# Theophile Sautory

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## EDUCATION

**Aug '21 – present**
Berkeley CA, USA
**UNIVERSITY OF CALIFORNIA, BERKELEY | PhD in Mechanical Engineering**
**Graduate Division Block Grant Award** recipient for distinguished academic record.
**Major**: Mechanical Engineering, specialization in Fluid Mechanics. **Minor**: Computer Science.
- **Research:** Physics Informed Machine Learning and Accelerating Physics Numerical Simulations.

**Oct '19 – Sep '20**
London, UK
**IMPERIAL COLLEGE LONDON | Master of Science, Computing Specialism: AI and ML**
**Distinction**, average grade**:** 78/100 (equivalent GPA: 4.0).
- **Thesis:** Neuro-symbolic video understanding and question answering with spatio-temporal properties.
- **Experience with:** VAEs, Residual CNNs, DCGANs, RNNs, LSTMs, and DQN for reinforcement learning.

**Oct '15 – Jun '19**
London, UK
**IMPERIAL COLLEGE LONDON | Master of Engineering, Mechanical Engineering**
**First Class Honors, Dean's List (Summa Cum Laude) –** average: 81.5/100 (equivalent GPA: 4.0), rank 4/170.
- **Thesis:** Turbulence Modelling with Artificial Neural Networks.

## EXPERIENCE

**Apr '21 – Jul '21**
*(4 months)*
London, UK
**IMPERIAL COLLEGE LONDON | Research Assistant AI - ML**
- Worked with Dr. Alrajeh on developing a software tool to help the decision making of analysts in crime linkage. Managed highly sensitive data with the UK National Crime Agency and Home Office.
- Developed Inductive Logic Programming and ML (Siamese Network and Autoencoders) solutions.

**Sep '20 – Mar '21**
*(7 months)*
Paris, France
**SCORTEX | ML Research Intern**
- Designed, implemented, and prototyped research on semi-supervised and unsupervised deep learning models for anomaly detection on images. Outperformed current literature on the MVTec unsupervised anomaly detection dataset using Python, TensorFlow and OpenCV.
- Participated in weekly lab meetings to present and discuss literature for anomaly detection on images.
- Produced analysis which directly allowed to gain a new client.

**Sep '20 – Nov '20**
*(3 months)*
Remote, France
**IMPERIAL COLLEGE LONDON | Postgraduate Research Assistant AI – ML**
- Created a neuro-symbolic model for the video question answering CLEVRER (MIT Watson Lab) task.
- Incorporated a Mask R-CNN and ResNets for perception with PyTorch, alongside an Answer Set Programming framework for natural language processing and temporal and causal reasoning.

**Jun – Sep '18**
*(4 months)*
Lille, France
**VEKIA – Next Generation Supply Chain | R&D Intern in ML**
- Devised a statistical model to describe the consumer good demand in the context of censored sales as a left truncated negative binomial distribution to predict past lost and future sales.
- Built an Artificial Neural Network to learn the parameters of the distribution using TensorFlow (v1).

## ADDITIONAL RESEARCH GROUP PROJECTS

**Fluid Mechanics**
- Designed a novel gas turbine engine specifically tailored for the application of parabolic flight. Performed a CFD flow analysis around the airplane wing using Star CCM + to study the lift, drag forces and stall.

**ML**
- Waymo 2D object detection challenge: Fine-tuned an EfficientDetd4 on 700k images using Google Cloud Platform, an NVIDIA Tesla V100 GPU, and PyTorch. Achieved an mAP of 0.58 on the task deploying techniques such as test-time-augmentation and curriculum learning.

## PUBLICATIONS

[1] Pierre Gutierrez, Antoine Cordier, Thaïs Caldeira, Theophile Sautory (2021): Data augmentation and pre-trained networks for extremely low data regimes unsupervised visual inspection, Proc. SPIE 11787, Automated Visual Inspection and Machine Vision IV, 1178703, DOI: 10.1117/12.2591876.

[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, DOI: 10.1080/10618562.2020.1789116.

## COMPUTER SKILLS

**Programming:** Python and MATLAB (experienced), C++ and Embedded C (basics).
**Machine Learning, Imaging, Libraries:** PyTorch, TensorFlow, Scikit-learn, Keras, OpenCV, Matplotlib, Numpy, Scipy, Pandas.
**Tools:** Git, LaTeX, Linux environment, CUDA GPUs, Star CCM+, Google Cloud Platform, Azure ML.

## LEADERSHIP & EXTRACURRICULAR ACTIVITIES

**Vice-President** of the Imperial College Basketball Society leading the 120 members society to win **Imperial Sports Club of the Year,** out of 60+ clubs for the first time in clubs' history (2019), **Team Captain** (2018), 15 years of play.