

RESEARCH INTERESTS

I am a fourth-year **PhD student** in theoretical computer science at **Lund University** and the **University of Copenhagen**, under the supervision of **Susanna F. de Rezende** and **Jakob Nordström**. Before that, I graduated from the Master of Logic at the University of Amsterdam and obtained a BSc in Computer Science from the University of the Basque Country.

- computational complexity theory
- logic, proof complexity & bounded arithmetic
- meta-complexity
- theoretical computer science
- philosophy of mathematics & mathematical practice

EDUCATION

Lund University & University of Copenhagen

Lund, Sweden / Copenhagen, Denmark

PhD in Theoretical Computer Science

2022 –

- Supervised by Susanna F. de Rezende and Jakob Nordström
- Funded by the Wallenberg AI, Autonomous Systems and Software (WASP) program.
- Expected graduation date: early 2027.

University of Amsterdam

Amsterdam, The Netherlands

MSc in Logic (120 ECTS)

2020 – 2022

- Two-year master's program at the Institute for Logic, Language and Computation (ILLC). Courses in logic, theoretical computer science, mathematics and philosophy.
- Graduated *cum laude*, partially funded by the E. W. Beth Foundation.
- **Thesis:** [Parameterized Compilability](#)
Supervisors: Ronald de Haan (ILLC, University of Amsterdam) and Hubie Chen (King's College London).

University of the Basque Country

San Sebastián, Spain

BSc in Computer Science (240 ECTS) – Graduated first of my year, GPA: 9.43 (out of 10)

2016 – 2020

PUBLICATIONS

- [AdRKR26] **N. Arteche**, S. F. de Rezende, E. Khaniki, and K. Risse, “The Proof Analysis Problem for Constant-Depth Frege”, in *67th Annual Symposium on Foundations of Computer Science (FOCS 2026)*, 2026.
- [AAAdRK25] **N. Arteche**, A. Atserias, S. F. de Rezende, and E. Khaniki, “The Proof Analysis Problem”, in *66th Annual Symposium on Foundations of Computer Science (FOCS 2025)*. *Invited to the Special Issue to appear on the SIAM Journal on Computing (SICOMP)*, 2025. DOI: [10.1109/FOCS63196.2025.00133](https://doi.org/10.1109/FOCS63196.2025.00133).
- [ACG25] **N. Arteche**, G. Carenini, and M. Gray, “Quantum automating TC^0 -Frege is LWE-hard”, *computational complexity*, vol. 34, no. 2, p. 16, 2025, extended abstract at the 39th Computational Complexity Conference (*CCC 2024*). DOI: [10.1007/s00037-025-00271-w](https://doi.org/10.1007/s00037-025-00271-w).
- [AKPS24] **N. Arteche**, E. Khaniki, J. Pich, and R. Santhanam, “From proof complexity to circuit complexity via interactive protocols”, in *51st EATCS International Colloquium on Automata, Languages and Programming (ICALP 2024)*, 2024. DOI: [10.4230/LIPIcs.ICALP.2024.12](https://doi.org/10.4230/LIPIcs.ICALP.2024.12).
- [AH24] **N. Arteche** and M. Hermo, “Towards the exact complexity of realizability for Safety LTL”, *Journal of Logical and Algebraic Methods in Programming*, vol. 141, 2024. DOI: [10.1016/j.jlamp.2024.101002](https://doi.org/10.1016/j.jlamp.2024.101002).

SELECTED TALKS

- **The Proof Analysis Problem**
 - **Proof Complexity Workshop** (August 11-13, 2025) August, 2025
University of Oxford
 - **Constructive Complexity Theory @ STOC'25** (June 25, 2025) June, 2025
Prague, Czech Republic
 - **Prague Logic Seminar** (April 30, 2025) April, 2025
Institute of Mathematics of the Czech Academy of Sciences
- **Quantum Automating TC^0 -Frege Is LWE -Hard**
 - **Proof Complexity Workshop** (September 3-5, 2024) September, 2024
University of Oxford
 - **Meta-Complexity Reunion Workshop** (April 15-18, 2024) April, 2024
Simons Institute for the Theory of Computing, UC Berkeley
- **From Proof Complexity to Circuit Complexity via Interactive Protocols**
 - **Imperial-Oxford-Warwick Complexity Network Seminar** (May 16, 2024) May, 2024

TEACHING EXPERIENCE

- **Guest lecturer** at the University of Amsterdam January 2024
Meta-Complexity (6 ECTS · MSc course) – Main instructor: Ronald de Haan
- **Teaching Assistant** at Lund University Spring 2025, 2026
Discrete Structures (7.5 ECTS · BSc course) – Lecturer: Susanna F. de Rezende
- **Teaching Assistant** at Lund University Spring 2023, 2024
Advanced Algorithms (7.5 ECTS · MSc course) – Lecturer: Susanna F. de Rezende
- **Teaching Assistant** at the University of Amsterdam Spring 2022
Computational Complexity (6 ECTS · MSc course) – Lecturers: Ronald de Haan and Jan Maly

SELECTED RESEARCH VISITS

Simons Institute for the Theory of Computing, UC Berkeley Visiting graduate student for the semester-long <i>Meta-Complexity</i> program.	Berkeley, USA January 2023 – May 2023
University of Oxford Visiting graduate student hosted by Ján Pich.	Oxford, UK July 2023, Sep. 2024, Aug. 2025
Institute of Mathematics of the Czech Academy of Sciences Visiting graduate student hosted by Neil Thapen (2024) and Pavel Hubáček (2025).	Prague, Czech Republic February 2024 & April 2025
McGill University Visiting graduate student hosted by Robert Robere.	Montreal, Canada June 2024

SCHOLARSHIPS AND AWARDS

- **Evert Willem Beth Scholarship** 2021 – 2022
Granted the E. W. Beth scholarship for my master's in logic at the University of Amsterdam.
- **Extraordinary BSc Degree Award & Kutxa Fundazioa Award** 2020
Best Computer Science student at the University of the Basque Country.

LANGUAGES

Spanish (native speaker), **English** (fluent, C2 level), **French** (fluent, C2 level), **Basque** (native speaker).