# Adam Seewald, Curriculum Vitae

Most recent version: adamseewald.cc/cv, ₺

Webpage adamseewald.cc

Email adam.seewald@aya.yale.edu

Phone +1 (774) 333-2250

ETH Zürich/WSL

Address Zürcherstrasse 111 8903 Birmensdorf ZH

Switzerland

- I am currently a postdoc at ETH Zürich and a visiting scientist at WSL, Switzerland.
- My research focuses on robotics and computer science and involves autonomous robots in different environmental use cases.
- My fields of research interest are aerial robotics, energy and environment-aware automation, field robots, and motion and path planning, among others.

## **Education**

#### 2018-2022 Ph.D., Engineering Science —

University of Southern Denmark, Odense, Denmark

Thesis Energy-aware coverage planning and scheduling for autonomous aerial robots, 🖒

Advisor Prof. Ulrik Pagh Schultz

## 2016-2018 Master, Computer Science and Engineering —

University of Verona, Italy

Thesis Evaluation of optimal trajectories for quadrotors with indirect methods in the presence of intermediate

constraints

Advisor Prof. Paolo Fiorini

2013-2016 Bachelor, Computer Science —

University of Verona, Italy

## **Experience**

2024- **Postdoc. Research Fellow**, Environmental Robotics Lab, Dept. of Environmental Syst. Sci. — **Visiting Scientist**, Swiss Federal Institute for Forest Snow and Landscape Research WSL —

ETH Zürich, Switzerland

Project Robot-assisted collection of eDNA for pest detection in precision agriculture, ♂ (PI: Stefano Mintchev)
Funding World Food System Center and Fenaco's research program on smart sustainable farming

- Develop robots for pest detection in precision agriculture (RGB-D perception, controls, planning, etc.)
- Coordinate research across organizations (World Food System Center, Agroscope, and AXA Climate)
- Serve as a teaching assistant for a course on robotics in precision agriculture

2022-2024 **Postdoc. Associate**, GRAB & Intelligent Autonomy Labs, Dept. of Mech. Eng. and Materials Sci. —

Yale University, New Haven, CT, USA

Project Mobile ground-based and aerial robots for biodiversity surveying, (PI: Aaron M. Dollar)

Funding Yale University's discretionary research fund

- Develop robot autonomy for surveying [c6, c7] (navigation, controls, planning, communication, etc.)
- Manage undergraduate and graduate projects at the GRAB & Intelligent Autonomy Labs (Yale U.)
- Assist NSF grant proposal focused on certifiable control
- Serve as a teaching assistant for course on sustainable technologies

#### University of Southern Denmark, Odense, Denmark

Project TeamPlay – Time, Energy, and security Analysis for Multi/Many-core heterogeneous PLAtforms, (PI: Ulrik Pagh Schultz)

Funding European Union's Horizon2020 program under grant agreement number 779882

- Develop aerial robotics use case [c4] (fixed-wing aerial robot for precision agriculture)
- Develop C++/ROS modeling/planning library [j1] (utilized by U. of Amsterdam, U. of Bristol, INRIA, etc.)
- Serve as a teaching assistant for courses on robotic numerical optimization

#### Research

Peer-reviewed journal published (1) and under review (2) publications:

- [j3] Vatsal Patel, Adam Seewald, and Aaron M. Dollar, "See how you feel: Simple six-axis force-torque sensing with a single camera and fiducial markers," 2025, under review. p. 25.
- [j2] Seonghoon Noh, Yeongsik Seo, Jehyeok Kim, <u>Adam Seewald</u>, Aaron M. Dollar, "Passive adaptability to rough terrain via mechanically intelligent legged design," 2024, under review. p. 31.
- [j1] Adam Seewald, Ulrik Pagh Schultz, Emad Ebeid, and Henrik Skov Midtiby, "Coarse-grained computation-oriented energy modeling for heterogeneous parallel embedded systems," in International Journal of Parallel Programming. 2021; vol. 49, no. 2, pp. 136–157. 10.1007/s10766-019-00645-y, □

Peer-reviewed conference in proceedings (7) and under review (1) publications:

- [c8] Adam Seewald, Ian Abraham, and Stefano Mintchev, "Scaling ergodic control for large-scale problems: Robotic exploration with a moving gaussian mixture model," 2024, under review. p. 7.
- [c7] Adam Seewald, Cameron J. Lerch, Marvin Chancán, Aaron M. Dollar, and Ian Abraham, "Energy-aware ergodic search: Continuous exploration for multi-agent systems with battery constraints," in IEEE International Conference on Robotics and Automation (ICRA'24), pp. 7048–7054. 10.1109/ICRA57147.2024.10609871, ©
- [c6] Adam Seewald, Marvin Chancán, Connor M. McCann, Seonghoon Noh, Omeed Fallahi, Hector Castillo, Ian Abraham, and Aaron M. Dollar, "RB5 Low-cost explorer: Implementing autonomous long-term exploration on low-cost robotic hardware," in IEEE International Conference on Robotics and Automation (ICRA'24), pp. 5977–5983. 10.1109/ICRA57147.2024.10610399, 🖒
- [c5] Benjamin Rouxel, Christopher Brown, Emad Ebeid, Heiko Falk, Clemens Grelck, Jesper Holst, Shashank Jadhav, Yoann Marquer, Marcos Martinez Alejandro, Kris Nikov, Ali Sahafi, Ulrik Pagh Schultz, <u>Adam Seewald</u>, Vangelis Vassalos, Simon Wegener, and Olivier Zendra, "The TeamPlay project: Analysing and optimising time, energy, and security for cyber-physical systems," in Design, Automation and Test in Europe Conference (DATE'23), pp. 1–6. 10.23919/DATE56975.2023.10137198, ©
- [c4] Adam Seewald, Héctor García de Marina, Henrik Skov Midtiby, and Ulrik Pagh Schultz, "Energy-aware planning-scheduling for autonomous aerial robots," in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'22), pp. 2946–2953. 10.1109/IROS47612.2022.9981285, ♂
- [c3] Georgios Zamanakos, <u>Adam Seewald</u>, Henrik Skov Midtiby, and Ulrik Pagh Schultz, "**Energy-aware design of vision-based autonomous tracking and landing of a UAV**," in IEEE International Conference on Robotic Computing (IRC'20), pp. 294–297. 10.1109/IRC.2020.00054, ♂
- [c2] Adam Seewald, Héctor García de Marina, Henrik Skov Midtiby, and Ulrik Pagh Schultz, "Mechanical and computational energy estimation of a fixed-wing drone," in IEEE International Conference on Robotic Computing (IRC'20), pp. 135–142. 10.1109/IRC.2020.00028, ♂

[c1] • Adam Seewald, Ulrik Pagh Schultz, Julius Roeder, Benjamin Rouxel, and Clemens Grelck, "Component-based computation-energy modeling for embedded systems," in ACM SIGPLAN International Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH'19), pp. 5–6. 10.1145/33590 61.3362775, ©

Peer-reviewed workshop publications (2):

- [w2] Adam Seewald, "Beyond traditional energy planning: The weight of computations in planetary exploration," in IROS Workshop on Planetary Exploration Robots: Challenges and Opportunities (PlanRobo'20), p. 3. ETH Zürich. 10.3929/ethz-b-000450120, ©
- [w1] Adam Seewald, Emad Ebeid, and Ulrik Pagh Schultz, "Dynamic energy modelling for SoC boards: Initial experiments," in Workshop on High-Level Programming for Heterogeneous and Hierarchical Parallel Systems (HLP-GPU'19), p. 4. 🗗

Others (2):

- [o2] Adam Seewald, "Energy-aware coverage planning and scheduling for autonomous aerial robots," Ph.D. thesis, p. 184. Syddansk Universitet. Det Tekniske Fakultet, 2021. 10.21996/7ka6-r457, 🗗
- [o1] Adam Seewald, Ulrik Pagh Schultz, Emad Ebeid, and Henrik Skov Midtiby, "powprofiler computations energy modeling tool," v. 1.0.2, 2021. 10.5281/zenodo.5562457, [2]

#### **Invited lectures**

- Innovations in robotics for sustainable crop production. Invited Talk at the Innovations for Sustainable Local Food Systems day, ETH Zürich World Food System Center. June 14, 2024. 🗗
- Ergodic control applications: Energy optimal control. Invited Speaker at the ICRA Tutorial on Ergodic Control, IEEE International Conference on Robotics and Automation. May 13, 2024.
- Energy-aware dynamic planning: Merging path planning and computations scheduling for the drone use-case. Invited Talk at the TeamPlay Final Workshop, (Virtual Event). May 27, 2021.
- Energy estimation and modeling for the drone use-case. Invited Talk at the TeamPlay Workshop, European Network on High-Performance Embedded Architecture and Compilation Conference. January 22, 2020.

## **Teaching and advising**

Teaching at graduate and undergraduate levels (3):

Fall 2024 Introduction to Agricultural Robotics, ETH Zürich

Role Teaching assistant (PI: Stefano Mintchev)

• Elective introductory course on robotics techniques in precision agriculture for master's students from different backgrounds

Fall 2022 You, Your Planet, and a Sustainable Future, Yale University

Role Teaching assistant (PI: Aaron M. Dollar)

 Survey course on sustainable technologies for undergraduate students in engineering and environmental science

Spring 2019, '20 Optimization and Control, University of Southern Denmark

Role Teaching assistant (PI: Agus Hasan)

 Elective course on numerical optimization, methods and solvers, for master's students in robot systems Advising of graduate and undergraduate students (2):

- Mattia Mangili, master's student in robotics, systems and control, ETH Zürich, 2024–
- Omeed Fallahi, undergraduate student in computer science, Yale University, 2022-2023
- Magnus O. C. Liisberg, master's student in robot systems, University of Southern Denmark, 2018–2019

#### Professional and outreach activities

- Member, Institute of Electrical and Electronics Engineers (IEEE), 2019-
- Member, Association for Computing Machinery (ACM), 2019–
- Organizer, Time, Energy, and Security Analysis for Multi/Many-core Heterogeneous Platforms Final Workshop (TeamPlay'21)
- Program Committee member, IEEE International Conference on Robotic Computing (IRC'23, '22, '21), &
- Reviewer, IEEE International Conference on Robotics and Automation (ICRA'25, '24), ♂
- Reviewer, IEEE Transactions on Robotics (T-RO), ♂
- Reviewer, IEEE Robotics and Automation Letters (RA-L), □
- Reviewer, International Symposium on Distributed Autonomous Robotic Systems (DARS'24), &
- Reviewer, IEEE International Conference on Soft Robotics (RoboSoft'24), 🖸
- Reviewer, IEEE International Conference on Automation Science and Engineering (CASE'23), ♂
- Reviewer, IEEE International Conference on Robot and Human Interactive Communication (Ro-man'22)
- Reviewer, IEEE International Conference on Unmanned Aircraft Systems (ICUAS'22), ☑
- Reviewer, International Workshop on Robotics Software Engineering (RoSE'22), 
   □
- Reviewer, IEEE International Conference on Unmanned Aircraft Systems (ICUAS'21)
- Reviewer, IEEE International Conference on Control, Automation, Robotics and Vision (ICARCV'20)

#### References

Prof. Aaron M. Dollar, ♂	Prof. Ulrik Pagh Schultz, ♂	Prof. Agus Hasan, ♂
Department of Mechanical Engi-	SDU UAS Center	Department of Natural Sciences
neering and Materials Science	Mærsk Mc-Kinney Møller Institute	Norwegian University of Science
Yale University	University of Southern Denmark	and Technology
aaron.dollar@yale.edu	ups@mmmi.sdu.dk	agus.hasan@ntnu.no

Last updated: January 31, 2025