

Borja Sierra Miranda

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I am a PhD candidate in the Logic and Theory Group at University of Bern, working under the supervision of Thomas Studer. My research lies in Non-wellfounded Proof Theory, with broader interests in Modal Logic, Provability Logic and Arithmetical Theories.

I am particularly interested in the mathematical study of the foundations of mathematics.

🎓 Education

2023–Present	Ph.D. in Computer Science • Logic and Theory Group, Institute of Computer Science, University of Bern • Advisor: Thomas Studer	Bern, Switzerland
2021–2023	M.Sc. in Logic – Track of Logic and Mathematics • Institute for Logic, Language and Computation, University of Amsterdam • Advisor: Bahareh Afsharhi & Albert Visser Thesis: <i>On the Provability Logic of Constructive Arithmetic</i> Grade: 9.18/10	Amsterdam, Netherlands
2017–2021	B.S. in Mathematics • Faculty of Mathematics, Universidad de Sevilla • Advisor: Andrés Córdón Franco Thesis: <i>Subsystems of Second Order Arithmetic and Reverse Mathematics</i> Grade: 9.57/10	Sevilla, Spain
2020–2021	Mobility Programme in Univerdad Complutense de Madrid	Madrid, Spain

📖 Publication

Journal Articles

- 2026 J1 **Cut elimination for a non-wellfounded system for the master modality**
Borja Sierra Miranda, Thomas Studer
Journal of Symbolic Logic, 2026
DOI: [10.1017/jsl.2026.10225](https://doi.org/10.1017/jsl.2026.10225)

Conference Proceedings

- 2026 C5 **Uniform Lyndon Interpolation via Non-wellfounded Proofs**
Borja Sierra Miranda, Thomas Studer
AiML 26: Bílková, M., Gattinger, M., van der Giessen, I., Girlando M., and Yanjing, W. (eds) *Proceedings of the Sixteenth International Conference on Advances in Modal Logic* Amsterdam, The Netherlands, 29–06–2026
DOI: [10.4204/EPTCS.447.40](https://doi.org/10.4204/EPTCS.447.40)
- 2026 C4 **Knowledge and Common Knowledge of Strategies**
Borja Sierra Miranda, Thomas Studer
WoLLIC 26: *to appear*
DOI: [10.48550/arXiv.2510.19298](https://doi.org/10.48550/arXiv.2510.19298)
- 2025 C3 **Non-wellfounded Proof Theory for Interpretability Logic**
Sebastijan Horvat, Borja Sierra Miranda, Thomas Studer
TABLEAUX 2025: Pozzato, G.L., Uustalu, T. (eds) *Automated Reasoning with Analytic Tableaux and Related Methods. TABLEAUX 2025. Lecture Notes in Computer Science()*, vol 15980. Springer,

Cham.

DOI: [10.1007/978-3-032-06085-3_11](https://doi.org/10.1007/978-3-032-06085-3_11)

- 2024 C2 **Coalgebraic Proof Translations for Non-Wellfounded Proofs**
Borja Sierra Miranda, Thomas Studer, Lukas Zenger
AiML 24: A. Ciabatonni, D. Gabelaia, and I. Sedlár, editors, *Advances in Modal Logic*, AiML 2024, Prague, Czech Republic, August 19-23, 2024
DOI: [10.48550/arXiv.2506.01711](https://doi.org/10.48550/arXiv.2506.01711)
- 2024 C1 **Cyclic Proofs for iGL via Corecursion**
Borja Sierra Miranda
FICS 24: A. Saurin, editor, *EPTCS Proceedings Twelfth Workshop on Fixed Points in Computer Science*
DOI: [10.4204/EPTCS.435.2](https://doi.org/10.4204/EPTCS.435.2)

Preprints

- 2026 M5 **Proof Theory and Interpolation for Sacchetti's Logics**
Borja Sierra Miranda, Thomas Studer
Under Review (Notre Dame Journal of Formal Logic)
[arXiv: 10.48550/arXiv.2607.06359](https://arxiv.org/abs/10.48550/arXiv.2607.06359)
- 2026 M4 **Proof Theory for Bimodal Provability Logics**
Borja Sierra Miranda, Thomas Studer
Under Review (Journal of Mathematical Logic)
[arXiv: 10.48550/arXiv.2605.12351](https://arxiv.org/abs/10.48550/arXiv.2605.12351)
- 2025 M3 **Uniform interpolation for interpretability logic**
Sebastijan Horvat, **Borja Sierra Miranda**, Thomas Studer
Under Review (Annals of Pure and Applied Logic)
[arXiv: 10.48550/arXiv.2511.01428](https://arxiv.org/abs/10.48550/arXiv.2511.01428)
- 2025 M2 **Provability Models**
Mojtaba Mojtahedi, **Borja Sierra Miranda**
Under Review (Journal of Symbolic Logic)
[arXiv: 10.48550/arXiv.2510.06696](https://arxiv.org/abs/10.48550/arXiv.2510.06696)
- 2025 M1 **Algebraic Proof Theory for Infinitary Action Logic**
Wesley Fussner, Simon Santschi, **Borja Sierra Miranda**
[arXiv: 10.48550/arXiv.2501.18231](https://arxiv.org/abs/10.48550/arXiv.2501.18231)

Honours and Awards

- 2023 *Cum Laude qualification in the M.Sc. in Logic*. Issued by the University of Amsterdam.
- 2021 *Best academic record in the Mathematics Bachelor, year 2017-2021*. Issued by the University of Seville.
- 2021 *Collaboration scholarship MEFP*. Issued by the University of Seville.
Scholarship which allowed me to collaborate with the Computer Science and Artificial Intelligence department of the University of Seville. More information:
<https://www.us.es/estudiar/becas-ayudas/becas-y-ayudas-de-formacion/externas>.
- 2017 *Baccalaureate of Science graduated with honours*. Issued by Colegio Miguel de Montaigne Sevilla.
- 2015 *Premios a la trayectoria académica y personal del alumnado de 4º de ESO*. Issued by Seville town hall.
Recognition of best academic trajectories in Seville of the first four years of secondary school (ESO).

Professional Service

Organizing Committee

- Organizing Committee, Swiss Graduate Society for Logic and Philosophy of Science Spring Meeting (2025)
- Organizing Committee, WoLLIC 2024 – 30th Workshop on Logic, Language, Information and Computation (2024)
- Organizing Committee, Swiss Graduate Society for Logic and Philosophy of Science Spring Meeting (2024)
- Organizing Committee, APT 2023 – Advances in proof theory (2023)
- Organizing Committee, Swiss Graduate Society for Logic and Philosophy of Science Winter Meeting (2023)

Peer Reviewing 6 full papers 2024 – 2026

I review for journals and conferences mainly in Proof Theory and Modal Logic.

Journal

- Journal of Symbolic Logic
- Journal of Logic and Computation
- Annals of Pure and Applied Logic
- Izvestiya: Mathematics

Conference

- IJCAR'26 – 13th International Joint Conference on Automated Reasoning (2026)

Workshop

- FICS 2024 – Fixed Points in Computer Science (2024)

Community

- Member of the board, Swiss Graduate Society for Logic and Philosophy of Science (2023–Present)

Teaching

Spring 2026	Teaching Assistant, Computability and Complexity, BSc of Computer Science, University of Bern.
Autumn 2025	Co-lecturer, Reasoning about knowledge, MSc of Computer Science, University of Bern.
Spring 2025	Teaching Assistant, Computability and Complexity, BSc of Computer Science, University of Bern.
Spring 2023	Teaching Assistant, Model Theory, MSc of Logic, University of Amsterdam.
Spring 2023	Teaching Assistant, Axiomatic Set Theory, BSc of Mathematics, University of Amsterdam.
Autumn 2022	Teaching Assistant, Introduction to Modal Logic, MSc of Logic, University of Amsterdam.
Spring 2022	Teaching Assistant, Theory of Functional Programming, BSc of Computer Science, University of Amsterdam.

Student Supervision

Master Theses

- **Dario Marti** *P Systems and other Bio-Inspired Models of Computation* — M.S. in Computer Science, University of Bern, Autumn 2025; cosupervised with Thomas Studer.

Bachelor Theses

- **Benjamin Dötschler** *Proof Theory and Cut Elimination in $IL^-(J2_+, J5)$* — B.S. in Computer Science, University of Bern, Spring 2026 (current); cosupervised with Thomas Studer.
- **Anjaly Muttappillil** *Circuit Complexity* — B.S. in Computer Science, University of Bern, Spring 2025; cosupervised with Thomas Studer.
- **Luca D'Arcangelo** *Gödel Incompleteness* — B.S. in Computer Science, University of Bern, Autumn 2024–Spring 2025; cosupervised with Thomas Studer.
- **Jan Vanhove** *SAT solving using conflict-driven clause learning and its application to classical planning* — B.S. in Computer Science, University of Bern, Spring 2024; cosupervised with Thomas Studer.

Talks

Talks in conferences

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| 30.06.2026 | <i>Uniform Lyndon Interpolation via Non-wellfounded Proofs.</i> Talk at conference Advances in Modal Logic 2026, Amsterdam, The Netherlands. |
| 19.11.2025 | <i>Proof Theory for Provability Logics: A Uniform Approach.</i> Talk at conference 7th BYMAT Conference: Bringing Young Mathematicians Together, Seville, Spain. |
| 29.09.2025 | <i>Non-Wellfounded Proof Theory for Interpretability Logic.</i> Talk at conference 34th International Conference on Automated Reasoning with Analytic Tableaux and Related Methods TABLEAUX 2025, Reykjavic, Iceland. |
| 07.07.2025 | <i>Uniform interpolation for IL via cyclic proofs.</i> Talk at conference Logic Colloquium 2025, Vienna, Austria. |
| 19.08.2024 | <i>Coalgebraic Proof Translations of Non-Wellfounded Proofs.</i> Talk at conference Advances in Modal Logic 2024, Prague, Czechia. |
| 24.06.2024 | <i>Coalgebra for non-wellfounded proof theory.</i> Talk at conference Logic Colloquium 2024, Gothenburg, Sweden. |
| 26.09.2023 | Σ_1 -provability logic of subsystems of HA. Talk at conference Logic and Applications 2023, Dubrovnik, Croatia. |

Talks in workshops

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| 15.12.2025 | <i>Provability Logic through Proofs: Proof Theory for GLP.</i> Talk at workshop Consistency and Provability Workshop, University of Bern, Bern, Switzerland. |
| 15.12.2025 | <i>Lyndon uniform interpolation via non-wellfounded proofs.</i> Talk at workshop Swiss Logic Gathering 2025, ETH Zurich, Zurich, Switzerland. |
| 14.08.2025 | <i>Non-wellfounded proof theory for provability logics.</i> Talk at workshop Infinitary Proof Theory: Techniques and Applications, Casa Matemática Oaxaca, Oaxaca, Mexico. |
| 29.11.2024 | <i>Cut elimination for a non-wellfounded system for the master modality.</i> Talk at workshop Arbeitstagung Bern–München–Verona 2024, Munich, Germany. |
| 09.09.2024 | <i>Coalgebraic proof translations for non-wellfounded proofs.</i> Talk at workshop 6th International School and Workshop on Proof Theory, Birmingham, United Kingdom. |
| 19.02.2024 | <i>Cyclic Proofs for iGL via Corecursion.</i> Talk at workshop Fixed Points in Computer Science FICS 2024, Naples, Italy. |
| 01.11.2023 | <i>Provability Logic in Fragments of HA - A First Look.</i> Talk at workshop Workshop on Proof Theory, Modal Logic and Reflection Principles WORMSHOP 2024, Bern, Switzerland. |

Invited talks in seminars

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| 07.05.2026 | <i>Proof Theory for Provability Logics.</i> Invited talk at Theoretical Computer Science Seminar, University of Birmingham, Birmingham, United Kingdom. |
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16.05.2025	<i>Teoría de la demostración de progreso local y la lógica de la demostrabilidad.</i> Invited talk at Seminario de Lógica y Computación de la Universidad de Sevilla, University of Seville, Seville, Spain.
15.05.2025	<i>La solidez de los razonamientos inválidos: demostraciones circulares y mal fundadas.</i> Invited talk at Seminario PHD, Mathematical Institute of the University of Seville IMUS, Seville, Spain.
31.03.2025	<i>Local-progress proof theory: admissibility implies eliminability.</i> Invited talk at Seminar za matematičku logiku i računarstvo, University of Zagreb, Zagreb, Croatia.
03.12.2024	<i>Cut elimination for a non-wellfounded system for the master modality.</i> Invited talk at Seminário de Lógica Matemática, University of Lisbon, Lisbon, Portugal.
11.10.2024	<i>Non-wellfounded master modality: from cut admissibility to cut elimination.</i> Invited talk at Modern Problems of Mathematical Logic, HSE University, Rusia, Moscow.
31.05.2024	<i>Coalgebraic proof translations for non-wellfounded proofs.</i> Invited talk at Modern Problems of Mathematical Logic, HSE University, Rusia, Moscow.

Research Visists

May 2026	University of Birmingham - Theory Group, School of Computer Science - Supervisor: Anupam Das Duration: 1 month	Birmingham, United Kingdom
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Skills

Languages	Spanish (native), English (Cambridge C2)
Programming	Haskell, Rocq, Agda