# **Adam Seewald**, Curriculum Vitae

Most recent version: adamseewald.cc/cv,


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- I am currently a postdoc at the Environmental Robotics Lab, ETH Zürich
- 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, field robots, motion and path planning, and energy and environment-aware automation, among others (RAS classif. )

## Education

2018-2022 **Ph.D., Engineering Science, University of Southern Denmark**

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| 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**

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| 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, Environmental Robotics Lab, Dept. of Environmental Systems Science, ETH Zürich**

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| 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 |
| Details | Development of techniques (i.e., aerial-physical interaction, RGB-D perception, etc.) for the collection and analysis of environmental DNA samples for the detection of pests in precision agriculture. |

2022-2024 **Postdoc, GRAB Lab, Dept. of Mechanical Eng. and Materials Science, Yale University**

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| Project | Mobile ground-based and aerial robots for biodiversity surveying, (PI: Aaron M. Dollar) |
| Funding | Yale University's discretionary research fund |
| Details | Development of mobile robotic autonomy (i.e., navigation, control, and planning algorithms and communication methodologies) for nature conservation and surveying efforts [c7, c6]. |

2018-2022 **Ph.D. Researcher, Unmanned Aerial Systems Center, University of Southern Denmark**

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| 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 |
| Details | Development of the aerial robotics use case [c4] (i.e., fixed-wing aerial robot for precision agriculture).<br>Development of an open-source motion planning/computing energy modeling library [j1, o1] utilized by a network of collaborators including University of Amsterdam, University of Bristol, and INRIA. |

## Research

Peer-reviewed journal publication:

[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 publications (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**," to appear in IEEE International Conference on Robotics and Automation (ICRA'24), p. 7.

[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**," to appear in IEEE International Conference on Robotics and Automation (ICRA'24), p. 7.

[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,

[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,

## Invited lectures

- **Solving energy-aware ergodic search problems via interior point methods**. 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 (2):

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| Fall 2022 | **You, Your Planet, and a Sustainable Future**, Yale University | |
| | Role | Teaching assistant (PI: Aaron M. Dollar) |
| | Details | 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 | |
| | Role | Teaching assistant (PI: Agus Hasan) |
| | Details | Elective course on numerical optimization, methods and solvers, for master's students in robot systems. |

Advising of graduate and undergraduate students (2):

- **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** of the 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 Robotics and Automation Letters (RA-L),
- **Reviewer**, IEEE International Conference on Soft Robotics (RoboSoft'24),
- **Reviewer**, IEEE International Conference on Robotics and Automation (ICRA'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


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


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