Curriculum Vitæ

Adam Seewald, January 24, 2022

Most recent version: adamseewald.cc/cv

Personal Information

- I joined the Ph.D. program in Engineering Science at the Unmanned Aerial Systems Center, University of Southern Denmark, in 2018, where I investigated techniques for modeling [j1], [c1], [c2] and optimization [c3], [j2] of autonomous aerial robots under the EU H2020 project TeamPlay. Here I worked on simultaneous path planning and task scheduling for mobile robots [j2], combining theoretical background with real-world and simulated robotics scenarios in precision agriculture [c3], [j2], search and rescue [j1], and planetary exploration [w1].
- I received my Master's degree in Computer Science at the Altair Robotics Laboratory, University of Verona, Italy, in 2018, where I investigated indirect methods for trajectory optimization for quadrotors.
- Research-wise, I am interested in applying modern planning techniques to autonomous robots by interconnecting robotics, computer science, and optimal control.
- I was born on November 27, 1993, in Bratislava, Slovakia and I am fluent in Czech, English, Italian, and Slovak.

Contacts

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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**

Thesis	Analysis, Porting and Testing of Parallel Code for Images Recognition on CUDA Jetson TK1 Platform
Advisor	Prof. Nicola Bombieri

Research Experience

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 research and innovation program under grant agreement number 779882
Supervisor	Prof. Ulrik Pagh Schultz
Details	The project investigated formally motivated techniques for non-functional properties of heterogeneous embedded systems. I contributed to the aerial robotics use case, developing 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. I applied energy optimizing techniques–including MPC and data-driven control [j2]–to aerial robots in flight [c2] and simulation using ROS [c3] and MATLAB(R) [c2], [j2]. I investigated other energy-critical systems [w1]. I collaborated with international partners on public deliverables and joint publications.

Publications

My publications include one journal article, three conference articles, and one workshop article (all articles were peer-reviewed).

[j1] **Adam Seewald**, Ulrik Pagh Schultz, Emad Ebeid, and Henrik Skov Midtiby
Coarse-Grained Computation-Oriented Energy Modeling for Heterogeneous Parallel Embedded Systems
International Journal of Parallel Programming. 2021; vol. 49, no. 2, pp. 136–157.
DOI: 10.1007/s10766-019-00645-y, preprint: adamseewald.cc/short/coarse2019

[c1] **Adam Seewald**, Ulrik Pagh Schultz, Julius Roeder, Benjamin Rouxel, and Clemens Grelck
Component-Based Computation-Energy Modeling for Embedded Systems
Proceedings Companion of the ACM SIGPLAN International Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH'19), pp. 5—6.
DOI: 10.1145/3359061.3362775, preprint: adamseewald.cc/short/component2019

[c2] **Adam Seewald**, Héctor García de Marina, Henrik Skov Midtiby, and Ulrik Pagh Schultz
Mechanical and Computational Energy Estimation of a Fixed-Wing Drone
Proceedings of the 4th IEEE International Conference on Robotic Computing (IRC'20), pp. 135—142.
DOI: 10.1109/IRC.2020.00028, preprint: adamseewald.cc/short/mechanical2020

[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
Proceedings of the 4th IEEE International Conference on Robotic Computing (IRC'20), pp. 294—297.
DOI: 10.1109/IRC.2020.00054, preprint: adamseewald.cc/short/energy2020

[w1] **Adam Seewald**
Beyond Traditional Energy Planning: the Weight of Computations in Planetary Exploration
Proceedings of the IROS Workshop on Planetary Exploration Robots: Challenges and Opportunities (PlanRobo'20), p. 3. ETH Zürich.
DOI: 10.3929/ethz-b-000450120, preprint: adamseewald.cc/short/beyond2020

Moreover, one article is currently in preparation.

[j2] **Adam Seewald**, Héctor García de Marina, Henrik Skov Midtiby, and Ulrik Pagh Schultz
Energy-Aware Planning-Scheduling for Autonomous Aerial Robots
In preparation, p. 10.
Source: adamseewald.cc/short/energy2021

Teaching

I co-taught a course at the Master's level.

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

Role	Teaching assistant
Supervisor	Prof. Agus Hasan
Details	The course was an elective for the Master's students in Robot Systems at the University of Southern Denmark. The students were from two different study programs: advanced robotics technology and drones and autonomous systems. I taught constrained optimization, sequential quadratic programming and assisted in the practical parts of the course.

Conference Participation

I have presented my work at conferences and workshops in robotics and computer science.

'21
Energy-Aware Dynamic Planning: Merging Path Planning and Computations Scheduling for the Drone Use-Case
Workshop presentation at the Time, Energy, and Security Analysis for Multi/Many-core Heterogeneous Platforms Final Workshop (TeamPlay'21)
Odense, Denmark (virtual), May 26–27, 2021.

'20
Mechanical and Computational Energy Estimation of a Fixed-Wing Drone, and Energy-Aware Design of Vision-Based Autonomous Tracking and Landing of a UAV
Conference papers presentation at the 4th IEEE International Conference on Robotic Computing (IRC'20)
Taichung, Taiwan (virtual), November 9–11, 2020.

Beyond Traditional Energy Planning: the Weight of Computations in Planetary Exploration
Workshop presentation at the IROS Workshop on Planetary Exploration Robots: Challenges and Opportunities (PlanRobo'20)
Las Vegas, USA (virtual), October 29–30, 2020.

Energy Estimation and Modeling for the Drone Use-Case
Workshop presentation at the Time, Energy, and Security Analysis for Multi/Many-core Heterogeneous Platforms Workshop (TeamPlay'20) at the European Network on High-performance Embedded Architecture and Compilation conference (HiPEAC'20)
Bologna, Italy, January 20–22, 2020.

'19
Component-Based Computation-Energy Modeling for Embedded Systems
Conference abstract presentation at the ACM SIGPLAN International Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH'19)
Athens, Greece, October 20–25, 2019.

Dynamic Energy Modelling for SoC Boards: Initial Experiment

Workshop presentation at the High-Level Programming for Heterogeneous and Hierarchical Parallel Systems Workshop (HLPGPU) at the European Network on High-performance Embedded Architecture and Compilation conference (HiPEAC'19)

Valencia, Spain, January 21–23, 2019.

Academic Service

- **Program Committee member** at the 5th 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 16th International Conference on Control, Automation, Robotics and Vision (ICARCV'20)

References

- Prof. Ulrik Pagh Schultz, Professor, SDU UAS Center, Mærsk Mc-Kinney Møller Institute, University of Southern Denmark, ups@mmmi.sdu.dk, +45 4079 7629
- Prof. Agus Hasan, Professor, Department of ICT and Natural Sciences, Norwegian University of Science and Technology, agus.hasan@ntnu.no, +45 9350 7327
- Dr. Héctor García de Marina, Research Fellow, Department of Computer Architecture and Automatic Control, Universidad Complutense de Madrid, Spain, hgarciad@ucm.es, +34 622 517 339