Adam Seewald

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Webpage	adamseewald.cc
Email	adam@seewald.email
Phone	+1 (774) 333-2250
Address	Mason Lab, Yale University 9 Hillhouse Avenue New Haven, CT 06511 USA

- I am currently a postdoc at the GRAB Lab, Yale University, and an incoming 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
- I was born on November 27, 1993, in Bratislava, Slovakia and I am fluent in Czech, English, Italian, and Slovak

Education

2018-2022 **Ph.D., Engineering Science, University of Southern 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, Environmental Robotics Lab, Dept. of Environmental Systems Science, ETH Zürich**

Project	Robot-assisted collection of eDNA for pest detection in precision agriculture,
Advisor	Prof. Stefano Mintchev
Details	I will be investigating robotic techniques for the collection and analysis of environmental DNA samples for the detection of pests from crops in precision agriculture.

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

Project	Mobile ground-based and aerial robots for biodiversity surveying,
Advisor	Prof. Aaron Dollar
Details	I am investigating techniques for navigation, control, and planning of mobile robotics platforms for nature conservation and surveying. These platforms include legged, aerial [c7], and wheeled [c6] robots jointly developed by multiple lab members.

2018-2021 **Ph.D. Researcher, Unmanned Aerial Systems Center, University of Southern Denmark**

Project	TeamPlay – Time, Energy, and security Analysis for Multi/Many-core heterogeneous PLAtforms,
Funding	European Union's Horizon2020 program under grant agreement number 779882
Advisor	Prof. Ulrik Pagh Schultz
Details	My contributions included the development of the aerial robotics use case and an open-source energy modeling tool written in C++ [j1], [c1] used by project partners such as the University of Amsterdam in the Netherlands, the University of Bristol in the United Kingdom, INRIA in France, and Irida Labs in Greece. To this end, I have applied energy optimizing techniques – including MPC and data-driven control [c4] – to aerial robots in flight [c2] and simulation using ROS [c3] and MATLAB (R) [c2], [c4] and investigated other energy-critical systems [w2].

Publications

My publications include one journal article and seven conference articles.

[j1] • **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,
Adam Seewald, Ulrik Pagh Schultz, Emad Ebeid, and Henrik Skov Midtiby

[c1] • **Component-based computation-energy modeling for embedded systems**, in: Proceedings Companion of the ACM SIGPLAN International Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH'19), pp. 5–6. 10.1145/3359061.3362775,
Adam Seewald, Ulrik Pagh Schultz, Julius Roeder, Benjamin Rouxel, and Clemens Grelck

[c2] • **Mechanical and computational energy estimation of a fixed-wing drone**, in: Proceedings of the IEEE International Conference on Robotic Computing (IRC'20), pp. 135–142. 10.1109/IRC.2020.00028,
Adam Seewald, Héctor García de Marina, Henrik Skov Midtiby, and Ulrik Pagh Schultz

[c3] • **Energy-aware design of vision-based autonomous tracking and landing of a UAV**, in: Proceedings of the IEEE International Conference on Robotic Computing (IRC'20), pp. 294–297. 10.1109/IRC.2020.00054,
Georgios Zamanakos, Adam Seewald, Henrik Skov Midtiby, and Ulrik Pagh Schultz

[c4] • **Energy-aware planning-scheduling for autonomous aerial robots**, in: Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'22), pp. 2946–2953. 10.1109/IROS47612.2022.9981285,
Adam Seewald, Héctor García de Marina, Henrik Skov Midtiby, and Ulrik Pagh Schultz

[c5] • **The TeamPlay project: Analysing and optimising time, energy, and security for cyber-physical systems**, in: Proceedings of the Design, Automation and Test in Europe Conference (DATE'23), pp. 1–6. 10.23919/DATE56975.2023.10137198,
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

[c6] • **RB5 Low-cost explorer: Implementing autonomous long-term exploration on low-cost robotic hardware**, to appear in: Proceedings of the IEEE International Conference on Robotics and Automation (ICRA'24), p. 7.
Adam Seewald, Marvin Chancán, Connor M. McCann, Seonghoon Noh, Omeed Fallahi, Hector Castillo, Ian Abraham, and Aaron M. Dollar

[c7] • **Energy-aware ergodic search: Continuous exploration for multi-agent systems with battery constraints**, to appear in: Proceedings of the IEEE International Conference on Robotics and Automation (ICRA'24), p. 7.
Adam Seewald, Cameron J. Lerch, Marvin Chancán, Aaron M. Dollar, and Ian Abraham

Other publications include two peer-reviewed workshop articles, a Ph.D. thesis, and a software.

[w1] • **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.
Adam Seewald, Emad Ebeid, and Ulrik Pagh Schultz

[w2] • **Beyond traditional energy planning: The weight of computations in planetary exploration**, in: Proceedings of the IROS Workshop on Planetary Exploration Robots: Challenges and Opportunities (PlanRobo'20), p. 3. ETH Zürich. 10.3929/ethz-b-000450120,
Adam Seewald

[o1] • `powprofiler` **computations energy modeling tool**, v. 1.0.2, 2021. 10.5281/zenodo.5562457,
Adam Seewald, Ulrik Pagh Schultz, Emad Ebeid, and Henrik Skov Midtiby

[o2] • **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,
Adam Seewald

Teaching

I co-taught courses at graduate and undergraduate level.

Fall 2022 **You, Your Planet, and a Sustainable Future**, course for undergraduate students

Role	Teaching assistant
Advisor	Prof. Aaron M. Dollar
Details	I prepared lecture material and assisted in the theoretical parts of the course – a survey course for undergraduate students in engineering and environmental science at Yale University.

Spring 2019, and 2020 **Optimization and Control**, course for master's students in Robotics

Role	Teaching assistant
Advisor	Prof. Agus Hasan
Details	I taught constrained optimization and sequential quadratic programming and assisted in the practical parts of the course – an elective course for the master's students in robot systems at the University of Southern Denmark.

Academic Service

- **Reviewer** for the IEEE International Conference on Soft Robotics (RoboSoft'24),
- **Reviewer** for IEEE Robotics and Automation Letters (RA-L),
- **Reviewer** for the IEEE International Conference on Robotics and Automation (ICRA'24),
- **Program Committee member** at the IEEE International Conference on Robotic Computing (IRC'23),
- **Reviewer** for the IEEE International Conference on Automation Science and Engineering (CASE'23),
- **Program Committee member** at the IEEE International Conference on Robotic Computing (IRC'22),
- **Reviewer** for the IEEE International Conference on Robot and Human Interactive Communication (Ro-man'22),
- **Reviewer** for the IEEE International Conference on Unmanned Aircraft Systems (ICUAS'22),
- **Reviewer** for the International Workshop on Robotics Software Engineering (RoSE'22),
- **Program Committee member** at the IEEE International Conference on Robotic Computing (IRC'21),
- **Co-organizer** of the Time, Energy, and Security Analysis for Multi/Many-core Heterogeneous Platforms Final Workshop (TeamPlay'21),
- **Reviewer** for the IEEE International Conference on Unmanned Aircraft Systems (ICUAS'21),
- **Reviewer** for the IEEE International Conference on Control, Automation, Robotics and Vision (ICARCV'20),

References

Prof. Aaron Dollar,
Department of Mechanical Engineering and Materials Science
Yale University
aaron.dollar@yale.edu

Prof. Ulrik Pagh Schultz,
SDU UAS Center
Mærsk Mc-Kinney Møller Institute
University of Southern Denmark
ups@mmmi.sdu.dk

Prof. Agus Hasan,
Department of Natural Sciences
Norwegian University of Science and Technology
agus.hasan@ntnu.no