

Matthieu Darcy

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EDUCATION

Caltech Ph.D. student in Computing and mathematical Sciences. Advisor: Prof. Houman Owhadi. <i>External affiliation:</i> NASA Jet Propulsion Lab - Research Affiliate.	Pasadena, California 2021–present
ENS Paris-Saclay - Institut Polytechnique de Paris Mathématiques Vision et Apprentissage, with Highest Honors.	Paris, France 2020–2021
Imperial College London MSc Applied Mathematics, with Distinction.	London, United Kingdom 2019–2020
King's College London BA Mathematics and Philosophy, first class.	London, United Kingdom 2016–2019

EXPERIENCE

Johnson & Johnson (Janssen Pharmaceuticals) - Machine learning consultant. Machine learning and mathematical modeling of disease progression. <ul style="list-style-type: none">– Developed a dynamical systems approach for the prediction and assimilation of Alzheimer's disease progression.– Paper forthcoming.	05/23 - 03/24
French Commission for Atomic Energy - Research intern, Thesis: <i>Deep learning for hexahedral meshing.</i> <ul style="list-style-type: none">– Applied a convolutional neural network approach to the automatic generation of high-quality meshes for the simulation of physical systems.	05/2021-08/2021
Imperial College London - Research project. Application of Kernel Flows to regression. <ul style="list-style-type: none">– Developed python code for the Kernel Flows algorithm and its applications.	05/2020-09/2020

TECHNICAL SKILLS

- **Programming:** Python (proficient), Julia (intermediate), LaTeX (proficient).
- **Packages:** Extensive experience in Numpy, Pytorch, Sklearn, Scipy, Jax, Pandas. Familiar with TensorFlow.
- **Statistical Tools:** Extensive experience in Gaussian Processes and Kernel methods, proficient in neural networks, statistics and machine learning.

RESEARCH INTERESTS

I am broadly interested in scientific machine learning, specifically in the applications of Gaussian processes, kernel methods, and wavelets to the inference and predictions of stochastic (partial) differential equations and dynamical systems.

- **Stochastic (Partial) Differential Equations:** inference and prediction of stochastic (partial) differential equations.
- **Operator Learning:** learning non-linear operators using kernel methods, with applications to PDEs and integro-functional equations.
- **Dynamical Systems:** learning and predicting dynamical systems from data.
- **Generative modeling:** multiscale approaches to generative models for partial differential equations.

PUBLICATIONS AND PREPRINTS

- [1] M. Darcy, E. Calvello, R. Baptista, H. Owhadi, A. M. Stuart, and X. Yang, *Solving roughly forced nonlinear pdes via misspecified kernel methods and neural networks*, 2025. arXiv: 2501.17110.
- [2] P. Batlle, M. Darcy, B. Hosseini, and H. Owhadi, “Kernel methods are competitive for operator learning”, *Journal of Computational Physics*, vol. 496, p. 112 549, 2024, issn: 0021-9991.
- [3] M. Darcy, B. Hamzi, G. Livieri, H. Owhadi, and P. Tavallali, “One-shot learning of stochastic differential equations with data adapted kernels”, *Physica D: Nonlinear Phenomena*, vol. 444, p. 133 583, 2023.
- [4] M. Darcy, B. Hamzi, J. Susiluoto, A. Braverman, and H. Owhadi, *Learning dynamical systems from data: A simple cross-validation perspective, part ii: Nonparametric kernel flows*, Dec. 2021.

TEACHING AND OUTREACH

- **SIAM chapter - Vice-President** 2023
Organization of student talks and seminars.
- **Teaching Assistant** for graduate-level courses at Caltech 2023
ACM 118: Stochastic Processes and Regression, 2023.
- **Refresher course lecturer** for incoming graduate students at Caltech 2022
Developed and taught a course reviewing linear algebra and functional analysis.

LANGUAGES

- **English:** native.
- **French:** native.