Clarence Lewis Protin

Of Belgian nationality, I was born in Madrid on the 12th of August of 1977 of a Belgian father and a mother from Pennsylvania in the United States.

email: cprotin@sapo.pt

ORCID : 0000-0001-5854-6928

Education

- PhD in Mathematics from the IST (2008) under the supervision of Pedro Resende with a thesis entitled Quantales of Open Groupoids (approved unanimously). The area of my thesis consisted in the application of a categorical treatment of quantales and locales to the Noncommutative Geometry of Alain Connes.
- Passed PhD qualifying exams in Geometry and Topology and Mathematical Analysis at the IST (2005).
- I completed graduate level courses at the Instituto Superior Técnico (IST) in category theory, modal logic, non-conventional computation and Feynman integrals (2004-2005).
- Four-year PhD Scholarship from the Science and Technological Foundation (FCT) 2004-2008 (SFRH/BD/17823/2004)
- Four-year degree in Mathematics, concluded at the University of Lisbon in 2003 with an average of 18/20 on the final year. I took courses in mathematical logic, algebraic topology, algebraic geometry and universal algebra and lattice theory.

Peer-Reviewed Publications

1. Quantales of Open Groupoids. J. Noncommut. Geom. 6 (2012), 199-247.
   doi: 10.4171/JNCG/90 `http://arxiv.org/abs/0811.4539` (with Pedro Resende).

2. Type-inhabitation of Atomic Polymorphism is Undecidable, Oxford Journal of Logic and Computation, Volume 31, Issue 2, March 2021.
   `https://academic.oup.com/logcom/advance-article-abstract/doi/10.1093/logcom/exaa090/6082839`

3. Typability and Type Inference in Atomic Polymorphism (with G. Ferreira), Logical Methods in Computer Science, Vol 18, Issue 3, 2022.
   `https://lmcs.episciences.org/9915`.

4. A Logic for Aristotle's Modal Syllogistic, History and Philosophy of Logic, 2022.
   `https://www.tandfonline.com/doi/full/10.1080/01445340.2022.2107382`
   `https://doi.org/10.1080/01445340.2022.2107382`)

5. Continuity, Topos and Infinitesimals, La Part de l'Oeil, 2023 (to appear).

   https://arxiv.org/abs/2105.05889

Paper 1 (with 23 citations according to Google Scholar) is an important contribution to the area of Alain Connes' Noncommutative Geometry and can be seen as furnishing the basis for a "noncommutative algebraic geometry" based on localic groupoids and a topos of modules over a quantale. Paper 2 solved a difficult problem in atomic polymorphism, a system of lambda calculus with important applications to the proof theory of intuitionistic propositional calculus. It is a result which has consequences for the theory of functional programming languages and for the study of fragments of second-order propositional logic. Paper 3 continues this line of research and studies the type theory of atomic polymorphism. Paper 4 deals with a novel algebraic logic style formalisation of Aristotle's theory of the modal syllogism.

Paper 5 is an exploration of the historical and philosophical origins of key concepts of modern topology and sheaf theory, in particular with reference to the work of Lawvere and Grothendieck.

Communications

- A Constructive Proof of the Univalence Axiom, Mathematical Logic Webinar, 18th and 25th of May of 2022. a-constructive-proof-of-the-univalence-axiom
- Bealer's Intensional Logic, ALOPHIS seminar, 18th of May 2021. https://people.unica.it/alophis/alophis-weekly-seminars/
- Bealer's Intensional Logic, Logic Seminar of the University of Lisbon (2020) (2 talks)

  https://ciencias.ulisboa.pt/pt/evento/12-10-2020/bealers-intensional-logic-part-i
- On the undecidibility of type inhabitation for atomic polymorphism, Logic Seminar of the University of Lisbon (2018)

  https://ciencias.ulisboa.pt/sites/default/files/cmafcio-08out18.pdf
- A Topos Theoretic Model for Intuitionistic Analysis, Grupo de Trabalho em Questões Lógicas of the Universidade de Lisboa (2010), Series of 5 lectures.

  http://cmaf.fc.ul.pt/arquivo/docs/seminarios/gtql/2010/2010_Maio_20.pdf
- Quantales beyond étale groupoids , Category Theory Conference 2007, Carvoeiro, Portugal.

  http://www.mat.uc.pt/~categ/ct2007/abstracts/Protin.pdf
- Minimal realization for quantum automata, Quantum Computation and Information Seminar at the Instituto Superior Técnico (2004).

  https://math.tecnico.ulisboa.pt/seminars/qci/index?action=show&id=943?action=show&id=943&lang=en
- From a probabilistic SC institution to parainstitutions, Logic and Computation Seminar at the Instituto Superior Técnico (2004).

  https://math.tecnico.ulisboa.pt/seminars/clc/index?action=show&id=989

Research centers and projects

- FCT project QUANTLOG (for 2004)
- PhD Student Member of the Centro de Lógica e Computação at the Instituto Superior Técnico (2004).
- External collaborator (2010 -) of the Grupo de Lógica Matemática of the CMAF of the University of Lisbon.
- Collaborator of the Center for the Philosophy of Science of the University of Lisbon (CFCUL) (2020 -) `https://cfcul.ciencias.ulisboa.pt/equipa/clarence-protin/`

Survey articles

Notes for my talks on Bealer's intensional logic `https://arxiv.org/abs/2012.09846`.

Work in preparation

- The PyLog Proof Assistant and Proof Checker. Written in Python, this is a proof checker and proof assistant which is based on natural deduction for the first-order predicate calculus expanded with an extension-forming operator $\{x : A(x)\}$. I have formalised and checked over ten thousand lines of proof related to the Kelley-Morse system of set theory. `https://owl77.github.io`. The main goal of PyLog is to formalise S. Simpson's book Subsystems of Second-Order Arithmetic.
- PyHott. This is a program similar to PyLog but for homotopy type theory.
- Ancient Natural Deduction (an essay on the relationship between ancient and modern logic) `https://arxiv.org/abs/2209.03388`
- A Topos for the Bounded Functional Interpretation.
- Towards a Formalisation of Aristotle's Topics.

Interests

Philosophical logic, proof theory, type theory and category theory.

Work as Editor

Subreviewer for an article that appeared in RAMICS 2020 `http://ramics18.gforge.inria.fr`

Some Conferences attended

Days in Logic 2022
https://daysinlogic2022.ualg.pt

LanCog Workshop on Substructural Logics, September 26-27, 2019
https://cful.letras.ulisboa.pt/events/workshop-on-substructural-logics/

International Category Theory Conference 2007
http://www.mat.uc.pt/~categ/ct2007/

CombLog '04
http://www.cs.math.ist.utl.pt/comblog04/

Employment and Experience

Present: (September 2022-): Tutor at the Universidade Aberta.

Past:

- Assistant Professor of Mathematics at the Universidade Lusófona de Humanidades e Tecnologias from 2009 to 2011.
- During the first semester I taught an average of 10 hours weekly and during the third semester I taught 13 hours weekly. During these two years I taught Linear Algebra, Mathematical Analysis I, Mathematical Analysis II and Mathematical Analysis III to students of various engineering degrees.
- Private Tutor (University and advanced high-school level) 2012 - 2022. I taught Linear Algebra, Calculus in one and several variables, Numerical Analysis, Probability and Statistics and Econometrics.
- German, Portuguese and English Translator

IT Skills

Machine code and x86 assembly, the Linux command line, C, OCaml, Python, Java and Web programming languages (HTML/CSS/PHP/Javascript). Learning Agda.

Languages

- My native tongue is English.
- I can read and understand French, German and Spanish.
- I am studying Dutch and Flemish.

- I can understand, speak and write Portuguese.
- I took a one semester of Mandarin at the Centro Cultural e Científico de Macau (2009).
- I have knowledge of classical Latin, ancient Greek and some classical Chinese.

Other activities and hobbies

- Classical piano. I studied music for eleven years (1984-1995) at the Escola de Música e Belas Artes Luisa Todi in Setúbal having reached level 6 on the piano.