

Curriculum Vitae: Pedro Pinto

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Nationality: Portuguese DOB: 27.09.1989

Academic Education

- PhD in Mathematics
 - Speciality Algebra, Logic and Foundations of Mathematics
 - Faculdade de Ciências da Universidade de Lisboa. September 2019
 - Thesis: “Proof mining with the bounded functional interpretation”
 - Advisor: Prof. Dr. Fernando Ferreira
- Masters in Mathematics (MSc)
 - Faculdade de Ciências da Universidade de Lisboa, December 2013
 - Dissertation: “Teorema da Estrutura de Furstenberg: demonstração e redução ao nível ω^ω ”
 - Advisors: Prof. Dr. Fernando Ferreira and Prof. Dr. Pedro Miguel Duarte
- Bachelor in Mathematics (BSc)
 - Honourable mention
 - Faculdade de Ciências da Universidade de Lisboa, July 2010

Language skills

Native language
Portuguese

Language	Reading	Writing	Speaking	Listening
English	C2	C2	C2	C2
German	A2	A2	A2	A2

Awards and Distinctions

- Appointed as a member of EMS Young Academy (EMYA) for the period 2024–2027.
- Conclusion of bachelor degree in Mathematics with Honourable Mention.
Faculdade de Ciências da Universidade de Lisboa. July 2010
- Honourable mention – Best freshmen students 1st year, FCUL.
Fundação da Faculdade de Ciências da Universidade de Lisboa. April 2009

Others (non-academic)

- First-aid course. Technische Universität Darmstadt. August 2022
- Workshop – Introdução ao Python e a conceitos fundamentais em Machine Learning (online).
LogicLab – Data Analytics. May 2021

Academic Employment

- Technische Universität Darmstadt. Postdoc. Principal investigator of DFG-Project “Proof Mining in Nonlinear Functional Analysis” (PI 2070/1-1). 1 July 2024 – 30 June 2026.
- Technische Universität Darmstadt. Research Assistant (‘*Wissenschaftlicher Mitarbeiter*’). 16 June 2021 – 15 June 2024 (extended for two years; switched to third-party funding after 30 June 2024)
- Technische Universität Darmstadt. Member of DFG-Project “Proof mining in Convex Optimization and Related Areas” (KO 1737/6-2). 1 September 2021 – 31 August 2023
- Technische Universität Darmstadt. Research Collaborator of DFG-Project “Proof mining in Convex Optimization and Related Areas” (KO 1737/6-1). 1 October 2020 – 31 August 2021
- Technische Universität Darmstadt. Research Collaborator of DFG-Project “Proof mining in Convex Optimization and Related Areas” (KO 1737/6-1), in the context of Ingenium: ‘Future Talents’ Short-term Scholarship. 1 October 2019 – 30 September 2020
- Universidade de Lisboa, Faculdade de Ciências. Research fellowship in connection with the FCT project with ref. UID/MAT/04561/2019. FCIências.ID – Associação para a Investigação e Desenvolvimento de Ciências. 1 March 2019 – 30 June 2019
- Universidade Autónoma de Lisboa. Employed as teacher in the Department of Economic and Business Sciences. 1 October 2018 – 28 February 2019
- Universidade de Lisboa, Faculdade de Ciências. Research position in the context of the *Lisbon Mathematics PhD* (LisMath) program. Funding ref. PD/BD/52645/2014. FCT – Fundação para a Ciência e a Tecnologia. 1 November 2014 – 31 October 2018
- Universidade de Lisboa, Faculdade de Ciências. Student Assistant (‘*Monitor*’) in the Department of Mathematics. 1 October 2012 – 30 September 2013

Other activities

- Co-Organizer of the weekly Mathematical Logic Seminar at Faculty of Sciences of the University of Lisbon (hybrid format), 2025/2026
- Associated Researcher at LOS – Logic, Optimization & Security Center, Bucharest, Romania. Since 2024
- Associated Researcher at ILDS – *Institute for Logic and Data Science*, Bucharest, Romania. Since 2024
- Oberwolfach Leibniz Fellow at MFO, Oberwolfach Research Institute for Mathematics, Germany. 17 March – 7 June, 2024
- Research collaborator at CEMS.UL – *Center for Mathematical Studies* (formerly CMAFcIO – Center for Mathematics, Fundamental Applications and Operations Research), Lisbon, Portugal. Since 2024
- Research collaborator at ILDS – *Institute for Logic and Data Science*, Bucharest, Romania. 2022 – 2024
- Research member at CMAFcIO – *Centro de Matemática Aplicações Fundamentais e Investigação Operacional*, Lisbon, Portugal. 2014 – 2020
- Research member at CAUL – *Centro de Álgebra da Universidade de Lisboa*. Scholarship “Initiation to Research” – Bolsa de Integração na Investigação (BII), Lisbon, Portugal. 2009/2010

Research

Research Interests

Logic (in particular Proof Theory), Proof Mining (proof interpretations and their use in mathematics), Convex Optimization, Approximation Theory, Computability Theory, Fixed Point Theory, Nonlinear Analysis

Articles

In peer-reviewed journals

- On the Halpern method with adaptive anchoring parameters (with N. Pischke).
To appear in: *Mathematics of Computation*, 24pp, (2025) Oberwolfach Preprints OWP-2024-11
- Proof mining and the convex feasibility problem: the curious case of Dykstra's algorithm.
The Review of Symbolic Logic, 18(3): 775–811 (2025) DOI
- Fejér monotone sequences revisited, (with U. Kohlenbach).
To appear in: *Journal of Convex Analysis*, 16pp, (2024) Arxiv 2310.06528
- On the finitary content of Dykstra's cyclic projections algorithm.
Zeitschrift für Analysis und ihre Anwendungen, 44(1/2): 165–192 (2025) DOI
- Nonexpansive maps in nonlinear smooth spaces.
Transactions of the American Mathematical Society, 377(9): 6379–64264, (2024) DOI
- On computational properties of Cauchy problems generated by accretive operators, (with N. Pischke).
Documenta Mathematica, 28(5): 1235–1274 (2023) DOI
- Rates of asymptotic regularity for the alternating Halpern-Mann iteration, (with L. Leuştean).
Optimization Letters, 18: 529–543 (2024). DOI
- Strong convergence for the alternating Halpern-Mann iteration in CAT(0) spaces, (with B. Dinis).
SIAM Journal on Optimization, 33(2), 785–815 (2023). DOI
- Effective metastability for a method of alternating resolvents, (with B. Dinis).
Fixed Point Theory 25(1): 61-98 (2024). DOI
- Quantitative translations for viscosity approximation methods in hyperbolic spaces, (with U. Kohlenbach).
Journal of Mathematical Analysis and Applications, 507: 125823, 33 pp (2022). DOI
- On the convergence of algorithms with Tikhonov regularization terms, (with B. Dinis).
Optimization Letters, 15(4), 1263–1276 (2021). DOI
- Quantitative results on a Halpern-type proximal point algorithm, (with L. Leuştean).
Computational Optimization and Applications, 79(1), 101–125 (2021). DOI
- Quantitative results on the multi-parameters Proximal Point Algorithm, (with B. Dinis).
Journal of Convex Analysis, 28(3), 23 pp (2021). Arxiv 1912.10175
- A rate of metastability for the Halpern type proximal point algorithm.
Numerical Functional Analysis and Optimization, 42(3): 320–343 (2021). DOI

- Metastability of the proximal point algorithm with multi-parameters, (with B. Dinis). *Portugaliae Mathematica*, 77(3), 345–381 (2020). DOI
- On the removal of weak compactness arguments in proof mining, (with F. Ferreira and L. Leuştean). *Advances in Mathematics* 354: 106728, 55 pp (2019). DOI

Submitted

- Products of hyperbolic spaces (with Andrei Sipos). 15pp Arxiv 2408.14093
- The alternating Halpern-Mann iteration for families of maps (with Paulo Firmino). 23pp Oberwolfach Preprint OWP-2024-07
- On Dykstra’s Algorithm with Bregman Projections (with Nicholas Pischke). 17pp Oberwolfach Preprint OWP-2024-04

Technical notes

- On quantitative versions of Xu’s Lemma. March 2023

Published abstracts

- Sunny nonexpansive retractions in nonlinear spaces. In: S. Buss, R. Iemhoff, U. Kohlenbach, M. Rathjen: Mathematical Logic: Proof Theory, Constructive Mathematics, EMS *Oberwolfach Reports*, 20(4): 3013–3061 (July 2024), Report No. 53/2023, 3051–3052. DOI
- Proof mining and asymptotic regularity (by L. Leuştean). In: S. Buss, R. Iemhoff, U. Kohlenbach, M. Rathjen: Mathematical Logic: Proof Theory, Constructive Mathematics, EMS *Oberwolfach Reports*, 20(4): 3013–3061 (July 2024), Report No. 53/2023, 3030–3033. DOI
- Proof mining and the convex feasibility problem. In: 2023 European Summer Meeting of the Association for Symbolic Logic: Logic Colloquium 2023, *The Bulletin of Symbolic Logic*, 30(1): 94–139 (March 2024), page 129 DOI
- Proof mining and asymptotic regularity (by L. Leuştean). In: 2023 European Summer Meeting of the Association for Symbolic Logic: Logic Colloquium 2023, *The Bulletin of Symbolic Logic*, 30(1): 94–139 (March 2024), page 124 DOI
- Proof Mining with the Bounded Functional Interpretation. In: Thesis Abstracts, *The Bulletin of Symbolic Logic*, 28(2): 265–266 (June 2022). DOI
- Quantitative translations for viscosity approximation methods (joint with U. Kohlenbach). In: S. Buss, R. Iemhoff, U. Kohlenbach, M. Rathjen: Mathematical Logic: Proof Theory, Constructive Mathematics, EMS *Oberwolfach Reports*, 17(4): 1693–1757 (September 2021), Report No. 34/2020, 1725–1727. DOI

Teaching

Technische Universität Darmstadt, Fachbereich Mathematik

<u>Year</u>	<u>Course</u>
2024/2025	Proof Mining ^{(L),(1)}
2023/2024	Introduction to Mathematical Logic ^(A)
2022/2023	Logics of Knowledge and Information ^(A)
2022/2023	Proof Mining ^{(L),(1)}
2021/2022	Aussagen- und Prädikatenlogik ^(A)
2021/2022	Automaten, formale Sprachen und Entscheidbarkeit ^(A)
2020/2021	Applied Proof Theory ^(A)

Universidade Autónoma de Lisboa, Dep. Ciências Económicas e Empresariais

<u>Year</u>	<u>Course</u>
2018/2019	Matemática ^{(L),(2)}
2018/2019	Matemática I ^{(L),(3)}

Universidade de Lisboa, Faculdade de Ciências, Dep. Matemática

<u>Year</u>	<u>Course</u>
2012/2013	Análise Matemática ^(A)
2012/2013	Elementos de Cálculo Diferencial ^(A)

(L) Lecturer

(A) Assistant to the course

(1) Course focused on the bounded functional interpretation and recent applications of proof mining

(2) Course focused on calculus methods applied to sports performance and financial analysis for the degree of Sport Management

(3) Course focused on calculus methods applied to economic analysis for the degree of Health Units Administration

Supervision of students

- (2023) António Fino – Master thesis co-advised with Dra. Gilda Ferreira – Univ. Aberta, Portugal

Educational resources

- Lecture notes (in English, 139pp) for the course *Proof Mining*, 2024/2025.
- Online content in the (TUDa) Moodle platform: design of exercise sheets including solutions (in English) for the course *Proof Mining*, 2024/2025.
- Online content in the (TUDa) Moodle platform: design of exercise sheets and homework material (in English) for the course *Introduction to Mathematical Logic*, 2023/2024.

- Online content in the (TUDa) Moodle platform: design of exercise sheets and homework material (in English) for the course *Logics of Knowledge and Information*, 2022/2023.
- Lecture notes (in English, 114pp) for the course *Proof Mining*, 2022/2023.
- Online content in the (TUDa) Moodle platform: design of exercise sheets including solutions (in English) for the course *Proof Mining*, 2022/2023.
- Online content in the (TUDa) Moodle platform: design of exercise sheets and homework material including solutions (in German) for the courses *Automaten, formale Sprachen und Entscheidbarkeit* and *Aussagen- und Prädikatenlogik*, 2021/2022.
- Online content in the (TUDa) Moodle platform: design of exercise sheets and homework material including solutions (in English) for the course *Applied Proof Theory*, 2020/2021.
- Online content in the (UAL) Moodle platform: design of exercise sheets and homework material including solutions (in Portuguese) for the courses *Matemática/Matemática I*, 2018/2019.

Talks

Invited

- Global Portuguese Mathematicians 2025.
Talk: “Proof-theoretical unwinding of mathematics”.
Faculdade de Ciências, Universidade de Lisboa, 28-30 July 2025
- Seminário de Lógica Matemática (SLM)
Talk: “On the Halpern method with adaptive anchoring parameters”.
Faculdade de Ciências, Universidade de Lisboa, (online) 28 January, 2025
- LOS-ILDS: Proof Mining Seminar
Talk: “On the Halpern method with adaptive anchoring parameters”.
Faculty of Mathematics and Computer Science, University of Bucharest, (online) 15 January, 2025
- Encontro Nacional da SPM 2024 (ENSPM2024).
Invited speaker for the parallel session: ‘Logic and Theory of Computation’.
Talk: “Proof-theoretical unwinding of mathematics”.
Universidade do Minho, Braga, Portugal. 10 – 12 July, 2024
- LOS-ILDS: Proof Mining Seminar.
Talk: “On generalizations to Nonlinear Smooth Spaces”.
Faculty of Mathematics and Computer Science, University of Bucharest (online). 6 March 2024
- Oberwolfach Workshop on Mathematical Logic: Proof Theory, Constructive Mathematics.
Talk: “Sunny nonexpansive retractions in nonlinear spaces”.
MFO, Oberwolfach Research Institute for Mathematics, Oberwolfach. 12 – 18 November 2023
- Seminário de Lógica Matemática (SLM).
Talk: “The strange case of Dykstra’s algorithm”.
Faculdade de Ciências, Universidade de Lisboa (online). 6 October 2023

- LOS-ILDS: Proof Mining Seminar.
Talk: “The strange case of Dykstra’s algorithm”.
Faculty of Mathematics and Computer Science, University of Bucharest (online). 26 July 2023
- Seminário CIMA/DMat/PDout.
Talk: “On Computational Properties of Cauchy Problems”.
Departamento de Matemática, Universidade de Évora. 22 February 2023
- Seminário de Lógica Matemática (SLM).
Talk: “Proof mining on PDE theory”.
Faculdade de Ciências, Universidade de Lisboa. 28 October 2022
- International Conference on Applied Proof Theory 2022 (APT22).
Talk: “Proof mining on PDE theory”.
University of Chieti–Pescara. 2 September 2022
- LOS-ILDS: Proof Mining Seminar.
Talk: “The alternating Halpern-Mann iteration”. Faculty of Mathematics and Computer Science, University of Bucharest (online). 6 July 2022
- LOS-IMAR Logic Seminar.
Talk: “Halpern and Mann iterative schemas: A path towards generalization”.
Faculty of Mathematics and Computer Science, University of Bucharest (online). 27 January 2022
- Seminário de Lógica Matemática (SLM).
Talk: “Halpern and Mann iterative schemas: A path towards generalization”.
Faculdade de Ciências, Universidade de Lisboa. 10 January 2022
- FMI-IMAR Logic Seminar.
Talk: “Unwinding of proofs”.
Faculty of Mathematics and Computer Science, University of Bucharest (online). 4 March 2021
- Oberwolfach Workshop on Mathematical Logic: Proof Theory, Constructive Mathematics.
Talk: “Quantitative translations for viscosity approximation methods”.
MFO, Oberwolfach Research Institute for Mathematics, Oberwolfach (online). 8 – 14 November 2020
- Seminário de Lógica Matemática (SLM).
Talk: “Quantitative translations for viscosity approximation methods”.
Faculdade de Ciências, Universidade de Lisboa (online). 26 October 2020
- Seminário de Lógica Matemática (SLM).
Talk: “Commentaries on the application of the b.f.i.”.
Faculdade de Ciências, Universidade de Lisboa. 3 February 2020
- Logic Colloquium 2019 Prague (invited special session speaker).
Special Session: Proof Theory and Proof Complexity.
Talk: “Proof mining with the bounded functional interpretation”.
Faculty of Architecture, Czech Technical University, Prague. August 2019
- Logic Seminar at Bucharest University.
Talk: “The bounded functional interpretation and the elimination of weak compactness”.
Faculty of Mathematics and Computer Science, University of Bucharest. 26 April 2018

Other conferences and meetings

- Colloquium Logicum 2024
Talk: “Sunny nonexpansive retractions in nonlinear spaces”
Austrian Academy of Sciences, Vienna, Austria, October 7–9, 2024
- Workshop on Proof Mining 2024 (organizer).
Talk: “Sunny nonexpansive retractions in nonlinear spaces”
Technische Universität Darmstadt. Darmstadt, Germany. 4–6 September 2024
- Days in Logic 2024.
IST Universidade de Lisboa. Lisbon, Portugal. 1–3 February 2024
- Winter Meeting in Lisbon: Mathematics & Applications.
Talk: “Sunny nonexpansive retractions in nonlinear spaces”.
University of Lisbon, Portugal, 18–20 December 2023
- Logic Colloquium 2023.
Talk: “Proof mining and the convex feasibility problem”.
University of Milan, Italy. 5–9 June 2023
- Doktorandentreff.
Talk: “Discussion of a recent proof mining result”.
Technische Universität Darmstadt. Darmstadt, Germany. 10 February 2023
- Colloquium Logicum 2022 (CL2022).
Talk: “A generalization via proof mining methods”.
University of Konstanz, Konstanz, Germany. 26 September 2022
- Doktorandentreff.
Talk: “Unwinding of proofs”.
Technische Universität Darmstadt. Darmstadt, Germany. 22 July 2022
- Days in Logic 2022.
Talk: “The Halpern-Mann iteration in UCW-hyperbolic spaces”.
Universidade do Algarve. Faro, Portugal. June 2022
- New Frontiers in Proofs and Computations.
Talk: “Quantitative results on variants of the proximal point algorithm”.
Institute for Advanced Study in Mathematics. Hangzhou, China (online). September 2021
- Eighteenth International Conference on Computability and Complexity in Analysis.
Talk: “Quantitative translations for viscosity approximation methods”.
Universität der Bundeswehr München. Munich, Germany (online). July 2021
- Days in Logic 2020.
Talk: “Proof mining of a discussion by cases”.
Faculdade de Ciências da Universidade de Lisboa. Lisboa, Portugal. January 2020
- Computational Approaches to the Foundations of Mathematics.
Talk: “Concrete Examples on the Elimination of Weak Compactness”.
Mathematisches Institut, LMU. Munich, Germany. April 2018

- Axiomatic Thinking.
Faculdade de Ciências da Universidade de Lisboa. Portugal. October 2017
- Logic Colloquium 2017.
Talk: “A quantitative analysis of a theorem by FE Browder guided by the b.f.i.”.
Stockholm University. Stockholm, Sweden. August 2017
- Journées sur les Arithmétiques Faibles 35.
Faculdade de Ciências da Universidade de Lisboa. Lisboa, Portugal. June 2016
- Conference PhD’s in Logic 2016.
Technische Universität Darmstadt. Darmstadt, Germany. May 2016
- Joint Meeting AMS/EMS/SPM.
Faculdade de Ciências da Universidade do Porto. Porto, Portugal. June 2015

Workshops and summer schools

- Workshop on Optimization, Dynamics and Convex Analysis (WODCA) 2025
Contributed Talk: “Proof mining in nonlinear convex analysis”.
University of Aveiro, Portugal. June 2025
- Autumn School Proof and Computation.
Herrsching, Germany. September 2017
- International Summer School for Proof Theory in First-Order Logic.
Talk: “A quantitative analysis of a theorem by F.E.Browder via the bounded functional interpretation”.
Universidade da Madeira, Colégio dos Jesuítas, Funchal. August 2017
- Hilbert-Bernays Summer School on Logic and Computation.
Mathematical Institute, Göttingen. July 2016
- 6th International Workshop on Classical Logic and Computation.
Faculdade de Ciências da Universidade do Porto. June 2016
- Workshop “Fronteiras da Matemática”.
Faculdade de Ciências da Universidade de Lisboa. April 2010
- Mathematical Games.
Faculdade de Ciências da Universidade de Lisboa. July 2009

Visits and Research stays

- Three-month research stay at the Oberwolfach Research Institute for Mathematics (MFO), Germany, under the project (2412p) “Unwinding of convergence proofs in Nonlinear Analysis” upon being awarded an Oberwolfach Leibniz Fellowship. 17 March – 7 June, 2024
- Three-month research stay at the Faculty of Mathematics and Computer Science, University of Bucharest by invitation of Prof. Dr. Laurențiu Leuştean to collaborate on applications of Proof Mining to Convex Optimization. 1 February – 30 April, 2018

Activities

Organization of Events

- Mathematical Logic Seminar (SLM) – Co-Organizer of the weekly logic seminar at Faculty of Sciences of the University of Lisbon (hybrid format), 2025/2026
- Computability in Europe (CiE) 2025 – Co-Organizer of the Special Session “Proof Theory: Pure and Applied”, University of Lisbon, 14–18 of July, 2025
- WPM24 – Co-Organizer of the first Workshop on Proof Mining. Technische Universität Darmstadt, Germany, 4–6 of September, 2024
- Doktorandentreff – Organizer of the biweekly meeting for the PhD students in the Logic group of the Department of Mathematics, Technische Universität Darmstadt, Germany. 2022–2023

Membership

- EMS Young Academy. Appointed for the period 2024–2027
- AMS – American Mathematical Society. Since 2024
- EMS – European Mathematical Society. Since 2024
- SPM – Sociedade Portuguesa de Matemática. Since 2023
- SPL – Sociedade Portuguesa de Lógica. Since 2022
- ASL – Association for Symbolic Logic. Since 2021
- Proof Society. Since 2021