

# BARDIENUS PIETER DUISTERHOF

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## PUBLICATIONS

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- 2020 ‘**Learning to Seek: Autonomous Source Seeking with Deep Reinforcement Learning Onboard a Nano Drone Microcontroller**’, Bardienus P. Duisterhof, Srivatsan Krishnan, Jonathan J. Cruz, Colby R. Banbury, William Fu, Aleksandra Faust, Guido C. H. E. de Croon, Vijay Janapa Reddi – *Under Review at ICRA 2021*
- 2019 ‘**Real-Time Machine Learning on Tiny Autonomous Machines**’, Bardienus P. Duisterhof, Srivatsan Krishnan, Jonathan J. Cruz, Colby R. Banbury, William Fu, Aleksandra Faust, Guido C. H. E. de Croon, Vijay Janapa Reddi – *Proceedings of the 2<sup>nd</sup> SysML Conference - On-device Intelligence Workshop*, Palo Alto, CA, USA, 2019.
- 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 – *Under Review at Transactions on Computer Systems (TOCS)*
- 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*
- 2018 ‘**Autonomous landing algorithm using a sun position predicting model for extended use of solar powered UAVs**’, B.P. Duisterhof & G.C.H.E. de Croon – *10th International Micro Air Vehicle (IMAV) Competition and Conference*

## EXPERIENCE

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**Prime Vision, Delft, the Netherlands**  
Robotics Engineer

*Feb 2021 - Present*

- **Motion planning team:** automation of sorting processes using a swarm of 25+ robots avoiding each other and obstacles.

**Delft University of Technology, Delft, the Netherlands**  
Undergraduate/Graduate Student

*Jul 2016 - Jan 2021*

- **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.**
- **Teaching assistant** in Aerospace Systems & Control Theory. Supported undergraduate students in help sessions and developed Python learning tools, enhancing distance learning.
- Head of acquisition Tokyo Study Tour, budget €30,000. Negotiated sponsorship with large companies, like EY, and achieved competitive ticket pricing with airlines such as KLM.
- Organized Honors Symposium, budget €5,000.

**Harvard Edge Computing, Cambridge, MA**  
Visiting Research Fellow

*May - Dec 2019*

- Developed a **fully autonomous RL-powered nano quadcopter**. Studied various machine learning techniques for deployment under stringent resource constraints.
- Implemented a **DQN Deep Reinforcement Learning policy** onboard a CrazyFlie, demonstrating robust light seeking and obstacle avoidance through hardware-software co-design.

- 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 the control system. Designed a controller for re-entry at constant Mach number ( $M=10$ ) and extended range through a boost-glide trajectory.

## AWARDS

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- 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. Unlocked visual servoing on a 30-gram flapping wing MAV.

## EDUCATION

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**Delft University of Technology, Delft, the Netherlands** *Sept 2018 – Dec 2020*  
M.Sc. Control and Simulation, Aerospace Engineering - GPA 8.8/10.0 Cum Laude (i.e., with distinction)

- 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.

**Delft University of Technology, Delft, the Netherlands** *Sept 2016 – Jul 2018*  
TU Delft Honors Student  
Selected for the competitive TU Delft Honors Program:

- Courses: took additional courses in design thinking, meeting and conference skills.
- Research: undergraduate researcher in the MAVLab (Guido de Croon) from sophomore year.

**Delft University of Technology, Delft, Netherlands** *Sept 2015 – Jul 2018*  
B.Sc. Aerospace Engineering - GPA 8.4/10, Cum Laude (i.e., with distinction)

- Top-ranked program in Aerospace Engineering, featuring a wide range of courses in aerospace engineering, computer science and mechanical engineering.
- Courses in aircraft design, control design, computational modelling and flight dynamics.

## SKILLS

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**Languages** Python, C, C++, MatLab, Java

**Frameworks** Tensorflow, TFLite, Keras, Stable Baselines, Paparazzi AutoPilot, ROS, OpenCV, Simulink

## EXTRA-CURRICULAR

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### Athletics

Competitive swimmer in national and international competitions.

### Sailing Instructor

Certified sailing instructor, teaching children and adults practical and theoretical sailing skills.

### Volunteering

Personally raised €3,116.35 for children with muscle diseases, by swimming across a channel in the ocean.