

Mario Coppola

 [linkedin.com/in/mariocoppola1](https://www.linkedin.com/in/mariocoppola1)  [coppolam.github.io](https://github.com/coppolam)

SKILLS

Scientific

Distributed intelligence • Machine learning • Sensor fusion • Relative localization • Control systems

Programming

Python • C++ • C • MatLab

Languages

English (Native) • Italian (Native) • Dutch (Advanced) • Spanish (Intermediate)

EDUCATION

PhD ROBOTICS AND AI

TU DELFT

2016-2020 | Delft, Netherlands

Thesis: *Automatic design of verifiable robot swarms.*

MSc AEROSPACE ENGINEERING

TU DELFT

2013-2016 | Delft, Netherlands

Specialized in Control and Simulation, with honors certificate. Thesis: *On-board relative localization for collision avoidance in micro air vehicle teams.*

EXCHANGE MINOR ROBOTICS

NANYANG TECHNOLOGICAL UNIVERSITY

Fall semester 2012 | Singapore

Courses on robotics and embedded systems.

BSc AEROSPACE ENGINEERING

TU DELFT

2010-2013 | Delft, Netherlands

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

Supervised by NASA Langley Research Center.

INTERNATIONAL BACCALAUREATE

INTERNATIONAL SCHOOL EINDHOVEN

2003-2010 | Eindhoven, Netherlands

ADDITIONAL ACTIVITIES

2017-2021	Reviewer for multiple journals and conferences
2019-2020	TU Delft PhD council representative
2019	Multi-Robot Systems Summer School at Czech Technical University, Prague
2018	Lecturer at BEST Summer School
2017	International Graduate Summer School in Aeronautics and Astronautics at Beihang University, Beijing

EXPERIENCE

PhD CANDIDATE | TU DELFT

Sep. 2016 – Sep. 2020 | Delft, Netherlands

- Research topic: **Automatic design of verifiable robot swarms**, jointly supervised by the Micro Air Vehicle Laboratory (MAVLab) and the Space Systems Engineering group.

Main achievements:

- An on-board relative localization technology that allows several tiny drones to localize each other and fly together in tight areas.
- Distributed intelligent algorithms that enable teams of robots to self-organize and achieve collective goals.
- A model-based machine learning framework to automatically design, optimize, and verify the behaviour of distributed robotic systems with limited onboard sensors.

RESEARCHER (INTERN) | MAX PLANCK INSTITUTE

Feb. 2015 – May. 2015 | Tübingen, Germany

- Intern within the Autonomous Robotics and Human-Machine Systems group at the Institute for Biological Cybernetics.
- I developed a reinforcement learning scheme to teach drones how to perform efficient collision avoidance in crowded areas.

R&D SCIENTIST (INTERN) | HONEYWELL AEROSPACE

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

- Project 1: Software developer for next generation flight-decks featuring multi-modal pilot interaction.
- Project 2: Review of the benefits and limitations of COTS model-based design tools for flight software development.
- From Feb. 2015 to Dec. 2015: Remote part-time consultant aiding with the preparation of R&D proposals.

TEACHING ASSISTANT | TU DELFT

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

- Assisted with teaching classes, supervising, and grading for various BSc Aerospace Engineering courses.

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	Third place at Best Graduates International Competition (assessment panel by Shell, ASML, Philips, TNO, DSM, Fugro, and Friesland Campina)
2010	Award for Outstanding Contribution to the International School Community from International School Eindhoven

PUBLICATIONS

For more information please visit my academic profiles:



Google Scholar profile scholar.google.com/citations?user=le_9D_cAAAAJ



ORCID profile www.orcid.org/0000-0003-4694-2960

Journal publications

1. **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.
2. 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*, 44(3):415–441, 2020.
3. **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, 2019.
4. **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, 2019.
5. **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, 2018.

Conference publications

6. **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 – 11th International Conference, ANTS 2018, Rome, Italy, Lecture Notes in Computer Science, volume 11172*, pages 123–134, Cham, Switzerland, 2018.
7. Kimberly N. 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, Vancouver, BC, Canada, 2017.

Pre-prints (awaiting peer-review/submission)

8. **Mario Coppola**, Jian Guo, Eberhard Gill, and Guido C. H. E. de Croon. A model-based framework for learning transparent swarm behaviors. *arXiv preprint arXiv: 2103.05343*, 2021.
9. Daniël Willemsen, **Mario Coppola**, and Guido C. H. E. de Croon. MAMBPO: Sample-efficient multi-robot reinforcement learning using learned world models. *arXiv pre-print arXiv:2103.03662*, 2021.
10. Shushuai Li, **Mario Coppola**, Christophe De Wagter, and Guido C. H. E. de Croon. An autonomous swarm of micro flying robots with range-based relative localization. *arXiv preprint arXiv:2003.05853*, 2020.