BERNARDO SUBERCASEAUX

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EDUCATION

Carnegie Mellon University, PA, United States — August 2021 - (expected) August 2026
5th PhD student, advised by Marijn J. H. Heule.

University of Chile, Chile — March 2014 - December 2020
Master in Computer Science (GPA 7.0/7.0), under the supervision of Pablo Barceló and Jorge Pérez.
Double Bachelor in Engineering and Computer Science (GPA 7.0/7.0), 2019.
1st place in Latin American Contest of Master theses in Artificial Intelligence IEEE LA-CCI.

CentraleSupélec (ex École Centrale Paris), France — September 2016 - June 2018
Bachelor + Master in Engineering - Computer Science (GPA 3.58/4.00)
Received the Eiffel Excellence Scholarship from the French government.

PUBLICATIONS

30. **JAIR 2025** (journal version) *"On Computing Probabilistic Explanations for Decision Trees"*, with M Arenas, P. Barceló, A. Kozachinskiy, and M. Romero.
29. **PODS 2025 (Distinguished paper award, invited to special issue of TODS)**, *"Explaining k-Nearest Neighbors: Abductive and Counterfactual Explanations"*, with P. Barceló, A. Kozachinskiy, M. Romero, and J. Verschae.
28. **ModRef 2025**, *"Asymptotically Smaller Encodings for Graph Problems and Scheduling"* (single author).
27. **CICM 2025**, **(Best paper award)**, *"Automated Symmetric Constructions in Discrete Geometry"*, with L. Qian, and M. Heule.
26. **CADE 2025**, *"Unfolding Boxes with Local Constraints"*, with L. Qian, E. Wang, and M. Heule.
25. **INFOCOM 2025**, *"Latency Guarantees for Caching with Delayed Hits"*, with K. Gurushankar, and N. Singer.
24. **AAAI 2024**, *"Probabilistic Explanations for Linear Models"* with M. Arenas and K. Meel.
23. **CG 2024**, *"A Mathematical Analysis of PlaceIt: A Game of Perfect Online Sorting"*, with P. Cuevas-Ruíz, and C. Chock.
22. **KR 2024**, *"A Uniform Language to Explain Decision Trees"*. with M. Arenas, P. Barceló, J. Caraball, and D. Bustamante.
21. **arXiv preprint 2024**, *"A Demigod's Number for the Rubik's Cube"*, with A. Merino.
20. **CICM 2024 (Best paper award runner-up)**, *"Automated Mathematical Discovery and Verification: Minimizing Pentagons in the Plane"*. with J. Mackey, M. Heule, and R. Martins.
19. **ITP 2024**, *"A Formal Verification of the Empty Hexagon Number"*. with W. Nawrocki, J. Gallicchio, C. Codel, M. Carneiro, and M. Heule.
18. **arXiv preprint 2024**, *"Pentagon Minimization without Computation"*, with J. Mackey.
17. **LPAR 2024**, *"Sometimes Hoarding is Harder than Cleaning: NP-hardness of Maximum Blocked-Clause Addition"* (single author).
16. **FUN 2024**, *"PackIt! Gamified Rectangle Packing"*. with T. Garrison and M. Heule.
15. **NAW 2024**, *"A proof long enough to stump Leonhard Euler"*. with M. Heule.

14. **LPAR 2023 (Best paper award)**, *"Toward Optimal Radio Colorings of Hypercubes via SAT-solving"*. with M. Heule.
13. **TACAS 2023 (Featured in Quanta Magazine, Best paper award nomination, invited to special issue of JAR)**, *"The Packing Chromatic Number of the Infinite Square Grid is 15"*. with M. Heule.
12. **TCS 2022** (journal version) *"On the expressiveness of Lara: A proposal for unifying linear and relational algebra"*, with P. Barceló, N. Higuera and J.Pérez.
11. **SAT 2022**, *"The Packing Chromatic Number of the Infinite Square Grid is at Least 14"*, with M. Heule.
10. **NeurIPS 2022**, *"Augmenting Online Algorithms with ε-Accurate Predictions"*. with A. Gupta, D. Panigrahi and K. Sun.
9. **NeurIPS 2022**, *"On Computing Probabilistic Explanations for Decision Trees"*. with M. Arenas, P. Barceló, and M. Romero.
8. **FUN 2022**, *"Wordle is NP-hard"*. with D. Lokshtanov.
7. **NeurIPS 2021 (Spotlight, $< 3\%$)**, *"Foundations of Symbolic Languages for Model Interpretability"*. with M. Arenas, D. Baez, P. Barceló, and J. Pérez.
6. **NeurIPS 2020**, *"Model Interpretability through the lens of Computational Complexity"*. with P. Barceló, M. Monet and J. Pérez.
5. **AFCI@NeurIPS 2020**, *"Foundations of Languages for Interpretability and Bias Detection"*. with P. Barceló and J. Pérez.
4. **ICDT 2020**, *"On the Expressiveness of LARA: A Unified Language for Linear and Relational Algebra"*. with P. Barceló, N. Higuera and J.Pérez.
3. **FUN 2021**, *"The Computational Complexity of Evil Hangman"*. with J. Barbay.
2. **DEEM 2019** & **AMW 2019**, *"Expressiveness of Matrix and Tensor Query Languages in terms of ML Operators"*. with P. Barceló, N. Higuera and J.Pérez.
1. **IOI Journal 2016**, *"Wavelet Trees for Competitive Programming"*. with R. Castro, N. Lehman and J. Pérez.

RESEARCH INTERNSHIPS

- **Amazon**, Automated Reasoning Group, Applied Scientist Intern, supervised by Mike Whalen (June 2024 - August 2024)
- **Amazon**, Automated Reasoning Group, Applied Scientist Intern, supervised by Mike Whalen (May 2023 - August 2023)

SOFTWARE ENGINEERING EXPERIENCE

- **Facebook**, CA, Software Engineering Intern (July 2019 - September 2019)
- **The Dog Company**, Part time Software Engineer (March 2018 - December 2018)
- **khipu**, Software Engineering Intern (July 2017 - September 2017)

TEACHING EXPERIENCE

TA: *Logic and Mechanized Reasoning*, *Undergraduate Quantum Computation*, *Complexity and Computability*, *Design and Analysis of Algorithms*, *Discrete Math*, *Theory of Computation*, *Introduction to Programming*, *Algorithms and Data Structures*, *Databases*, *Programming Languages*, and *Workshop for Competitive Programming*.

SKILLS

Programming Skills C, C++, Java, Python, Racket, SQL, Javascript (NodeJS, React)