

# Theo Bourdais

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[theobourdais.github.io](https://theobourdais.github.io)

## Education

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### California Institute of Technology

PhD in Computational + Mathematical Sciences, advised by **Houman Owhadi**.

2022 - Present

Pasadena, CA

### University of Cambridge

Master of Mathematics, specialized in statistics. Graduated with distinction (highest grade).

2020 - 2021

Cambridge, UK

### Ecole polytechnique

Master of Science, specialized in Applied Maths and Theoretical Physics. Graduated top 10% of the cohort.

2017 - 2021

Palaiseau, France

## Industry Experience

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### Doc.ai

Junior Data Engineer

2021 - 2022

Remote

- Used state-of-the-art computer vision models, and created large-scale training pipelines.
- Created production-level code inside a large team of researchers and coders.
- Worked in the medical AI field with confidential patient data.

### INRIA

Research Intern

2020

Saclay, France

- Developed a method for robust optimization through quantile learning.
- Proved mathematical guarantees.
- Implementation showed significant improvements on synthetic data.

## Publications and Pre-Prints

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- **Bourdais, T.**, et al. "Computational Hypergraph Discovery, a Gaussian Process framework for connecting the dots," in arXiv preprint arXiv:2311.17007, 2023.
- **Lootus, M.**, et al. "Development and assessment of an artificial intelligence-based tool for ptosis measurement in adult myasthenia gravis patients using selfie video clips recorded on smartphones," in Digital Biomarkers, vol. 7, no. 1, pp. 63–73, 2023.

## Research Interest

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I am interested in Scientific machine learning using Gaussian processes and their applications for the study of neural networks and for computational biology. Current projects include:

- Equation discovery using data,
- Model aggregation,
- Applications of random matrix theory to enhance the accuracy of neural networks.

## Distinctions and Awards

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- **Kortschak Fellowship**: multi-year fellowship at Caltech with full scholarship.
- **Ranked 1st nationwide (France)** for competitive entry exams to Ecole polytechnique.

## Technical Skills

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**Programming Languages**: Python, C++ (bases), Java (Bases), Go (Bases), SQL (bases), LaTeX.

**Packages**: TensorFlow, PyTorch, Numpy, Sklearn, Pandas.

**Statistical Tools**: Deep understanding of kernel methods, proficiency in neural networks, statistics and machine learning (K-means, SVM, gradient boosting).

**Algorithms**: Classical algorithms (e.g. sorting, binary search, etc.), data structures (e.g. linked lists, hashmaps, etc.), Study of randomized algorithms () **Languages**: French, English, Spanish (B2)