

Sophie Berthelette

Postdoctoral Researcher


Università della Svizzera italiana (USI), Faculty of Informatics


✉ berthelette.sophie@gmail.com 📞 +41 78 246 85 48 🌐 <https://usi.to/bc7z>

Current Position

Postdoctoral Researcher 06/2025 – Present
USI, Faculty of Informatics, Lugano, Switzerland
Project: The Informatics of heat, time, and causality

Education

PhD in Physics 01/2020 – 01/2025
Université de Montréal, Canada
Supervisor: Gilles Brassard
Title: Physics in the information age; an algorithmic reinterpretation of statistical mechanics 

MSc in Physics 09/2017 – 08/2019
Université de Montréal, Canada
Supervisor: Gilles Brassard
Title: Kolmogorov complexity and quantum correlations; a study of the magic square 

BSc in Physics 10/2014 – 06/2017
Université de Montréal, Canada

Scholarships

- *Doctoral Completion Scholarships*, Études supérieures et postdoctorales – Université de Montréal, 2024. Amount: 8 000 CAD.
- *International Internship Program Scholarship*, Transdisciplinary Institute for Quantum Information (INTRIQ), 2023. Amount: 2 000 CAD.
- *Merit Scholarship*, Études supérieures et postdoctorales – Université de Montréal, 2023. Amount: 5 000 CAD.
- *Merit Scholarship*, Études supérieures et postdoctorales – Université de Montréal, 2022. Amount: 5 000 CAD.
- *International Internship Program Scholarship*, Fond de Recherche du Québec - Nature et Technologies (FRQNT), 2019. Amount: 5 000 CAD.
- *Arthur Yelon - John Brebner Scholarship*, Regroupement Québécois sur les matériaux de pointe (RQMP), 2015. Amount: 1 000 CAD.

Awards and Honors

- Best Presentation Award, *INTRIQ Student Conference*, 2021
- Best Poster Award, *Fall INTRIQ Meeting*, 2020
- Honorable Mentions – Recognized by the Dean of the Faculty of Arts and Sciences as an outstanding student, *Université de Montréal*, 2015 (2), 2016 (2), 2017

Academic Visits

- USI – Cryptography and Quantum Information Group** 03/2022 – 06/2022
Project title: Constructor theory and infodynamics
- USI – Cryptography and Quantum Information Group** 04/2019 – 05/2019
Project title: Turing computability and Kolmogorov complexity

Research Internships

- Université de Montréal – CERN (ATLAS)** 05/2016 – 08/2016
Project title: Reduction of electron charge misidentification using a BDT analysis on Zee sample
- Université de Montréal – RQMP** 05/2015 – 08/2015
Project title: Study of the properties of amorphous silicon using gold ion implantation

Teaching Experience

As lecturer

- **PHY1901 – Mechanics and Modern Physics** 2021
Université de Montréal

As teaching assistant



- **IFT3155 – Quantum Information** 2018, 2019, 2021, 2023
Université de Montréal
- **PHY1901 – Mechanics and Modern Physics** 2018 – 2020
Université de Montréal
- **PHY1902 – Electricity and Optics** 2018
Université de Montréal
- **PHY1651 – Classical Mechanics I** 2015 – 2016
Université de Montréal

Supervision and Mentoring

- BSc thesis, Jiang, J. CHSH game and PT games, USI, 2022

Publications

Peer-reviewed articles

- Bédard, C. A., Berthelette, S., Coiteux-Roy, X., Wolf, S. (2025). Temperature as joules per bit. *American Journal of Physics*, 93(5), 390-395. 
- Berthelette, S., Brassard, G., Coiteux-Roy, X. (2024). On computable numbers, with an application to the Druckproblem. *Theoretical Computer Science*, 1002, 114573. 

Preprints / In preparation

- Bédard, C. A., Berthelette, S., Coiteux-Roy, X., Wolf, S. (2025). A Non-Probabilistic Approach to Classical Statistical Mechanics. In preparation.

Conference Presentations

- Temperature as Joules per Bit. *DPG Spring Meeting of the Condensed Matter Section*, Dresden, Germany. 2026.
- Temperature as Joules per Bit. *Foundations of Physics Conference*, Bristol, United Kingdom. 2023.
- Physics Revisited: Exploring the Land of Counterfactuals. *Conférence étudiante de l'INTRIQ*, Bromont, Canada. 2022.
- Can the CHSH Game Be Transformed into a Pseudo-Telepathy Game? *Conférence étudiante de l'INTRIQ*, Bromont, Canada. 2021.
- CHSH Game and Magic Square Pseudo-Telepathy Game. *Conférence étudiante de l'INTRIQ*, Bromont, Canada. 2020.
- Reduction of electron charge misidentification using a multivariate data analysis. *ATLAS Canada - Summer Student presentations*, Montreal, Canada. 2016.

Academic Service

- Reviewer, *American Journal of Physics*, 2025
- Head of the student council, *INTRIQ*, 2020 – 2024
- Graduate studies coordinator, *University of Montreal Physics Student Association*, 2017

Languages

French (native speaker), English (full proficiency), Italian (A2 - USI certification).

References

Prof. Gilles Brassard – PhD & MSc Supervisor

Department of Computer Science and Operations Research, Université de Montréal

✉ brassard@iro.umontreal.ca

Prof. Stefan Wolf – Postdoctoral Supervisor

Faculty of Informatics, Università della Svizzera italiana

✉ wolfs@usi.ch

Prof. Xavier Coiteux-Roy – Co-author

Department of Computer Science & Department of Physics and Astronomy, University of Calgary

✉ xavier.coiteuxroy@ucalgary.ca

Dr. Charles Alexandre Bédard – Co-author

Department of Software Engineering and Information Technology, École de technologie supérieure

✉ charles.alexandre.bedard@etsmtl.ca