Matthieu Darcy

Website
Email: mdarcy@caltech.edu
GitHub: github.com/MatthieuDarcy
LinkedIn: matthieu-darcy-88290a18a
Twitter: Matt_D_Darcy

Education

Caltech — Pasadena, California
Ph.D. student in Computing and mathematical Sciences. — 2021–present
Advisors: Profs. Houman Owhadi, Andrew M. Stuart.

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.