

CURRICULUM VITAE

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PHILIPPE GAUCHER

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PERSONAL DETAILS

Gender: He/Him
Date of birth: February 5th, 1967
Place of birth: Amiens, France
Present Citizenship: French

RESEARCH AREA

Homotopy theory and applications in computer science (concurrency theory)

EDUCATION

- | | |
|-----------------|---|
| 09/1984–06/1987 | Undergraduate courses (L1, L2) to prepare nationwide competitive exams, Mathematics, Physics, Computer Science at the Classe Préparatoire du Lycée Corneille (Rouen, France) |
| 10/1987–06/1988 | Undergraduate and graduate studies (L3, M1) at the Ecole Normale Supérieure de la rue d'Ulm (Paris, France) |
| 1988 | L3 and M1 degrees in mathematics and computer science (Magistère Ecole Normale Supérieure de la rue d'Ulm et Université Paris 7 Denis-Diderot)
Title: <i>A propos de l'homologie des algèbres de Lie</i> |
| 09/1988–06/1989 | Graduate studies (M2) at the Institut de Recherche Mathématique Avancée (Université Louis Pasteur, Strasbourg, France) |
| 1989 | M2 degree in pure mathematics (algebraic topology, Université Louis Pasteur, Strasbourg)
Supervisor: Daniel Guin
Title: <i>On the general linear group and Hochschild homology</i> |

1992	<p>Ph.D. degree in mathematics (algebraic topology, Université Louis Pasteur, Strasbourg)</p> <p>Jury: Jean-Louis Loday (supervisor), Henri Carayol (rapporteur), Christophe Soulé (rapporteur), Daniel Guin, Hubert Rubenthaler</p> <p>Title: <i>Opérations sur l'homologie d'algèbres de matrices et homologie cyclique</i></p>
2002	<p>Habilitation degree in mathematics (algebraic topology and application in computer science, Université Louis Pasteur, Strasbourg)</p> <p>Jury: Jean-Louis Loday (supervisor), Jeremy Gunawardena (rapporteur), Hans-Werner Henn (rapporteur), Michael Johnson (rapporteur), Pierre-Louis Curien, Jean-Yves Girard, Daniel Guin</p> <p>Title: <i>Déformation des Flots de Chemins Continus : Théorie et Applications</i></p>

EMPLOYMENT

10/1987–08/1991	Student at the Ecole Normale Supérieure de la rue d'Ulm (Paris)
09/1991–08/1992	Math Teacher at the Université Louis Pasteur (Strasbourg) Allocataire Moniteur Normalien
09/1992–08/1993	Military service at the ONERA (Toulouse) Supervisor: Gérard Eizenberg
09/1993–09/2003	CNRS researcher at the Institut de Recherche Mathématique Avancée (IRMA, Strasbourg)
10/2003–12/2015	CNRS researcher at Preuve Programme Système (PPS, Paris)
01/2016–Now	CNRS researcher at the Institut de Recherche en Informatique Fondamentale (IRIF, Paris)

ACADEMIC AWARDS

1984	Lauréat du Concours Général de Mathématiques
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PROFESSIONAL SERVICE

1989–1992	Teaching (French: colleur en math sup) at the lycée Kleber de Strasbourg
1994–1995	Webmaster of IRMA Strasbourg

2001–2002	Teaching in L1 and L2 math (130 h, algebra, analysis, logic)
2002–2003	Teaching in L1 math and L3 geography (96 h, algebra, analysis)
2003–2007	Local coordinator for ANR project (INVAL)
2006–Now	Reviewer for Math Reviews (162 reviews including 4 books)
2007–Now	Reviewer for zbMATH (190 reviews)
2022–Now	Member of the Editorial Board of Extracta Mathematica
2003–Now	Reviewer for mathematical and computer-scientific journals (Compositionality, Electronic Notes in Computer Science, Fundamenta Mathematicae, Mathematical Structures in Computer Science, New-York Journal of Mathematics, Springer Lecture Notes in Mathematics, Topology and Applications)
2003–Now	Project reviewer (NSERC Canada, Israel Science Foundation)

PUBLICATIONS

- [1] P. Gaucher. Lambda-opérations et homologie des matrices. *C. R. Acad. Sci. Paris Sér. I Math.*, 313(10):663–666, 1991.
- [2] P. Gaucher. Produit tensoriel de matrices et homologie cyclique. *C. R. Acad. Sci. Paris Sér. I Math.*, 312(1):13–16, 1991.
- [3] P. Gaucher. Produit tensoriel de matrices, homologie cyclique, homologie des algèbres de Lie. *Ann. Inst. Fourier (Grenoble)*, 44(2):413–431, 1994. <https://doi.org/10.5802/aif.1404>.
- [4] P. Gaucher. Lambda-opérations sur l’homologie d’une algèbre de Lie de matrices. *K-Theory*, 13(2):151–167, 1998. <https://doi.org/10.1023/A:1007719230240>.
- [5] P. Gaucher. From concurrency to algebraic topology. In *Electronic Notes in Theoretical Computer Science*, volume 39, pages 1–19, 2000. [https://doi.org/10.1016/S1571-0661\(05\)01149-7](https://doi.org/10.1016/S1571-0661(05)01149-7).
- [6] P. Gaucher. Homotopy invariants of higher dimensional categories and concurrency in computer science. *Mathematical Structures in Computer Science*, 10(4):481–524, 2000. Geometry and concurrency. <https://doi.org/10.1017/S0960129500003182>.
- [7] P. Gaucher. Combinatorics of branchings in higher dimensional automata. *Theory Appl. Categ.*, 8:No. 12, 324–376 (electronic), 2001.
- [8] P. Gaucher. About the globular homology of higher dimensional automata. *Cah. Topol. Géom. Différ. Catég.*, 43(2):107–156, 2002.

- [9] P. Gaucher. Investigating the algebraic structure of dihomotopy types. In *Electronic Notes in Theoretical Computer Science*, volume 52, page 25pp. Elsevier Science Publishers, 2002. [https://doi.org/10.1016/S1571-0661\(04\)00221-X](https://doi.org/10.1016/S1571-0661(04)00221-X).
- [10] P. Gaucher. Automate parallèle à homotopie près. I. *C. R. Math. Acad. Sci. Paris*, 336(7):593–596, 2003. [https://doi.org/10.1016/S1631-073X\(03\)00118-3](https://doi.org/10.1016/S1631-073X(03)00118-3).
- [11] P. Gaucher. Automate parallèle à homotopie près. II. *C. R. Math. Acad. Sci. Paris*, 336(8):647–650, 2003. [https://doi.org/10.1016/S1631-073X\(03\)00119-5](https://doi.org/10.1016/S1631-073X(03)00119-5).
- [12] P. Gaucher. The branching nerve of HDA and the Kan condition. *Theory Appl. Categ.*, 11:No. 3, 75–106 (electronic), 2003.
- [13] P. Gaucher. A model category for the homotopy theory of concurrency. *Homology, Homotopy and Applications*, 5(1):p.549–599, 2003. <https://doi.org/10.4310/hha.2003.v5.n1.a20>.
- [14] P. Gaucher and E. Goubault. Topological deformation of higher dimensional automata. *Homology Homotopy Appl.*, 5(2):39–82, 2003. <https://doi.org/10.4310/HHA.2003.v5.n2.a3>.
- [15] P. Gaucher. The homotopy branching space of a flow. In *Electronic Notes in Theoretical Computer Science*, volume 100, pages 95–109. Elsevier Science Publishers, 2004. <https://doi.org/10.1016/j.entcs.2004.08.015>.
- [16] P. Gaucher. Comparing globular complex and flow. *New York J. Math.*, 11:97–150 (electronic), 2005.
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- [18] P. Gaucher. Homological properties of non-deterministic branchings of mergings in higher dimensional automata. *Homology Homotopy Appl.*, 7(1):51–76 (electronic), 2005. <https://doi.org/10.4310/hha.2005.v7.n1.a4>.
- [19] P. Gaucher. Inverting weak dihomotopy equivalence using homotopy continuous flow. *Theory Appl. Categ.*, 16:No. 3, 59–83 (electronic), 2006.
- [20] P. Gaucher. T-homotopy and refinement of observation (III) : Invariance of the branching and merging homologies. *New York J. Math.*, 12:319–348 (electronic), 2006.
- [21] P. Gaucher. T-homotopy and refinement of observation (IV) : Invariance of the underlying homotopy type. *New York J. Math.*, 12:63–95 (electronic), 2006.
- [22] P. Gaucher. T-homotopy and refinement of observation, part II: Adding new T-homotopy equivalences. *Internat. J. Math. Math. Sci.*, 2007:Article ID 87404, 20 pages, 2007. <https://doi.org/10.1155/2007/87404>.

- [23] P. Gaucher. Globular realization and cubical underlying homotopy type of time flow of process algebra. *New York J. Math.*, 14:101–137 (electronic), 2008.
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- [25] P. Gaucher. Homotopical interpretation of globular complex by multi-pointed d-space. *Theory Appl. Categ.*, 22:No. 22, 588–621 (electronic), 2009.
- [26] P. Gaucher. T-homotopy and refinement of observation (I) : Introduction. *Electronic Notes in Theoretical Computer Science*, 230:103–110, 2009. <http://dx.doi.org/10.1016/j.entcs.2009.02.019>.
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- [28] P. Gaucher. Directed algebraic topology and higher dimensional transition systems. *New York J. Math.*, 16:409–461 (electronic), 2010.
- [29] P. Gaucher. Towards a homotopy theory of higher dimensional transition systems. *Theory Appl. Categ.*, 25:No. 25, 295–341 (electronic), 2011.
- [30] P. Gaucher. Erratum to ”towards a homotopy theory of higher dimensional transition systems”. *Theory Appl. Categ.*, 29:No. 2, 17–20 (electronic), 2014.
- [31] P. Gaucher. Homotopy theory of labelled symmetric precubical sets. *New York J. Math.*, 20:93–131 (electronic), 2014.
- [32] P. Gaucher. The choice of cofibrations of higher dimensional transition systems. *New York J. Math.*, 21:1117–1151 (electronic), 2015.
- [33] P. Gaucher. The geometry of cubical and regular transition systems. *Cah. Topol. Géom. Différ. Catég.*, LVI-4, 2015.
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- [35] P. Gaucher. Combinatorics of past-similarity in higher dimensional transition systems. *Theory Appl. Categ.*, 32:No. 33, 1107–1164 (electronic), 2017.
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- [41] P. Gaucher. Six model categories for directed homotopy. *Categories and General Algebraic Structures with Applications*, 15(1):145–181, 2021. <https://doi.org/10.52547/cgasa.15.1.145>.
- [42] P. Gaucher. Comparing cubical and globular directed paths. *Fundamenta Mathematicae*, 2023. <https://doi.org/10.4064/fm219-3-2023>.
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PREPRINTS

- [1] P. Gaucher. Directed degeneracy maps for precubical sets, 2022. <https://doi.org/10.48550/arXiv.2209.02667>.
- [2] P. Gaucher. Regular directed path and Moore flow, 2022. <https://doi.org/10.48550/arXiv.2208.00918>.
- [3] P. Gaucher. Homotopy theory of Moore flows (III), 2023. <https://doi.org/10.48550/arXiv.2303.16174>.
- [4] P. Gaucher. Towards a theory of natural directed paths, 2023. <https://doi.org/10.48550/arXiv.2306.02792>.