


# Tom Marty

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

 [tom.marty@mila.quebec](mailto:tom.marty@mila.quebec)  
 LinkedIn

Montreal, Canada  
 Twitter

## EDUCATION

<b>Ph.D. in Machine Learning</b> <i>MILA - Montréal Institute of Learning Algorithms - GPA 4.00</i>	Jan. 2024 – <i>Montréal, Canada</i>
<b>M.Sc. in Machine Learning</b> <i>Polytechnique Montréal - GPA 3.91</i>	Sep. 2021 – Jun. 2023 <i>Montréal, Canada</i>
<b>B.Sc. in Computer Science, minor in Applied Mathematics</b> <i>X 2018, Ecole Polytechnique - GPA 3.84</i>	Sep. 2018 – Jun. 2021 <i>Palaiseau, France</i>
<b>Lycée Jean-Baptiste Say</b> <i>"Classe préparatoire" Intensive multi-disciplinary preparation - GPA 4.00 - Top 0.1% national</i>	Sep. 2016 – Jun. 2018 <i>Paris, France</i>

## RESEARCH INTEREST




- **Broad interest** : Artificial intelligence, Machine Learning, Generative AI and Operational Research
- **Methodological interest** : **Causality**, Bayesian Statistics, OOD Generalization, Information Theory
- **Applications** : Fairness, Robust Machine Learning, Open-Ended Decision Making, AI for video-games

## INDUSTRY AND ACADEMIC EXPERIENCE


<b>Visiting Researcher</b> <i>ServiceNow Research</i> <ul style="list-style-type: none"><li>• Developed WorkArena (ICML2024): an open-source Benchmark and Gym environment for evaluating Agent at solving common-knowledge tasks on a Web Browser</li></ul>	Apr. 2023 – Sept. 2023 <i>Montréal, Canada</i>
<b>Research Supervisor</b> <i>Corail Research Group</i> <ul style="list-style-type: none"><li>• Supervised five interns on the development of the open-source project SeaPearl</li><li>• Teaching Assistant for the course INF8215 given by Quentin Cappart in Fall 21 and Fall 22</li></ul>	Jan. 2022 – Sept. 2022 <i>Montréal, Canada</i>
<b>Research Engineer Intern</b> <i>Corail Research Group</i> <ul style="list-style-type: none"><li>• Developed <i>SeaPearl</i> : an open-source RL-driven generic Constraint Programming solver</li><li>• Used Deep Q-networks and Heterogeneous GNNs to approximate optimal decision process</li></ul>	Jan. 2021 – Sept. 2021 <i>Montréal, Canada</i>
<b>Software Engineer Intern</b> <i>Dronisos, drone light show company</i> <ul style="list-style-type: none"><li>• Developed <i>Harmony</i>, a Physics based meta-heuristic that secures massive drone swarms</li><li>• <i>Harmony</i> - currently in use - reduced the allocated securing time from 2 weeks (handmade) to 2 seconds</li><li>• Achieved automatic securing on the company first 1000 drones choreography (+500k\$ show)</li></ul>	Jun. 2020 – Sept. 2020 <i>Bordeaux, France</i>

## 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, 2024 \*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, Pytorch Lightning* May. 2024 –  
• Work in progress...
- On the Necessity of Human Insight and Causality to Improve Adversarial Robustness** Mar. 2024 –  
• Work in progress...
- WorkArena : an Open-Source Benchmark for evaluating Web Agents** | *Python* Apr. 2023 – Mar. 2024  
• Paper accepted at ICML 2024 Vienna, presented at NVIDIA GTC 2024
- 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-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  
• 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

Visit  my website to delve into these projects...

## HONORS AND AWARDS

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

## TEACHING EXPERIENCE

- Teaching Assistant** Fall 2022  
*INF8215, Artificial Intelligence : Algorithms and methods*
- Teaching Assistant** Fall 2021  
*INF8215, Artificial Intelligence : Algorithms and methods*
- Teaching Assistant** Nov. 2018 – Mar. 2019  
*Ministry of National Education* 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

## REVIEWING AND COMMUNITY SERVICE

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Reviewer, Montréal Artificial Intelligence Symposium — MAIS2024

Sept. 2024

Reviewer, Constraint Programming — CP2023

August. 2023

## 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

**Developer Toolbox:** Git, Pytorch, Lightning, Hydra, WandB, VScode, SLURM, CI testing

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

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

**Activities:** Outdoor climbing, river surf, ski, mountain 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