

MACHINE LEARNING METHODS FOR AEROSPACE APPLICATIONS

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ABSTRACT

Recent advances in machine learning (ML) are transforming the field of computational methods in aerospace engineering. This mini-symposium will bring together researchers and practitioners who are at the forefront of ML methodology and its application to aerospace problems. The symposium will cover theoretical innovations and practical deployments. We invite contributions that leverage machine learning across a broad spectrum of aerospace applications. Topics may include, but are not limited to:

- **Physics-informed machine learning** approaches that integrate domain knowledge and physical laws into learning frameworks to enable improved generalization, data efficiency, and robustness in complex aerospace systems.
- **Anomaly detection and predictive maintenance** strategies, particularly in mission-critical systems such as aircraft engines, spacecraft subsystems, and satellite constellations, where early fault detection and interpretability are crucial.
- **Aerodynamic modeling and flow control**, where surrogate modeling, reduced-order modeling, or reinforcement learning can speed up design and optimization processes.
- **Earth observation and satellite-based sensing**, including the use of ML for large-scale remote sensing data interpretation, change detection, or predictive analytics in climate and environmental monitoring.
- **Space transport and autonomous navigation**, where machine learning plays a role in trajectory planning, control under uncertainty, or onboard decision-making.

While these examples highlight prominent use cases, the mini-symposium encourages submissions on **all aspects of machine learning for aerospace applications**.