

# Thomas Seiller

## Curriculum Vitae

LIPN – UMR CNRS 7030  
Institut Galilée, Université Paris-Nord  
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🌐 www.seiller.org  
Married, two children



### Positions

- 2018– **Research Scientist, CNRS.**  
Chargé de Recherche 1<sup>ère</sup> classe (Research Tenured Position, Associate Professor level)  
Laboratory: Laboratoire d'Informatique de Paris Nord (LIPN), Paris 13 University.
- 2015–2018 **Post-Doctoral Researcher, University of Copenhagen.**  
Marie Curie Individual Fellowship (Horizon 2020)
- 2014–2015 **Post-Doctoral Researcher, Paris 7 University.**
- 2013–2014 **Post-Doctoral Researcher, IHÉS and IHP.**  
CARMIN post-doctoral fellowship
- 2012–2013 **Post-Doctoral Researcher, INRIA.**
- 2011–2012 **Assistant Professor (Computer Science), Université de Savoie.**
- 2008–2011 **Research and Teaching Assistant (Mathematics), Université de la Méditerranée.**

### Grants/Awards

- 2018 **Young Investigator Project (7K€), JCJC 2018 call, INS2I – CNRS.**  
Project BIGRE (Geometric Lower Bounds by Realisability).
- 2015 **Marie Curie Individual Fellowship (212K€), Call H2020-MSCA-IF-2014.**  
Project 659920 – ReACT (A Realisability Approach to Complexity Theory).
- 2015 **Best Paper Award, An intensionally fully-abstract sheaf model for  $\pi$ , CALCO 2015.**
- 2013 **CARMIN postdoctoral fellowship.**  
Combined stay at the "Institut des Hautes Études Scientifiques" and the "Institut Henri Poincaré"
- 2008 **PhD fellowship, from the French ministry for Higher Education and Research.**
- 2007 **"Bourse d'excellence", from the French ministry for Higher Education and Research.**

### Supervision

- PhD **Nguyễn Lê Thành Dũng, Paris 13 University, from September 2018.**
- PhD **Pierre-Yves Coursolles, École Polytechnique, from October 2018.**
- Master **Nguyễn Lê Thành Dũng, ÉNS Paris, January – July 2018.**
- Licence **Seng Beng Goh, University of Cambridge, June – September 2018.**

### Education

- PhD **Mathematics, Aix-Marseille University.**
- Master **Mathematical Logic and Foundations of Computer Science, U. Paris 7.**
- Maitrise **Philosophy, Paris 1 University.**
- Licence **Mathematics, Strasbourg 1 University.**

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## Publications (Peer Reviewed)

- Journal **Interaction Graphs: Multiplicatives**, *Annals of Pure and Applied Logic* 163 (2012), pp. 1808-1837, DOI: [10.1016/j.apal.2012.04.005](https://doi.org/10.1016/j.apal.2012.04.005).
- Journal **Interaction Graphs: Additives**, *Annals of Pure and Applied Logic* 167 (2016), pp. 95-154, DOI: [10.1016/j.apal.2015.10.001](https://doi.org/10.1016/j.apal.2015.10.001).
- Journal **Characterizing co-NL by a Group Action**, *Mathematical Structures in Computer Science* 26 (2016), pp. 606-663, with C. Aubert, DOI: [10.1017/S0960129514000267](https://doi.org/10.1017/S0960129514000267).
- Journal **Logarithmic Space and Permutations**, *Information and Computation* 248 (2016), Pages 2-21, with C. Aubert, DOI: [10.1016/j.ic.2014.01.018](https://doi.org/10.1016/j.ic.2014.01.018).
- Journal **Interaction Graphs: Graphings**, *Annals of Pure and Applied Logic* 168 (2017), Pages 278-320, DOI: [10.1016/j.apal.2016.10.007](https://doi.org/10.1016/j.apal.2016.10.007).
- Journal **An intensionally fully-abstract sheaf model for  $\pi$  (extended version)**, *Logical Methods in Computer Science* 13 (2017), with C. Eberhart, T. Hirschowitz, DOI: [10.23638/LMCS-13\(4:9\)2017](https://doi.org/10.23638/LMCS-13(4:9)2017).
- Journal **A Correspondence between Maximal Abelian Sub-Algebras and Linear Logic Fragments**, *Mathematical Structures in Computer Science* 28 (2018), Pages 77-139, DOI: [10.1017/S0960129516000062](https://doi.org/10.1017/S0960129516000062).
- Journal **Interaction Graphs: Nondeterministic Automata**, *ACM Transactions in Computational Logic* 19 (2018), DOI: [10.1145/3226594](https://doi.org/10.1145/3226594).
- Conference **Logic Programming and Logarithmic Space**, *Lecture Notes in Computer Science Vol. 8858 (Proceedings of APLAS 2014)*, with C. Aubert, M. Bagnol, and P. Pistone, DOI: [10.1007/978-3-319-12736-1\\_3](https://doi.org/10.1007/978-3-319-12736-1_3).
- Conference **An intensionally fully-abstract sheaf model for  $\pi$** , *6th Conference on Algebra and Coalgebra in Computer Science (CALCO 2015)*, with C. Eberhart and T. Hirschowitz, DOI: [10.4230/LIPIcs.CALCO.2015.86](https://doi.org/10.4230/LIPIcs.CALCO.2015.86).
- Conference **Unary Resolution: Characterizing Ptime**, *19th International Conference on Foundations of Software Science and Computation Structures (FoSSaCS 2016)*, with C. Aubert and M. Bagnol, DOI: [10.1007/978-3-662-49630-5\\_22](https://doi.org/10.1007/978-3-662-49630-5_22).
- Conference **Interaction Graphs: Full Linear Logic**, *ACM/IEEE Logic in Computer Science (LICS 2016)*, pp. 427-436, DOI: [10.1145/2933575.2934568](https://doi.org/10.1145/2933575.2934568).
- Conference **Loop Quasi-Invariant Detection**, *International Symposium on Automated Technology for Verification and Analysis (ATVA 2017)*, with J.-Y. Moyén and T. Rubiano, DOI: [10.1007/978-3-319-68167-2\\_7](https://doi.org/10.1007/978-3-319-68167-2_7).
- Chapter **On the Computational Meaning of Axioms**, In O. Pombo, A. Nepomuceno, J. Redmond (Ed.) *Epistemology, Knowledge and the Impact of Interaction* (Springer), with A. Naibo and M. Petrolo, DOI: [10.1007/978-3-319-26506-3\\_5](https://doi.org/10.1007/978-3-319-26506-3_5).
- Chapter **Verificationism and classical realizability**, In C. Baskent (Ed.) *Perspectives on Interrogative Models of Inquiry* (Springer), with A. Naibo and M. Petrolo, DOI: [10.1007/978-3-319-20762-9\\_9](https://doi.org/10.1007/978-3-319-20762-9_9).
- Workshop **Loop Quasi-Invariant Chunk Motion by peeling with statement composition**, In *Proceedings DICE-FOPARA 2017*, with J.-Y. Moyén and T. Rubiano, DOI: [10.4204/EPTCS.248.9](https://doi.org/10.4204/EPTCS.248.9).

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## Publications (Others)

- Recension **Recension de "The blind spot. Lectures on logic" par J.-Y. Girard (European Mathematical Society, 2011)**, *Gazette des Mathématiciens* 142, pp.136-143, with C. Rétoré, [hal-01076369](https://hal.archives-ouvertes.fr/hal-01076369).

Proceedings **Why Complexity Theorists Should Care About Philosophy**, In Jean Fichot, Thomas Piecha (editors), *Beyond Logic. Proceedings of the Conference held in Cerisy-la-Salle*, pp. 381–393., DOI: [10.15496/publikation-18676](https://doi.org/10.15496/publikation-18676).

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## Peer Reviewed Communications without formal Proceedings

- 2013 **Logarithmic Space and Permutations**, *DICE 2013*.
- 2015 **Measurable Preorders and Complexity**, *TACL 2015*.
- 2016 **Interaction Graphs and Quantitative Semantics**, *GaLoP 2016*.
- 2018 **A semantic conjecture on second-order MLL and its complexity consequences (work in progress)**, *Linearity-TLLA 2018*, with Nguyễn Lê Thành Dũng.
- 2018 **Coherent Interaction Graphs: A Non-Deterministic Geometry of Interaction for MLL**, *Linearity-TLLA 2018*, with Nguyễn Lê Thành Dũng.
- 2018 **Entropy and Complexity Lower Bounds**, *DICE 2018*, with Luc Pellissier.
- 2018 **Entropy and Complexity Lower Bounds**, *Linearity-TLLA 2018*, with Luc Pellissier.

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## Tools/Software

- Software **A prototype LLVM pass**, implementing the loop optimisation described in the series of joint papers with J.-Y. Moyen and T. Rubiano.  
[https://github.com/ThomasRuby/lqicm\\_pass](https://github.com/ThomasRuby/lqicm_pass)
- Software **A proof-of-concept in python for optimising C programs**, implementing the loop optimisation described in the series of joint papers with J.-Y. Moyen and T. Rubiano.  
[https://github.com/ThomasRuby/LQICM\\_On\\_C\\_Toy\\_Parser](https://github.com/ThomasRuby/LQICM_On_C_Toy_Parser)

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## Unpublished Documents (Available Online)

- 2007 **La Ludique**, (*First Year*) Masters Thesis (Philosophy).
- 2008 **From Proof Nets to the Hyperfinite Factor**, Masters Thesis (Mathematical Logic and Foundations of Computer Science).
- 2011 **Topologie Non-Commutative. (Notes on Gelfand’s theorem)**, *Lecture Notes*.
- 2011 **Théorie des Ensembles (Set Theory)**, *Lecture Notes*.
- 2012 **Logique dans le facteur hyperfini: géométrie de l’interaction et complexité**, *PhD thesis*.
- 2012 **Description of the Thesis: Logic in the Hyperfinite Factor: Geometry of Interaction and Complexity**, 20-page english summary of my PhD thesis.
- 2014 **Interaction Graphs and Complexity**, *Abstract*.
- 2015 **Memoization for Unary Logic Programming: Characterizing Ptime**, *Research report*, Joint work with Marc Bagnol and Clément Aubert, January 2015.
- 2016 **Notes on Graph C\*-algebras and Dynamical Systems**, *Lecture Notes*.

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## Preprints

- Under Rev. **Interaction Graphs: Exponentials**, *Logical Methods in Computer Science*.
- Submitted **Towards a Complexity-through-Realizability theory**.
- Submitted **From Dynamic to Static Semantics, Quantitatively**.
- Submitted **Semantics, Entropy and Complexity Lower Bounds**, with L. Pellissier.
- In Prep. **Interaction Graphs and Computational Complexity I**.
- In Prep. **Interaction Graphs and Computational Complexity II**.

- In Prep. **Interaction Graphs: Pure Lambda-Calculi.**
- In Prep. **Interaction Graphs: Zeta Functions.**
- In Prep. **Logical Constants from a Computational Point of View**, with A. Naibo, M. Petrolo.

## Organisational Activities

- Organization **Organiser of the CALeidoscope spring/summer school**, *Paris, France*, 2019.  
Spring/summer School on Computational Complexity, "Computational Complexity as a Kaleidoscope: Algebra, Geometry, Logic, and their interactions." (in french: Le Kaleidoscope de la Complexité Algorithmique: Algèbre, Géométrie, Logique et leurs Interactions.)
- Organization **Workshop on Proof Nets and Transcendental Syntax**, *GDRI Linear Logic*, Villetaneuse, France, 2018.
- Organization **Logic group seminar and working groups**, *LIPN*, Villetaneuse, from 2018, ongoing.
- Organization **Seminar on semantics of linear logic**, *IT University, Copenhagen*, 2015-2016.
- Organization **Symposium "The meaning of Axioms"**, *14th CLMPS congress*, 2011.  
Speakers: Denis Bonnay, Gilles Dowek, Alexandre Miquel, Alberto Naibo, Mattia Petrolo, Samuel Troncon
- Organization **"Séances de Mathématiques" seminar**, *IML, Marseille*, from 2010 to 2011.
- Organization **Interdisciplinary Working Group for PhD Students**, *Reunions in Paris and Marseille*, in 2010 and 2011.  
Funded by: Paris 1 University, Paris 7 University, Aix-Marseille II University, ENS (Paris)
- Organization **Working Group on Geometry of Interaction**, *Reunions in Paris and Marseille*, from 2008 to the creation of the ANR project LOGOI.

## Invited Doctoral Courses and Seminars

- Course **Paris 1 University**, *June 2009*, 15 hours course, Paris, France.
- Course **Thematic School "Linear Logic, Ludics and Geometry of Interaction"**, *August 27th – September 1st, 2012*, 1h30 course, Paraty, Brazil.
- Course **Summer School on Linear Logic and Geometry of Interaction**, *August 27th-31st, 2013*, 1h30 course, Turin, Italy.
- Course **Oberseminar "Logik und Sprachtheorie"**, *October 29th, 2013*, 4 hours course, Tübingen, Germany.
- Seminar **Semantics of Linear Logic**, *From November 2015 to May 2016*, IT University, Copenhagen, Denmark.

## Invited Communications in International Events

- Talk **Summer School on Linear Logic and Geometry of Interaction**, *August 31st, 2013*, Turin, Italy.
- Talk **Workshop "Higher Order Computation: Types, Complexity, Applications"**, *June 16th, 2014*, Institut Henri Poincaré, Paris, France.
- Talk **Workshop "Quantitative Semantics of Logic and Computation"**, *September 2nd, 2016*, Marseille, France.
- Talk **Conference of the ANR-DFG project BeyondLogic**, *May 22nd-26th, 2017*, Cerisy, France.
- Talk **Linear Logic, Thirty Years Later**, *October 25th, 2017*, Rome, Italy.
- Talk **Logical Time and Computational Time**, *November 13th-14th, 2017*, Lyon, France.

Talk **Cologne-Twente workshop on Graphs and Combinatorial Optimization**, *June 18th-20th 2018*, CNAM, Paris, France.

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## Administrative Roles

- 2018 – **Member of the International Relations committee at LIPN.**
- 2018 – **Person in charge of Communication and Web for the LoVe team at LIPN.**  
**Member of the Communication committee at LIPN.**

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## Other Research Activities

- Invitation **Short Research Stay**, *Datalogisk Institut, University of Copenhagen*, August 2014.
- Invitation **Short Research Stay**, *PUC-Rio, Brazil*, August 2018.
- PC Chair **Chair and Organiser of DICE-FOPARA 2019**, *ETAPS 2019 affiliated event, Prague, Czech Republic*, 2019.  
Joint workshop: 10th workshop on Developments in Implicit Computational Complexity, and 6th workshop on Foundational and Practical Aspects of Resource Analysis.
- PC Member **Member of the Program Committee for GaLoP (Games for Logic and Programming Languages) 2019.**
- PC Member **Member of the Program Committee for DICE (Developments in Implicit Computational Complexity) 2016.**
- Peer-Review **Referee for international journals.**  
Information and Computation, Mathematical Structures in Computer Science, Logical Methods in Computer Science, ACM Transactions in Computational Logic
- Peer-Review **Referee for international conferences.**  
CSL 2013, RTA/TLCA 2014, ACM/IEEE LICS 2015, 2016, FoSSaCS 2017, CALCO 2017
- Reviewer **Reviewer for Mathematical Reviews (American Mathematical Society).**
- Reviewer **Reviewer for Zentralblatt MATH ([zbMATH](#)).**

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## Selection of other Invited Communications

- Talk **ANR project LOGOI meeting**, *June 14th, 2012*, Marseille, France.
- Talk **ANR project RECRE meeting**, *October 11th, 2012*, Lyon, France.
- Talk **"PPS Seminar"**, *January 24th, 2013*, PPS, Paris, France.
- Talk **ANR project LOGOI meeting**, *February 1st, 2013*, Marseille, France.
- Talk **"LAMA Seminar"**, *April 4th, 2013*, LAMA, Chambéry, France.
- Talk **ANR project LOGOI meeting**, *June 10th-11st, 2013*, Paris, France.
- Talk **"68nqrt" Seminar**, *June 13th, 2013*, IRISA/INRIA, Rennes, France.
- Talk **GdR IM meeting**, *January 28th, 2014*, Paris, France.
- Talk **Séminaire de Mathématiques**, *February 25th, 2014*, IHÉS, Bures-sur-Yvette, France.
- Talk **"Algorithmics, Complexity and Logic Laboratory" seminar**, *March 31st, 2014*, LACL, Paris, France.
- Talk **ANR project ELICA meeting**, *February 6th, 2015*, LIPN, Paris, France.
- Talk **ANR project LOGOI meeting**, *March 24th, 2015*, IML, Marseille, France.
- Talk **HCC seminar**, *November 27, 2015*, Department of Computer Science (DIKU), University of Copenhagen, Denmark.
- Talk **"PPS Seminar"**, *March 10th, 2016*, PPS, Paris, France.
- Talk **CHOCOLA Seminar**, *November 9th, 2017*, ENS Lyon, France.

- Talk **Workshop on Realisability**, June 12th-13th 2018, CIRM, Marseille, France.
- Talk **Computer Science Department seminar**, August 7th, 2018, PUC-Rio, Rio de Janeiro, Brazil.

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## Selection of Communications (Workshops and Conferences)

- Talk **"Interaction Graphs: Multiplicatives"**, *GaLoP V (Games for Logic and Programming Languages)*, *ETAPS 2010 Workshop*, March 20th-21st, 2010, Paphos, Cyprus.
- Talk **"Logical Constants from a Computational Point of View"**, *ANR project LOCI meeting*, January 20th-21st, 2011, CIRM, Marseille, France.
- Talk **"Interaction Graphs: Additives"**, *Workshop on Linear Logic (Geometry of Interaction, Traced Monoidal Categories and Implicit Complexity)*, November 7th-11th, 2011, Kyoto, Japan.
- Talk **"Interaction Graphs: Additives"**, *Logic and Interaction 2012*, January 30th – March 2nd, 2012, CIRM, Marseille, France.
- Talk **"Interaction Graphs: Additives"**, *LICS 2012 (Logic In Computer Science)*, June 25th-28th, 2012, Dubrovnik, Croatia.
- Talk **"Interaction Graphs: Additives"**, *GaLoP VII (Games for Logic and Programming languages)*, June 29th, 2012, Dubrovnik, Croatia.
- Talk **"Espace Logarithmique et Permutations"**, *GEOCAL Meeting*, February 15th, 2013, Lyon, France.
- Talk **"Logarithmic Space and Permutations"**, *DICE 2013 (Developments in Implicit Computational Complexity)*, March 17th, 2013, Rome, Italy.
- Talk **"Interaction Graphs and Complexity"**, *GEOCAL Meeting*, March 25th, 2014, Bordeaux, France.
- Talk **"Towards a Complexity-through-Realizability Theory"**, *FOPARA–DICE 2015*, April 12th, 2015, London, UK.
- Talk **"Measurable Preorders and Complexity"**, *TACL 2015 (Topology, Algebra and Categories in Logic)*, June 26th, 2015, Ischia, Italy.
- Talk **"Interaction Graphs and Quantitative Semantics"**, *GALOP 2016 (Games for Logic and Programming Languages)*, *ETAPS 2016 Workshop*, April 2nd, 2016, Eindhoven, Netherlands.
- Talk **"Measurable Preorders and Complexity"**, *FOSSACS 2016 (Foundations of Software Science and Computation Structures)*, April 6th, 2016, Eindhoven, Netherlands.
- Talk **"Interaction Graphs: Full Linear Logic"**, *LICS 2016 (IEEE/ACM Logic in Computer Science)*, July 6th, 2016, New York, USA.
- Talk **"Computational Complexity, between Algebra and Geometry"**, *GEOCAL-LAC Meeting*, November 29th, 2016, Paris, France.
- Talk **"Entropy and Complexity Lower Bounds"**, *Developments in Implicit Computational Complexity (DICE) 2018*, April 14th-15th, 2018, Thessaloniki, Greece.
- Talk **"Measurable Dynamics, Logic and Computational Complexity"**, *Conference on Mathematical Logic, Satellite event of the ICM 2018*, August 10th-11th, 2018, Niterói, Brazil.

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## Teaching Experience

- 2018-2019 **Lectures in Mathematics / Computer Science**, *Université Paris 13*, 54 hours.  
Courses: Category Theory (third year students, dual mathematics and computer science diploma, first semester).

- 2017-2018 **Lectures in Mathematics / Computer Science**, *Université Paris 13*, 48 hours.  
Courses: Category Theory (third year students, dual mathematics and computer science diploma, first semester).
- 2017-2018 **Exercise Sessions and Practice Sessions in Computer Science (languages: C)**, *Université Paris 13*, 60 hours.  
Courses: Logic, Algorithmics (first year students, second semester).
- 2012-2013 **Exercise Sessions and Practice Sessions in Computer Science (languages: Python)**, *Université de Savoie*, 40 hours.  
Courses: Algorithmic and Programming (first year students, second semester).
- 2011-2012 **Exercise Sessions and Practice Sessions in Computer Science (languages: Python, Ada and C)**, *Université de Savoie*, 176 hours.  
Courses: Introduction to Algorithmic and Programming (first year students, first semester), Algorithmic and Programming (first year students, second semester), Imperative Programming (second year students, first semester), Operating Systems (third year students, first semester).
- 2008-2011 **Lectures in Mathematics (third year students)**, *Université de la Méditerranée*.  
Courses: Introduction to Logic. (36 hours of teaching each year)

## Other Teaching Activities

- 2015 **Participation to the "Fête de la science" in Paris.**  
This is a national yearly event for the popularisation and promotion of science, organised by the French ministry for higher education and research.
- 2013 **Qualified for holding a *Maitre de Conférence* position both in mathematics and in computer science**, *Delivered by the French ministry of higher education and research*, 13/02/2013, Qualification Number: 13225242836.
- 2012-2013 **Co-organization of a "Maths à modeler" course**, *Université de Savoie*.  
This is an initiation to research course for elementary school pupils (around ten 1h30 sessions).
- 2008-2011 **Participation to five "Hippocampe" courses**, *Université de la Méditerranée*.  
These are three-days courses initiating high-school and middle-school students to research.

## Carrier Breaks

- 21 Weeks Paternity Leave (2 weeks) from May 6th 2016 to May 23rd 2016, and Parental Leave (19 weeks) from October 24th, 2016 to March 5th, 2017.