+351-930514086
Lisbon,Portugal
hao.he@aliyun.com
he.hao@seapower.pt

He Hao

Ph.D. (expected Dec. 2025)

Profile: linkedin.com/in/hehao123/
Github: github.com/HAOHE123
Kaggle: kaggle.com/hehao111
Google Scholar: 3sP1AOAAAAAJ

Technical Skills

Languages **Proficient**: Python, MATLAB, LaTeX,
Familiar: SQL, C++, Spark, LabVIEW

Tech Tools PyTorch, scikit-learn, Simulink, Cloud (AutoDL, Azure), CI/CD (e.g., by Docker/Git), MLOps

Expertise Machine Learning, Distributed Systems, Data Visualization, Optimization (Nonlinear, Parameter)

Experience

Autonomous Systems Engineer **Jan 2026 — Now**
SeaPower *Figueira da Foz, Coimbra, Portugal*

- Building autonomy stack components (perception, localization/navigation, decision-making) using AI/ML, sensor fusion, and control.

PhD Full-time Contract **Sep 2021 — Aug 2025**
Fundação para a Ciência e a Tecnologia (FCT) *Lisbon, Portugal*

- Developed hybrid optimization-based control frameworks for drone swarms in wildfire surveillance, including distributed ADMM for database partition (reducing optimization time from 24+ hours to 10s per region), GMM modeling of drought data for trajectory planning (achieving 95% coverage and 32.31% surveillance time reduction via distributed computation), and end-to-end deployable pipelines with ensemble models integrating real drone dynamics and battery constraints.
- First-authored 7 peer-reviewed publications (5 JCR Q1, 1 JCR Q2) on distributed optimization methods, enabling scalable stochastic coverage and resilience in nonconvex environments.

Data Scientist **Jun 2024 — Jan 2025**
Guangyuan Keyou Technology Development (Hong Kong) Co., Limited *Hong Kong SAR*

- Analyzed and modeled pipeline corrosion data in collaboration with SDEs to develop an application for real-time detection and monitoring of pipeline status.

Expert **Nov 2024 — Jan 2025**
Kaggle *Remote*

- Achieved Expert tier through participation in competitions.

Education

Education
Doctor of Philosophy in Electrical and Computer Engineering, PhD, Grade: 18.40/20.00, *Instituto Superior Técnico*
Feb 2019 — Dec 2025

- Awarded Scholarship Within the Framework of R&D Projects and Institutions (2019-2020) (BL204/2018)
- FCT: Call for Research Scholarships for Ph.D. (National Public Support for Research) (2021-2025)

Bachelor of Science in Electrical and Computer Engineering, BS, Grade: 18/20 (3.58/4.00), *University of Macau* Sep 2014 — Jun 2018

- 2015 Henry Fok Foundation Scholarship (Top 1 student in ECE)
- Sensor-based Cooperative Robotics Research (SCORE) laboratory

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Ph.D. Projects

Wildfire Surveillance for Drone Swarms **Feb 2019 — Dec 2025**

- First Authored 7 peer-reviewed publications (4 published journals, 1 under review for the main content of the phd thesis; plus 1 prior journal and 1 conference), focusing on hybrid and distributed optimization methods, enabling fast convergence to risk-based distributions.
- Optimized Markov chain designs using convex/semidefinite programming and decentralized strategies like ADMM, enabling scalable stochastic coverage over large domains with minimal communication.
- Developed distributed high-level planning for drone swarms via block diagonal splitting and primal retrieval, achieving optimized guidance in confined and large-scale networks validated on FWI data.
- Innovated continuous and hybrid first-order optimization with adaptive gradients, momentum, and coordinate-wise updates for smooth, real-time trajectories, outperforming NMPC in efficiency under constraints.
- Designed a gradient-free distributed architecture with ellipse-fit spirals for multi-agent surveillance, reducing mission times by up to 30% and ensuring resilience to failures in nonconvex environments.

Publication

- A Microscopic-View Infection Model Based on Linear Systems, *Information Sciences*, Feb 2020, https://doi.org/10.1016/j.ins.2019.09.021
- Analysis of Gradient Descent Algorithms: Discrete to Continuous Domains and Circuit Equivalents, *Systems & Control Letters*, Jun 2025, https://doi.org/10.1016/j.sysconle.2025.106146
- Smooth Surveillance Using Quadrotors for Tasks with Nonconvex Utility Functions, *Systems & Control Letters*, Dec 2025, https://doi.org/10.1016/j.sysconle.2025.106281
- A Self-Organizing Distributed Algorithm to Tackle the Stochastic Coverage Problem, *Franklin Open*, Sep 2025, https://doi.org/10.1016/j.fraope.2025.100355
- Continuous Trajectory Planning for Non-Convex Utility Functions Using Hybrid Optimization, *European Journal of Control*, Accepted
- Distributed Surveillance System with Drone Formations, *IEEE Transactions on Control of Network Systems*, Under Review
- Source Localization and Network Topology Discovery in Infection Networks, *Chinese Control Conference (CCC)*, Jul 2018, https://doi.org/10.23919/ChiCC.2018.8482274

Certificates

- Introduction to Neural Networks and PyTorch, *Coursera*, Issued Oct 2024, https://www.coursera.org/verify/OICOL496OP85
- Machine Learning Specialization, *Coursera*, Issued Sep 2024, https://www.coursera.org/verify/SKTLV6KINHXL
- Machine Learning with Python: Foundations, *LinkedIn Learning*, Issued Aug 2023, https://www.linkedin.com/learning/certificates/6af6fd07066b3c43c6f5b08b36364c52220b75c4175c5bf544614517f71ef9de
- Python Functions for Data Science, *LinkedIn Learning*, Issued Aug 2023, https://www.linkedin.com/learning/certificates/e54ee3a89ff9afd497e2bd29307273eb4f55a8f24ae942ae437832bc46423dca
- Python for Engineers and Scientists, *LinkedIn Learning*, Issued Aug 2023, https://www.linkedin.com/learning/certificates/251162601e24177f735fd639511f85b069747cc7998daa149768ea68c4f7c69c