - **Project Page**

2019 **'The Role of Compute in Autonomous Aerial Vehicles'**, Behzad Boroujerdian, Hasan Genc, Srivatsan Krishnan, **Bardienus Pieter Duisterhof**, Brian Plancher, Kayvan Mansoorshahi, Marcelino Almeida, Wenzhi Cui, Aleksandra Faust, Vijay Janapa Reddi – *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 Burgus, 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

- Best Graduate in Engineering, TU Delft, 2021.**Video**.
- Best Graduate in Aerospace Engineering, TU Delft, 2021. **Video**.
- IMAV Conference 2019: **Best paper award nominee**, top 6 papers.
- **IMAV 2018 Autonomous Drone Race**: 3rd prize and innovation award in indoor competition with DelFly Nimble. Visual servoing on a 30-gram flapping wing MAV.

SELECTED MEDIA COVERAGE

- **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

- AE2235: Aerospace Systems & Control Theory. Supported undergraduate students in help sessions and developed Python learning tools for an enhanced remote learning experience.

SERVICE

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 the first year of 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 three other students with the aim of improving the student experience. My responsibilities is to lead our large events, such as a boat party with 200 attendants (summer 2022), or a ski trip with 85 attendants (spring 2023).

Fund Raising

- Raised €3,116.35 ($3.4k) for children with muscle diseases, by swimming across a channel in the Dutch North Sea. Raised money from several companies by offering a swimming clinic for their executives in exchange for a donation.

Paper Reviewing

- Reviewed papers for top-tier conferences and journals in robotics, CV and ML including: RA-L, ICRA, IROS, ICCV, CVPR, CORL and NeurIPS (workshop).