

# Mario Coppola

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## SKILLS

### Scientific

Robotics • Evolutionary learning • State estimation • Sensor fusion • Reinforcement learning • Swarm intelligence

### Programming

C++ • C • Python • MatLab • Simulink

### Languages

English (Fluent) • Italian (Fluent) • Dutch (Intermediate) • Spanish (Intermediate)

## EDUCATION

### MSC IN AEROSPACE ENGINEERING

DELFT UNIVERSITY OF TECHNOLOGY

2013-2016 | Delft, Netherlands

Honors student, specialized in Control and Simulation. Thesis: *On-board relative localization for collision avoidance in micro air vehicle teams*.

### ROBOTICS MINOR (EXCHANGE)

NANYANG TECHNOLOGICAL UNIVERSITY

Fall semester 2012 | Singapore

Focus on robotics, real-time programming, and embedded systems.

### BSC IN AEROSPACE ENGINEERING

DELFT UNIVERSITY OF TECHNOLOGY

2010-2013 | Delft, Netherlands

Thesis: *Design of a controllable system for the guided atmosphere-assisted deceleration of a human-rated precursor vehicle to Mars*.

Performed under the supervision of NASA Langley Research Center.

### INTERNATIONAL SCHOOL

EINDHOVEN

INTERNATIONAL BACCALAUREATE

2003-2010 | Eindhoven, Netherlands

## ADDITIONAL ACTIVITIES

2019	Delft University PhD council member
2019	Multi-Robot Systems Summer School at Czech Technical University, Prague
2018	Lecturer at BEST Summer School on Swarm Robotics
2017	International Graduate Summer School in Aeronautics and Astronautics at Beihang University, Beijing

## EXPERIENCE

### PHD CANDIDATE | DELFT UNIVERSITY OF TECHNOLOGY

Sep. 2016 – Current | Delft, Netherlands

- Research topic: *Designing provable robotic swarms*.
- Developing distributed controllers such that a team of robots collaborates towards a cooperative task.
- Developing novel machine learning solutions to automatically design, optimize, and verify the on-board controllers of distributed robotic systems.
- Developing on-board relative localization filters for swarms of tiny drones, enabling them to sense each other during flight.
- Expected graduation date: September 2020.

### RESEARCHER (INTERN) | MAX PLANCK INSTITUTE FOR BIOLOGICAL CYBERNETICS

Feb. 2015 – Jun. 2015 | Tübingen, Germany

- Autonomous Robotics and Human-Machine Systems group.
- Developed an approximate reinforcement learning procedure to teach quadrotors to perform evasive maneuvers when faced with moving obstacles such as people or other drones.

### R&D SCIENTIST (INTERN) | HONEYWELL AEROSPACE

Jul. 2014 – Dec. 2015 | Brno, Czech Republic

- Project 1: Software developer for next generation flight-decks featuring multi-modal pilot interaction.
- Project 2: Surveyed potential benefits and limitations of model-based design tools in order to improve flight software development procedures.
- From Feb. 2015 to Dec. 2015, remote part-time consultant aiding with the preparations for the Clean Sky 2 European project.

### TEACHING ASSISTANT | DELFT UNIVERSITY OF TECHNOLOGY

Aug. 2013 – Jul. 2014 & Aug. 2015 – Jan. 2016 | Delft, Netherlands

- Taught classes, supervised, and graded students for the following courses: 'Simulation, Verification, and Validation', 'Computational Modeling', 'Exploring Aerospace Engineering'.

## SELECTED AWARDS

2017	System Design award at the 2017 International Micro Air Vehicle (IMAV) competition and conference
2017	Excellent Student award at the International Graduate Summer School in Aeronautics and Astronautics of Beihang University, Beijing
2014	3 <sup>rd</sup> place at BestGraduates International Edition
2014	Winner of the Critical Reflections in Technology essay award from Delft University of Technology

## PEER-REVIEWED PUBLICATIONS



ORCID profile

[orcid.org/ 0000-0003-4694-2960](https://orcid.org/0000-0003-4694-2960)



Google Scholar profile

[scholar.google.com/citations?user=le\\_9D\\_cAAAAJ](https://scholar.google.com/citations?user=le_9D_cAAAAJ)

- **Mario Coppola**, Kimberly N. McGuire, Christophe De Wagter, and Guido C. H. E. de Croon. A survey on swarming with micro air vehicles: Fundamental challenges and constraints. *Frontiers in Robotics and AI*, 7:18, 2020.
- **Mario Coppola**, Jian Guo, Eberhard Gill, and Guido C. H. E. de Croon. The pagerank algorithm as a method to optimize swarm behavior through local analysis. *Swarm Intelligence*, 13(3):277–319, Dec 2019.
- Steven van der Helm, **Mario Coppola**, Kimberly N. McGuire, and Guido C. H. E. de Croon. On-board range-based relative localization for micro air vehicles in indoor leader–follower flight. *Autonomous Robots*, Mar 2019.
- **Mario Coppola**, Jian Guo, Eberhard Gill, and Guido C. H. E. de Croon. Provable self-organizing pattern formation by a swarm of robots with limited knowledge. *Swarm Intelligence*, 13(1):59–94, Mar 2019.
- **Mario Coppola** and Guido C. H. E. de Croon. Optimization of swarm behavior assisted by an automatic local proof for a pattern formation task. In Marco Dorigo, Mauro Birattari, Christian Blum, Anders L. Christensen, Andreagiovanni Reina, and Vito Trianni, editors, *Swarm Intelligence*, pages 123–134, Cham, 2018. Springer International Publishing.
- **Mario Coppola**, Kimberly N. McGuire, Kirk Y. W. Scheper, and Guido C. H. E. de Croon. On-board communication-based relative localization for collision avoidance in Micro Air Vehicle teams. *Autonomous Robots*, 42(8):1787–1805, Dec 2018.
- Kimberly McGuire, **Mario Coppola**, Christophe de Wagter, and Guido C. H. E. de Croon. Towards autonomous navigation of multiple pocket-drones in real-world environments. In *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 244–249, Sep. 2017.