

# PASCALE GOURDEAU

Vector Institute Postdoctoral Research Fellow

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## RESEARCH INTERESTS

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Learning theory, robustness, trustworthy machine learning

## EDUCATION & ACADEMIC EMPLOYMENT

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### Postdoctoral Research Fellow

2023 – Present

Vector Institute & University of Toronto

Supervisors: Nicolas Papernot and Shai Ben-David

### DPhil (PhD) in Computer Science

2017 – 2023

University of Oxford

Supervisors: James Worrell, Varun Kanade and Marta Kwiatkowska

Thesis title: *Sample Complexity of Robust Learning against Evasion Attacks*

Medical leaves: October 2019 – April 2020; October 2020 – April 2021

### M.Sc. in Computer Science

2017

McGill University, Montreal

Supervisors: Prakash Panangaden and Doina Precup

Thesis Title: *Bisimulation Pseudometrics for Weighted Finite Automata*

Overall GPA: 4/4

### B.Sc. in Computer Science (Honours)

2012 – 2016

McGill University, Montreal

Minor in Mathematics

Overall GPA: 3.94/4

## EMPLOYMENT AND TEACHING EXPERIENCE

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### Trinity College, University of Oxford

December 2022

*Undergraduate Admissions Interviewer*

Oxford, UK

- Underwent Oxford admissions and interview training
- Assisted in reviewing candidates' applications, and interviewing and recommending applicants

### Wadham College, University of Oxford

2022 – Present

*Course Tutor (grading assignments, reviewing them one-on-one 1h/week)*

Oxford, UK

- Probability & Computing: Winter 2023
- Computational Learning Theory: Fall 2022

### Department of Computer Science, University of Oxford

2018 – Present

*Course Teacher and Marker (grading assignments, reviewing them w/ students 1h/week)* Oxford, UK

- Computational Learning Theory: Fall 2021, Fall 2022
- Machine Learning: Fall 2018

### Department of Computer Science, McGill University

2016 – 2017

*Teaching Assistant (grading assignments and exams, holding office hours)*

Montreal, Canada

- Programming Languages and Paradigms: Winter 2017
- Logic and Computation: Fall 2016

- Foundations of Programming: Summer 2016

**Reasoning and Learning Lab<sup>1</sup>, McGill University**

*Research Assistant*

*Summers 2014 and 2015*

*Montreal, Canada*

- Summer 2015: automata theory research. Themes: minimization and approximation algorithms for automata, bisimulation metrics. Supervised by Prakash Panangaden.
- Summer 2014: medical application of machine learning. Project: using machine learning classification algorithms to predict extubation readiness in extreme preterm infants. Supervised by Doina Precup.

## **DISTINCTIONS AND AWARDS**

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**Natural Sciences and Engineering Research Council Postdoctoral Fellowship** *2023*

Two years of funding for postdoctoral research at the Vector Institute

**Graduate Scholarship** *2019, 2022*

Awarded by Trinity College, Oxford for outstanding graduate research

**Clarendon Scholarship** *2017*

Three and a half years of funding (tuition fees and living expenses) for the DPhil in Computer Science at the University of Oxford

**Natural Sciences and Engineering Research Council Postgraduate Doctoral Scholarship** *2017*

Three years of funding for the DPhil in Computer Science at the University of Oxford

**Natural Sciences and Engineering Research Council Graduate Scholarship** *2016*

Funding for the M.Sc in Computer Science at McGill University

**Anita Borg Memorial Scholarship** *2015*

Scholarship from Google recognizing women's contribution and leadership in Computer Science

**Natural Sciences and Engineering Research Council Undergraduate Student Research Award** *2015*

Summer research funding in the Reasoning and Learning Lab at McGill University

**Science Undergraduate Research Award** *2014*

Summer research funding in the Reasoning and Learning Lab at McGill University

**Full scholarship to attend Lester B. Pearson UWC** *2010*

International boarding school network (United World Colleges) working towards peace and a sustainable future. Programme: International Baccalaureate (2 years)

## **PUBLICATIONS**

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### **Journal Publications**

1. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, "On the hardness of robust classification," in *Journal of Machine Learning Research (JMLR)*, 2021.
2. Borja Balle, **Pascale Gourdeau**, and Prakash Panangaden, "Bisimulation metrics and norms for real-weighted automata," in *Information and Computation*, 2020.

### **Conference Publications and Preprints**

1. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, "When are local queries useful for robust learning?," in *36th Conference on Neural Information Processing Systems (NeurIPS)*, 2022.

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<sup>1</sup>Now joint with Mila.

2. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, “Sample complexity bounds for robustly learning decision lists against evasion attacks,” in *International Joint Conference on Artificial Intelligence (IJCAI)*, 2022. [long presentation]
3. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, “On the hardness of robust classification,” in *33rd Conference on Neural Information Processing Systems (NeurIPS)*, 2019. [spotlight]
4. Borja Balle, **Pascale Gourdeau**, and Prakash Panangaden, “Bisimulation metrics for weighted automata,” in *44th International Colloquium on Automata, Languages, and Programming (ICALP), Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik*, 2017.
5. **Pascale Gourdeau**, Lara Kanbar, Wissam Shalish, Guilherme Sant’Anna, Robert Kearney, and Doina Precup, “Feature selection and oversampling in analysis of clinical data for extubation readiness in extreme preterm infants,” in *2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 4427–4430, IEEE, 2015.

## Workshops

1. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, “When are local queries useful for robust learning?,” in *Women in Machine Learning Workshop (WiML)*, concurrent with NeurIPS, 2022. [oral presentation]
2. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, “On the hardness of robust classification,” in *Women in Machine Learning Workshop (WiML)*, concurrent with NeurIPS, 2019.
3. **Pascale Gourdeau**, Varun Kanade, Marta Kwiatkowska, and James Worrell, “On the hardness of robust classification,” in *Machine Learning with Guarantees Workshop*, concurrent with NeurIPS, 2019.

## INVITED TALKS

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### Sample Complexity Bounds for Robust Classification

- University of British Columbia
- University of Victoria, British Columbia
- University of Princeton
- Université Laval, Quebec City

### On the Hardness of Robust Classification

- Mila, McGill University/Université de Montréal
- IRIF, Université de Paris
- LabRI, Université de Bordeaux

### Bisimulation Metrics for Weighted Finite Automata

- University of Warwick
- University College London
- Verification seminar, University of Oxford

## PROFESSIONAL SERVICE

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**Chairmanship:** Area Chair, *Women in Machine Learning Workshop 2022*

**Conference and Workshop Reviewing:** *COLT 2019, 2023; NeurIPS 2021 – 2023; ICLR 2023; WiML Workshop 2019*