Benjamin Morel

Ph.D. candidate

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GitLab

Work experiences

Mar, 2025 – Mar, 2026 **Research engineer**
French Institute for Research in Computer Science and Automation (INRIA) - Rennes, France

As part of a numerical simulation project, I developed models to simulate the flow of liquid resin in porous reinforcement materials across diverse geometries and injection conditions. My work centered on three approaches: Physics-Informed Neural Networks (PINN), Finite Element Method (FEM), and Graph Neural Networks (GNN).

I designed and implemented deep learning architectures, tuned hyperparameters, and cross-validated model predictions using high-fidelity reference data from unseen simulations.To enhance performance, I optimized algorithms (mixed precision, sampling strategies, Fourier embeddings) and expanded model capabilities (sensor data integration, parametric modes). Additionally, I managed team documentation, maintained the GitLab repository, and ensured seamless model deployment across various hardware configurations. This project led to presentations at major events such as AIComp and JEC World.

Mar, 2024 – Jul, 2024 **Internship in numerical simulations in design office**
Airbus SAS Operations - Toulouse, France

I built a surrogate model based on machine learning to predict stress outputs during the wing-fuselage assembly phase of an Airbus A321neo aircraft. I automated the generation of training and validation data from a high-fidelity solver software using Python and Shell scripts.

I designed a full validation process to assess the model's performance. The predicted stress values for unseen data closely matched the solver results. This model continues to be utilized for other Airbus aircraft models.

Feb, 2023 – Jul, 2023 ***Research internship in aircraft design***
University of Naples Federico II - Naples, Italy

Attached to the Design Aircraft and Flight (DAF) research division, I worked on exploring hybridization parameters using the Monte Carlo method for hybrid-electric distributed propulsion aircraft.

I developed and implemented a sizing algorithm, generating thousands of aircraft designs to identify an optimal hybrid configuration with the lowest takeoff weight. My results provided a draft version of an optimal hybrid aircraft and contributed to validating the high-fidelity methods and aircraft sizing models used by the DAF division.

Education

Sep, 2019 – Sep, 2024 **Master of aerospace engineering**
ELISA Aerospace - Saint-Quentin, France

Computational mathematics, Probabilities & optimization, Flight physics aerodynamics, Physics of fluid, Finite element method, EEA (Electricity, Energy & Automation).

Skills

Tech Stack Python, PyTorch, TensorFlow, Scikit-Learn, Docker, Git, MATLAB, basic C++

Softwares Ansys Fluent, Abaqus Standard/CAE

Skills Finite-Element Analysis, Physics-Informed Neural Networks, Graph Neural Networks

Languages French, English, Italian

Miscellaneous

Athletics Playing in competitions for 14 years.

Astronomy Reading popular articles and using a telescope.

Voluntary Defending the interests of persons with mental disabilities and their families at *Les Papillons Blancs*.