# Théophile Sautory

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## EDUCATION

### UC BERKELEY
MS in Mechanical Engineering (PhD track)
Exp. May 2023 | Berkeley, CA
Thesis: Super-resolution of PC-MRI images with physics-informed machine learning.

### IMPERIAL COLLEGE LONDON
MS in Computer Science, Artificial Intelligence & Machine Learning
Sep. 2020 | London, UK
Thesis: Neuro-symbolic video question answering with spatio-temporal properties.

### BEng in Mechanical Engineering
Jun. 2019 | London, UK
Thesis : Turbulence modelling with artificial neural networks.

## SKILLS

### PROGRAMMING
Experienced:
Python • Julia • MATLAB
Familiar:
C/C++ (CUDA/MPI/OpenMP)

### LIBRARIES
PyTorch • TensorFlow • Scikit-learn Keras • OpenCV • Matplotlib Numpy • Scipy • Pandas

### TOOLS
Git • Github • LaTeX • GCP
Unix environment • Slurm
Abaqus • Solidworks • Fluent

## AWARDS

2021, UC Berkeley
Graduate Division Block Grant Award, Mechanical Engineering.
2016-19, Imperial College London
Engineering Dean's List (top 10%).

## EXTRACURRICULAR

Basketball
Vice-president of the Imperial College Basketball Society, and team captain, leading the 120 members to win Imperial Sports Club of the Year (2018-2019).

## EXPERIENCE

### ANSYS | Machine Learning Research Intern, CTO Office
May 2022 - Aug. 2022 | San Jose, CA
- Worked on the development of novel PDE solvers by combining Ansys Fluent with deep learning.
- Designed autoencoders and their training mechanisms for multi-objective optimization in the context of physics-informed machine learning.

### UK NATIONAL CRIME AGENCY | Artificial Intelligence Research Assistant
Apr. 2021 – Jul. 2021 | London, UK
- Built Siamese autoencoders trained with contrastive loss for crime linkage, decreasing by a factor of $\sim 5$ the number of cases to compare.
- Formalized a method to learn to rank the distinctiveness of behaviour in serial offending with inductive logic programming and Fisher's Exact tests.
- Presented our algorithms to crime analysts, and mentored them towards their application.

### SCORTEX | Machine Learning Researcher in Semi & Unsupervised Deep Learning
Sep. 2020 – Mar. 2021 | Paris, France
- Improved the ROC-AUC performance in anomaly detection on images for the MVTec dataset by 5%, leveraging descriptors of pre-trained networks with generative models and data augmentation.
- Developed low-data regimes datasets with distribution shifts to increase the robustness of our convolutional autoencoders.

## SELECTED PROJECTS

### PARALLELIZATION OF VASCULATURE TRACING
Mar. 2022 – May 2022
Collaborated with a doctoral student to parallelize a serial automatic blood vessel tracing algorithm using multiprocessing, a shared memory, local locks and spatial locality. Reduced the runtime of the algorithm by a factor of 3 using 4 processors.

### WAYMO 2D OBJECT DETECTION CHALLENGE
Apr. 2020 – May 2020
Collaborated in a group of three to fine-tune an EfficientDetd4 on 700k - 1080p images using Google Cloud Platform, an NVIDIA Tesla V100 GPU, and PyTorch. Implemented test time augmentation, mixed precision training and kmeans clustering for anchor priors to achieve an mAP of 0.58 on the task.

## SELECTED PUBLICATIONS

[1] M Law, **T Sautory**, L Mitchener, K Davies, M Tonkin, J Woodhams, D Alrajeh (2022): Learning to Rank the Distinctiveness of Behaviour in Serial Offending, International Conference on Logic Programming and Nonmonotonic Reasoning

[2] **Theophile Sautory**, Nuri Cingillioglu, Alessandra Russo (2021): HySTER: A Hybrid Spatio-Temporal Event Reasoner, Thirty-Fifth AAAI Conference on Artificial Intelligence Workshop on Hybrid Artificial Intelligence

[3] Alvaro Prat, **Theophile Sautory** & S. Navarro-Martinez (2020): A Priori Sub-grid Modelling Using Artificial Neural Networks, International Journal of Computational Fluid Dynamics