


# Tom Marty

 [3rdcore.github.io](https://3rdcore.github.io)  
 Github

 tom.marty@mila.quebec  
 LinkedIn

Montreal, Canada  
 Twitter

## EDUCATION

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### MILA - Montréal Institute of Learning Algorithms

*Ph.D. in Machine Learning*

Jan. 2024 –

Montréal, Canada

- **Courses :** Causal Inference (Dhanya Sridhar)

### Polytechnique Montréal

*M.Sc. in Operationnal Research - GPA 3.91*

Sep. 2021 – Jun. 2023

Montréal, Canada

- **Courses :** Représentation Learning (Aaron Courville) | Spectral Graph Theory (Guy Wolf) | Continual Learning (Irina Rish)

### 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

## INDUSTRY AND ACADEMIC EXPERIENCE

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### Visiting Researcher

*ServiceNow Research*

Apr. 2023 – Sept. 2023

Montréal, Canada

- Developed WorkArena : an open-source Benchmark and Gym environment for evaluating Agent at solving common-knowledge tasks on a Web Browser

### 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 in Fall 21 and Fall 22

### 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
- *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)

## PUBLICATIONS

### Learning a Generic Value-Selection Heuristic Inside a Constraint Programming Solver

**Tom Marty\***, Tristan François, Pierre Tessier, Louis Gautier, Léo-Boisvert, Louis-Martin Rousseau, Quentin Cappart, (extended version)

Constraint Journal

*\*under review*

### WorkArena: How Capable Are Web Agents at Solving Common Knowledge Work Tasks?

Alexandre Drouin, Maxime Gasse, Massimo Caccia, Issam H Laradji, Manuel Del Verne, **Tom Marty**, Léo Boisvert, Megh Thakkar, Quentin Cappart, David Vazquez, Nicolas Chapados, Alexandre Lacoste

International Conference on Machine Learning (ICML). 2024.

[Project](#) [Code](#) [PDF](#)

### The Unsolved Challenges of LLMs as Generalist Web Agents: A Case Study

Rim Assouel\*, **Tom Marty\***, Massimo Caccia, Issam H. Laradji, Alexandre Drouin, Sai Rajeswar, Hector Palacios, Quentin Cappart, David Vazquez, Nicolas Chapados, Maxime Gasse, Alexandre Lacoste

Foundation Models for Decision Making Workshop (NeurIPS). 2023.

[PDF](#)

### Learning a Generic Value-Selection Heuristic Inside a Constraint Programming Solver

**Tom Marty\***, Tristan François, Pierre Tessier, Louis Gautier, Louis-Martin Rousseau, Quentin Cappart

Constraint Programming (CP). 2023.

[Code](#) [PDF](#)

## OTHER PROJECTS

**Leveraging Information Theory to create better optimizers** | *Python*

May. 2024 –

- Work in progress...

**On the necessity of human insight to improve natural adversarial robustness**

Mar. 2024 –

- Work in progress...

**WebArena : an Open-Source Benchmark for evaluating Web Agents** | *Python*

Apr. 2023 – Sept. 2023

- Paper accepted at ICML 2024, Vienna

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

Fev. 2021 – Jul. 2023

- Paper accepted at CP2023, Toronto

**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

**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-Dimentionnal 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
- Inspired by 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

## HONORS AND AWARDS

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Distinguished Paper Award at CP2023, Toronto	Sept. 2023
MITACS Accelerate scholarship of two units for my internship at ServiceNow Research	Mar. 2023
Oustanding Investment Mention, Ecole Polytechnique de Paris	Jul. 2022
Vallet Fondation scholarships for outstanding CPGE students	2018

## TEACHING EXPERIENCE

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<b>Teaching Assistant</b> <i>INF8215, Artificial Intelligence : Algorithms and methods</i>	Fall 2022
<b>Teaching Assistant</b> <i>INF8215, Artificial Intelligence : Algorithms and methods</i>	Fall 2021
<b>Teaching Assistant</b> <i>Ministry of National Education</i>	Nov. 2018 – Mar. 2019 <i>France</i>
<ul style="list-style-type: none"><li>• Responsible for a group of up to 20 undergraduate students during scientific workshops</li><li>• Worked alongside the academic team to prepare students for entrance exams</li></ul>	

## STUDENT ASSOCIATION

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<b>Public Speaking Club: Rethorix</b> <ul style="list-style-type: none"><li>• Organization of an eloquence contest between the schools of the Plateau de Saclay</li></ul>	Oct. 2019 – Oct. 2020
<b>President of Nuit du Styx</b> <ul style="list-style-type: none"><li>• General organization and logistic of an electronic music festival gathering more than 2000 peoples</li></ul>	Nov. 2020

## SKILLS & HOBBIES

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**Languages:** French : Native | English : Fluent | Russian : Primary  
**Programming Languages:** Python, Julia, C++, R  
**Developer Toolbox:** Git, Pytorch, Lightning, Hydra, WandB, VScode, SLURM, CI testing  
**Remote Controlled UAV:** Conception, Building, Programmation, Testing, Adjustment  
**Activities:** Outdoor climbing, river surf, ski, montain hiking

## REFERENCE

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**Prof. Dhanya Sridhar** (Ph.D. advisor)  
Core academic member of MILA - AI CIFAR Chair holder  
Email : dhanya.sridhar@mila.quebec

**Dr. Alexandre Lacoste**  
Staff Research Engineer, ServiceNow Research  
Email : alexandre.lacoste@servicenow.com

**Prof. Quentin Cappart** (M.Sc. advisor)  
Assistant Professor at Polytechnique Montréal  
Email : quentin.cappart@polymtl.ca