

# THÉOPHILE SAUTORY

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## Education

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<b>University of California, Berkeley</b>	Aug. 2021 – Exp. May 2026
<b>PhD in Mechanical Engineering</b>	<i>Berkeley, CA</i>
Physics Informed Machine Learning & Accelerating CFD Simulations.	
Advisor: Philip Marcus.	
<b>Imperial College London</b>	Oct. 2019 – Sep. 2020
<b>MSc in Computing, Specialism AI &amp; ML</b>	<i>London, UK</i>
<b>Imperial College London</b>	Oct. 2015 – Jun. 2019
<b>MEng in Mechanical Engineering</b>	<i>London, UK</i>

## Experience

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<b>Imperial College London</b>	Apr. 2021 – Jul. 2021
<b>Research Assistant in AI &amp; ML</b>	<i>London, UK</i>
<ul style="list-style-type: none"><li>• Responsible for the R&amp;D of AI tools to help analysts' crime linkage decision making, collaborating with Computer Science and Psychology Professors to integrate expert knowledge in algorithms.</li><li>• Implemented Siamese Autoencoders trained with Contrastive Loss to perform crime linkage in the latent space using PyTorch, reducing the number of cases to be compared by a factor of 10.</li><li>• Formalized an ordering procedure to learn weak constraints in Inductive Logic Programming to unveil the impact of situational contexts on offenders behaviours.</li></ul>	
<b>Scortex - Quality Intelligence</b>	Sep. 2020 – Mar. 2021
<b>Machine Learning Research Intern</b>	<i>Paris, France</i>
<ul style="list-style-type: none"><li>• Prototyped and implemented research on semi and unsupervised deep learning models for anomaly detection on images. Focused on Autoencoders using CNNs, and Transfer Learning.</li><li>• Outperformed current literature on the MVTec unsupervised anomaly detection dataset using Python, TensorFlow and OpenCV, and produced analysis which directly allowed to gain a new client.</li><li>• Participated in weekly lab meetings to present and discuss literature, and brainstorm on new directions.</li></ul>	
<b>Vekia – Next Generation Supply Chain</b>	Jun. 2018 – Sep. 2018
<b>R&amp;D Intern in Machine Learning</b>	<i>Lille, France</i>
<ul style="list-style-type: none"><li>• Worked in hand with senior researchers to devise 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.</li><li>• Built an Artificial Neural Network to learn the parameters of the distribution using TensorFlow (v1).</li></ul>	

## Projects

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<b>Neuro-Symbolic AI for Video Question Answering</b>	Mar. 2020 - Nov. 2020
<ul style="list-style-type: none"><li>• Developed a neuro-symbolic model for the video question answering CLEVRER task (HySTER, 2021).</li><li>• Incorporated a Mask R-CNN for segmentation, ResNets for depth estimation, alongside an Answer Set Programming framework for natural language processing and temporal and causal reasoning.</li></ul>	
<b>Waymo 2D Object Detection Challenge</b>	Apr. 2020 - May. 2020
<ul style="list-style-type: none"><li>• Worked in a group of three to fine-tune an EfficientDet4 on 700k - 1080p images using Google Cloud Platform, an NVIDIA Tesla V100 GPU, and PyTorch.</li><li>• Implemented techniques such as Test Time Augmentation, mixed precision training, and kmeans clustering for anchor priors, achieving an mAP of 0.58 on the task.</li></ul>	

## Turbulence Modelling with Artificial Neural Networks

Oct. 2018 - Jun 2019

- Formulated a new turbulence model to close the filtered Navier-Stokes equations for sub-grid Large Eddy Simulation (LES) model using artificial neural networks.
- Improved model correlation coefficients when compared with classical turbulence models using the same input features on datasets from the Johns Hopkins turbulence database.
- Worked with my supervisor and classmate to publish our research (A Priori Sub-grid Modelling, 2020).

## Technical Skills

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**Programming:** Python and MATLAB (experienced), C++ and Embedded C (basics).

**Libraries:** PyTorch, TensorFlow, Scikit-learn, Keras, OpenCV, Matplotlib, Numpy, Scipy, Pandas.

**Tools:** Git, Github, LaTeX, Unix environment, CUDA GPUs, Star CCM+, Google Cloud Platform.

## Leadership and Extracurricular

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**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.

## Awards

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UC Berkeley <b>Graduate Division Block Grant Award</b> , Mechanical Engineering	2021
Imperial College London Engineering <b>Dean's List</b> (top 10%)	2016, 2017, 2018, 2019

## Publications

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- [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.