Matthieu Darcy

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EDUCATION

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

EXPERIENCE

Janssen Pharmaceuticals - Machine learning consultant.	05/23 - Present
Machine learning and mathematical modeling for the prediction of disease progression.	
French Commission for Atomic Energy - Research intern,	05/2021-08/2021
Deep learning for hexahedral meshing.	
Imperial College London - Research project.	05/2020-09/2020
Application of Kernel Flows to regression.	

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 Differential Equations**: inference and prediction of stochastic differential equations.
- **Stochastic Partial Differential Equations**: data-driven approaches to solving SPDEs.
- **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.

COMPUTING AND PROGRAMMING

- **Python:** proficient in numpy, scikit-learn, scipy, JAX, pandas, pytorch.
- **Julia:** intermediate.
- **LaTeX:** proficient.

Publications and Preprints

[1] P. Batlle, M. Darcy, B. Hosseini, and H. Owhadi, *Kernel methods are competitive for operator learning*, 2023. arXiv: 2304.13202 [`stat.ML`].

[2] 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, ISSN: 0167-2789.

[3] 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.

Conferences and Seminars

- 10th International Congress on Industrial and Applied Mathematics, August 2023 - Presentation.
- Argonne National Lab LANS Seminar, August 2023 - Presentation.
- DataSig, Rough Path Interest Group, March 2023 - Presentation
- Workshop on Establishing Benchmarks for Data-Driven Modeling of Physical Systems (USC), April 2023 - Presentation.
- SIAM conference on the Application of Dynamical Systems, May 2023 - Presentation.
- SIAM conference on Computational Sciences and Engineering, February 2023 - Presentation.
- Third Symposium on Dynamical Systems and Machine Learning 2022 (Fields Institute) September 2022 - Poster.
- International Conference on Continuous Optimization 2022, July 2022 - Presentation.
- Caltech SIAM chapter 2022 - Presentation.
- Second Symposium on Dynamical Systems and Machine Learning 2020 (Fields Institute) - Presentation.

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.