

# Tom Marty

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## EDUCATION

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### Polytechnique Montréal

*Master Thesis in Operationnal Research, Computer Science - CORAIL Research Group*

Sep. 2021 –

Montréal Canada

- **Courses :** Représentation Learning (Aaron Courville) | Spectral Graph Theory (Guy Wolf) | Continual Learning (Irina Rish)
- **SeaPearl (Thesis) - Supervised by Quentin Cappart and Louis-Martin Rousseau:** Using Reinforcement-Learning and Graph Representation Learning to accelerate discrete optimization problem solving process - one paper in preparation for **CPAIOR 2023**

### Ecole Polytechnique - X 2018

*Bachelor Of Science in Computer Science, Minor in Applied Mathematics - GPA 3.84*

Sep. 2018 – Jun. 2021

Palaiseau, France

- **Theoretical Computer Science :** Graph Theory | Computational Geometry | Advanced Algorithmic
- **Applied Mathematics :** Optimisation | Statistical modeling | Deep Learning
- **Computer Graphics :** Computer Vision | Image Processing and Rendering

### Lycée Jean-Baptiste Say

*"Classe préparatoire" Intensive multi-disciplinary program leading to entrance exams - GPA 4.00*

Sep. 2016 – Jun. 2018

Paris, France

## EXPERIENCE

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### Research Supervisor

*Corail Research Group*

Jan. 2022 – Sept. 2022

Montréal, Canada

- Supervised five interns on the development of the open-source project SeaPearl
- Teaching Assistant for the course INF8215 given by Quentin Cappart

### Research Engineer Intern

*Corail Research Group*

Jan. 2021 – Sept. 2021

Montréal, Canada

- Developed *SeaPearl* : an open-source RL-driven generic Constraint Programming solver
- Used Deep Q-networks and Heterogeneous GNNs to approximate optimal decision process

### Software Engineer Intern

*Dronisos, drone light show company*

Jun. 2020 – Sept. 2020

Bordeaux, France

- Developed *Harmony*, a Physics based meta-heuristic that secures massive drone swarms ( NP-Complete )
- *Harmony* - currently in use - reduced the allocated securing time from 2 weeks (handmade) to 2 seconds
- Achieved automatic securing on the company first 1000 drones choreography (+500k\$ show)

### Teaching Assistant

*Ministry of National Education*

Nov. 2018 – Mar. 2019

Noyon, France

- Responsible for a group of up to 20 undergraduate students during scientific workshops
- Worked alongside the academic team to prepare students for entrance exams

## PROJECTS

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### SeaPearl : an Open-Source RL-driven Constraint Programming Solver | *Julia*

Fev. 2021 –

- Please visit this link for detailed explanations

### Adversarial Attacks on Sentiment Classification models | *Python, HuggingFace*

Fev. 2022 – May. 2022

- Adversarial fine-tuning on large NLP models : Eleuther AI GPT 125M/1.3B/2.7B/6B parameters
- Evidence of a correlation between scaling and robustness against increasingly subtle Adversarial Attacks
- Project coordinated by Irina Rish, AI CIFAR Chair holder, MILA

### Diffusion Geodesic distance for non-linear dimensionality reduction | *Python*

Oct. 2021 – Jan. 2022

- Approximated the geodesic distance using a diffusion process over the manifold

- Proposed a new data visualization algorithm based on Multi-Dimensionnal Scaling and Diffusion Geodesic

**Autonomous Drone Swarm Deployment - DGA contest** | *Python, PyTorch* Nov. 2020 – Mar. 2021

- Multi-agent Q-Learning method for deployment optimization
- Density-Based Spatial Clustering for point of interest detection

**Realtime 3D Deep Motion Capture** | *C++, OpenCV, PyTorch* Oct. 2020 – Dec. 2020

- Implemented a method of inferring a full character's 3d pose using only a camera as an input
- Used a EECV 2020 research paper to implement the algorithm

**Sketch-based Shape Retrieval** | *Python, C++, OpenGL* Sep. 2020 – Dec. 2020

- Implemented a method to find any specific 3d model in a database using a drawing as an input
- Succeeded to faithfully retrieve several simple 3D shapes by using a single drawing given by a user

## STUDENT ASSOCIATION

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**Public Speaking Club: Rethorix** Oct. 2019 – Oct. 2020

- Organization of an eloquence contest between the schools of the Plateau de Saclay

**President of Nuit du Styx** Nov. 2020

- General organization and logistic of an electronic music festival gathering more than 2000 peoples

## SKILLS & HOBBIES

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**Languages:** French : Native | English : Fluent | Russian : Primary

**Programming Languages:** Python, C++, Julia, R, Pytorch

**Developer Tools:** Pycharm, CLion, Git, SCRUM Framework

**Open-Source web service deployment:** Nextcloud, Nginx, Swag, OpenMediaVault

**Remote Controlled UAV:** Conception, Building, Programmation, Testing, Adjustment

**Sports:** Outdoor climbing, Ski, Mountain hiking