Noel Arteche

email: noel.arteche@cs.lth.se
website: narteche.github.io
(*last updated*: March 2026)

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.

Research Interests

- 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

[AAdRK25] **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.

[ACG25] **N. Arteche**, G. Carenini, and M. Gray, "Quantum automating $\mathbf{TC}^0$-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.

[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.

[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.

Languages

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

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
  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 — Berkeley, USA
Visiting graduate student for the semester-long *Meta-Complexity* program. — January 2023 – May 2023

University of Oxford — Oxford, UK
Visiting graduate student hosted by Ján Pich. — July 2023, Sep. 2024, Aug. 2025

Institute of Mathematics of the Czech Academy of Sciences — Prague, Czech Republic
Visiting graduate student hosted by Neil Thapen (2024) and Pavel Hubáček (2025). — February 2024 & April 2025

McGill University — Montreal, Canada
Visiting graduate student hosted by Robert Robere. — 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.