

Adam Seewald, Curriculum Vitae

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- 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

2018-2022 **Ph.D. Researcher**, Unmanned Aerial Systems Center —

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.)
- Manage EU project TeamPlay [↗](#), coordinated industry collaboration (Sky-Watch, Irida Labs, etc.)
- Serve as a teaching assistant for courses on robotic numerical optimization

Research

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

- [j2] • Seonghoon Noh, Yeongsik Seo, Jehyeok Kim, [Adam Seewald](#), 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, [Adam Seewald](#), 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, [Adam Seewald](#), 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. [10.1145/3359061.3362775](#), [↗](#)

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](https://doi.org/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](https://doi.org/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](https://doi.org/10.5281/zenodo.5562457), [↗](#)

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

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|------|---|
| Role | Teaching assistant (PI: Stefano Mintchev) |
| | <ul style="list-style-type: none"> • Elective introductory course on robotics techniques in precision agriculture for master’s students from different backgrounds |
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Fall 2022 **You, Your Planet, and a Sustainable Future**, Yale University

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|------|---|
| Role | Teaching assistant (PI: Aaron M. Dollar) |
| | <ul style="list-style-type: none"> • Survey course on sustainable technologies for undergraduate students in engineering and environmental science |
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Spring 2019, '20 **Optimization and Control**, University of Southern Denmark

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| Role | Teaching assistant (PI: Agus Hasan) |
| | <ul style="list-style-type: none"> • Elective course on numerical optimization, methods and solvers, for master’s students in robot systems |
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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, [↗](#)

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Prof. Ulrik Pagh Schultz, [↗](#)

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