

# Mathieu Nalpon

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## EDUCATION

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- **CentraleSupélec - Paris Saclay University** Paris, France  
*Master's degree in Mathematics and Data Science* Sept. 2019 – Oct. 2022
- **Cachan University** Paris, France  
*Bachelor of Engineering* Sept. 2016 – July. 2019

## EXPERIENCE

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- **ArianeGroup Defense & Space** Paris, France  
*Data Scientist* Sept. 2021 - Oct. 2022
  - **Autonomous Neutralization of a launcher:** Worked on state-of-the-art solution for autonomous neutralization of a launcher. I coded and performed several simulations around an internal algorithm to validate the neutralization.
    - \* Implemented and performed tests to select suitable parameters available in the rocket to input it into the algorithm.
    - \* Simulated in perfect condition the case of trajectory deviation and neutralization. Then I added multiple noises to validate correct reaction in real flight.
  - **Refining a launcher's lifetime through post-neutralization debris fallout:** The neutralization of a rocket results in a scattering of debris across the Atlantic. I was tasked with designing and coding from scratch a Python algorithm that calculates the dispersion and encompass the debris of a neutralized rocket.
    - \* Used statistical methods to obtain the continuous probability density of rocket debris.
    - \* Used computational geometry algorithms to get the convex hull encompassing the debris.
    - \* Added clustering methods in case of multi-modal density to locate high-intensity zones.
- **ArianeGroup Defense & Space** Paris, France  
*Software Engineer* Oct. 2020 – Apr. 2022
  - **Rocket trajectory prediction and launcher lifetime:** During a flight test, a launcher may experience failures, causing it to change course. If deemed dangerous, it is immediately neutralized. I have entirely designed and coded a software program that gives the "lifetime" of a launcher.
    - \* Designed and coded a program to predict the trajectory of the launcher.
    - \* Added calculation taking into account trajectory disturbance/deviation.
    - \* Optimized the non-linear functions in the code to reduce the time complexity.

## PROJECTS

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- **Fine-tuning segment anything:** PEFT of segment anything model with LoRA to do inpainting with stable diffusion. Webui with gradio.
- **Cats generator:** Used a DCGAN to generate cats and learned the difficulty of training GANs.
- **Data Challenge ENS - Learning biological properties of molecules from their structure:** Prediction of new chemical compounds using machine learning algorithms. I used kernels, ensemble methods, SVR, boosting and neural nets.
- **Private Kaggle Competition - Plankton Classification to asses the quality of the marine ecosystem:** I had to classify 86 species of plankton with an unbalanced dataset. Used data augmentation (blur, rotation, translation) to balance the dataset. Predicted plankton with VGG and ResNet.
- **Viral Tweet Predictor:** Tweet retrieval and preprocess stream with kafka, pipeline of a Hawkes Process (predictor). Containerized with Docker and orchestrated with Kubernetes (vertical scalability and robustness testing).

## PROGRAMMING SKILLS

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- **Languages:** Python, Pytorch, SQL, C++(basics)
- **Technologies:** Azure, Kafka, Git, Docker, Kubernetes, React Native, Flask