

Flavien BREUVART

Research interests

Key-words: Lambda-calculus, type systems, denotational semantics, topology, probabilistic computing, quantum computing, category theory, domains theory, proof theory

Program: I am interested in operational and denotational semantics for programming languages and lambda-calculi in particular. More precisely I am working on three directions and their interactions :

- Models of pure lambda-calculus: used for studying the lattice of lambda-theories, in particular its interactions with computability theory.
- Quantitative semantics: building parametrised concrete semantics either to extract quantitative information or to model resource sensitive calculi. I am particularly interested in probabilistic calculi as well as semantics sensible to complexity and sequentiality.
- Probabilistic (higher order) Rewriting: Understanding probabilistic reduction and termination. More exactly, I am interested in separating classical and probabilistic properties of probabilistic programs so that linear/non-probabilistic invariant that can be towed by lifting standard proof techniques.

By transitivity I am also interested in many related domains: logic, algebra, proof theory, computability theory, complexity theory,.. But also further computer science domains: language design, circuit design, cryptography protocols (differential privacy)...

Position

2016-Now: **Assistant professor (maître de conférence)**, at LIPN, Université Paris 13, Villetaneuse, France.

2015-2016: **Inria post-doctoral position**, in Focus Team, Bologna, Italy.

2012-2015: **PhD candidate**, with Antonio Bucciarelli and Michele Pagani, at PPS, University Paris Diderot, Paris, France.

2012-2015: **Teaching Assistant**, at UFR Informatique, University Paris Diderot, Paris, France.

Grants and Awards

2018: **ANR JCJC CoGITARe**, starting grant of 200k€ .

2015: **Inria post-doctoral positions**, in Focus Team, Bologna, Italy.

2014: **Kleene Award**, for best student paper, in CSL-LICS, Vienna, Austria.

2012: **Three-Years PhD fellowship**, from the french "Ministry of Higher Education and Research", France.

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Université Paris 13, Institut Galilée, LIPN, team LCR

Publications

Conference papers

- [C3] Flavien Breuvert and Ugo Dal Lago. “On Intersection Types and Probabilistic Lambda Calculi”. In: *Proceedings of the 20th International Symposium on Principles and Practice of Declarative Programming, PPDP 2018, Frankfurt am Main, Germany, September 03-05, 2018*. Ed. by David Sabel and Peter Thiemann. ACM, 2018, 8:1–8:13. DOI: 10.1145/3236950.3236968. URL: <https://lipn.univ-paris13.fr/~breuvert/articles/ProbIntTyp.pdf>.
- [C1] Flavien Breuvert, Ugo Dal Lago, and Agathe Herrou. “On Higher-Order Probabilistic Subrecursion”. In: *FOSSACS*. Ed. by Javier Esparza and Andrzej S. Murawski. Vol. 10203. Lecture Notes in Computer Science. 2017, pp. 370–386. ISBN: 978-3-662-54457-0. DOI: 10.1007/978-3-662-54458-7_22. URL: https://doi.org/10.1007/978-3-662-54458-7_22.
- [C2] Flavien Breuvert et al. “New Results on Morris’s Observational Theory: The Benefits of Separating the Inseparable”. In: *1st International Conference on Formal Structures for Computation and Deduction, FSCD 2016, June 22-26, 2016, Porto, Portugal*. Ed. by Delia Kesner and Brigitte Pientka. Vol. 52. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2016, 15:1–15:18. ISBN: 978-3-95977-010-1. DOI: 10.4230/LIPIcs.FSCD.2016.15. URL: <https://doi.org/10.4230/LIPIcs.FSCD.2016.15>.
- [C3] Marco Gaboardi et al. “Combining effects and coeffects via grading”. In: *ICFP*. Ed. by Jacques Garrigue, Gabriele Keller, and Eijiro Sumii. ACM, 2016, pp. 476–489. ISBN: 978-1-4503-4219-3. DOI: 10.1145/2951913.2951939. URL: <http://doi.acm.org/10.1145/2951913.2951939>.
- [C4] Flavien Breuvert and Michele Pagani. “Modelling Coeffects in the Relational Semantics of Linear Logic”. In: *24th EACSL Annual Conference on Computer Science Logic, CSL 2015, September 7-10, 2015, Berlin, Germany*. Vol. 41. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2015, pp. 567–581.
- [C5] Flavien Breuvert. “On the characterization of models of H^* ”. In: *CSL-LICS*. Ed. by Thomas A. Henzinger and Dale Miller. Kleene award. ACM, 2014, 24:1–24:10. ISBN: 978-1-4503-2886-9. DOI: 10.1145/2603088.2603111. URL: <http://doi.acm.org/10.1145/2603088.2603111>.
- [C6] Flavien Breuvert. “The Resource Lambda Calculus Is Short-Sighted in Its Relational Model”. In: *Typed Lambda Calculi and Applications, 11th International Conference, TLCA 2013, Eindhoven, The Netherlands, June 26-28, 2013. Proceedings*. Ed. by Masahito Hasegawa. Vol. 7941. Springer, 2013, pp. 93–108. ISBN: 978-3-642-38945-0. DOI: 10.1007/978-3-642-38946-7_9. URL: https://doi.org/10.1007/978-3-642-38946-7_9.

Journal papers

- [J4] Flavien Breuvert, Giulio Manzonetto, and Domenico Ruoppolo. “Relational Graph Models at Work”. In: *Logical Methods in Computer Science* 14.3 (2018). DOI: 10.23638/LMCS-14(3:2)2018. URL: [https://doi.org/10.23638/LMCS-14\(3:2\)2018](https://doi.org/10.23638/LMCS-14(3:2)2018).
- [J1] Flavien Breuvert. “On the characterization of models of H^* : The semantical aspect”. In: *Logical Methods in Computer Science* 12.2 (2016). invited. DOI: 10.2168/LMCS-12(2:4)2016. URL: [https://doi.org/10.2168/LMCS-12\(2:4\)2016](https://doi.org/10.2168/LMCS-12(2:4)2016).

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Submitted

- [S1] Flavien Breuvert. “Refining Properties of Filter Models: Approximability, Sensibility and Reducibility”. submitted. URL: <https://lipn.univ-paris13.fr/~breuvert/articles/ApproxTh.pdf>.
- [S2] Flavien Breuvert, Ugo Dal Lago, and Agathe Herrou. “On Higher-Order Probabilistic Subrecursion (long version)”. invited, submitted. URL: <https://lipn.univ-paris13.fr/~breuvert/articles/ProbSubrecLong.pdf>.

non peer-reviewed

- [A1] Flavien Breuvert. “On the characterization of models of H^* : the operational aspect”. In: waiting to be submitted. URL: <https://lipn.univ-paris13.fr/~breuvert/articles/OpeAspect.pdf>.
- [A2] Flavien Breuvert. “On the discriminating power of tests in resource lambda-calculus”. In: vol. abs/1205.4691. 2012. URL: <http://arxiv.org/abs/1205.4691>.

Responsibilities

- 2019-now: **Project coordination**, *Coordinator for the ANR JCJC CoGITARe*, Villetaneuse, France.
- 2018-now: **Commission member**, *member of the informal commission “vie du laboratoire” of the LIPN*, Villetaneuse, France.
- 2018-now: **Course coordination**, *Supervisor for the “Compilation” class (M1)*, Villetaneuse, France.
- 2017-now: **Course coordination**, *Supervisor for the “LEE” class (M2)*, Villetaneuse, France.
- 2017-now: **Course coordination**, *Supervisor for the “Principes de programmation” class (L3)*, Villetaneuse, France.
- 2017-now: **Seminar organization**, *Organization of the group seminar, at team Love (previousli LCR) of LIPN, University Paris 13, Villetaneuse, France.*
- 2016: **Seminar organization**, *Organization of the temporary working group “Probabilistic calculi”, at Focus, University of Bologna, Bologna, Italy.*
- 2014: **Workshop organization**, *Participation at the organization of the international workshop Domain XI, at PPS, University Paris Diderot, Paris, France.*
- 2013: **seminar organization**, *Organization of the temporary working group “Sémantique des calculs classiques”, at PPS, University Paris Diderot, Paris, France.*
- 2012-2015: **Representative of PhD students**, *in the Board of directors, of the laboratory PPS, Paris, France.*

Teaching

- 2018: **Compilation**, *Lecturer and TA for M1 course named Compilation*, at university Paris 13, Villetaneuse, France.
- 2017: **JEE and frameworks**, *Lecturer and TA for M2 course named LEE*, at university Paris 13, Villetaneuse, France.

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- 2017 & 2018: **Haskell**, *Lecturer and TA for L3 course named Principes de programmation*, at university Paris 13, Villetaneuse, France.
- 2017: **Compilation**, *TA for M1 course named Compilation*, at university Paris 13, Villetaneuse, France.
- 2017 & 2018: **Ocaml**, *TA for L2 course named Programmation fonctionnelle*, at university Paris 13, Villetaneuse, France.
- 2016: **JEE and frameworks**, *TA for M2 course named LEE*, at university Paris 13, Villetaneuse, France.
- 2015: **advanced Java**, *TA for L3 course named POOIG*, at university Paris Diderot, Paris, France.
- 2014: **advanced Java**, *TA for M1 course for linguists named POO3*, at university Paris Diderot, Paris, France.
- 2014 & 2015: **architecture**, *TA for M1 course*, at university Paris Diderot, Paris, France.
- 2014: **“UE libre” vulgarization**, *In charge of the “UE libre” (optional short course) on scientific vulgarization in M1*, at university Paris Diderot, Paris, France.
- 2013 & 2014: **mid-beginner Java**, *TA for L1 course named TO2*, at university Paris Diderot, Paris, France.
- 2012: **Java projects**, *Supervising Java projects in L2 (more exactly for the “classe préparatoire intégrée de l’EIDD”)*, at university Paris Diderot, Paris, France.
- 2008-2012: **vulgarization**, *occasional (5-10 times per years) 1 hour of vulgarization on mathematics and computer sciences for middle school students*, with the association PRACCIS, Cachan, France.
- 2008-2009: **vulgarization of game theory**, *1h/week of vulgarization of game theory to high school students*, with the association Sciences Ouvertes, Drancy, France.

Communications

- 2017-now **Divers intervention in the Love group seminar**, Villetaneuse, France.
- 07/09/2018 **Conference PDP**, Frankfurt, Germany.
“Refining Properties of Filter Models: Approximability, Sensibility and Reducibility”
- 07/07/2018 **Workshop HOR**, *Part of FLOC*, Oxford, UK.
“Refining Properties of Filter Models: Approximability, Sensibility and Reducibility”
- 06/08/2017 **“Theory seminar”**, *School of Computer Science*, University of Birmingham, Birmingham, UK.
“Toward a general theory of graded types”
- 26/04/2017 **Conference Fossacs**, Upsala, Sweden.
“On Higher-Order Probabilistic Subrecursion”
- 05/04/2017 **Seminar of logic team**, *of LAMA*, University of Savoie, Chambéry, France.
“Un type est-il composé de termes ou un terme composé de types? ”
- 06/09/2016 **Workshop LC&A**, Innsbruck, Austria.
“On Higher-Order Probabilistic Subrecursion”

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- 28/08/2016 **Workshop Crecogi**, *collocated with CSL*, Marseille, France.
"From Hard Work to Trickery: A Systematic Approach to Probabilistic Rewriting"
- 26/06/2016 **Workshop ITRS**, *collocated with FSCD*, Porto, Portugal.
"Old and New Results on Probabilistic Intersection Type System"
- 07/04/2016 **Seminar semantics**, *in IRIF*, Paris, France.
"L'encodage probabiliste: vers une formalisation systématique des langages probabilistes, déterministes et potentiellement divergent."
- 26/03/2016 **Seminar of logic team**, *in I2M*, Marseille, France.
"L'encodage probabiliste: vers une formalisation systématique des langages probabilistes, déterministes et potentiellement divergent."
- 02/03/2016 **GdT Probabilistic Calculi**, Bologna, Italy.
"From hard work to trickery: a systematic approach of probabilistic rewriting."
- 06/02/2016 **GdRI-LL**, Bologna, Italy.
"Toward dependant coefficients"
- 32/10/2015 **PhD Defence**, Paris, France.
"Dissecting Denotational Semantics"
- 10/09/2015 **Conference CSL**, Berlin, Germany.
"Modelling Coeffects in Rel"
- 03/09/2014 **Seminar of logic team**, *of LAMA*, University of Savoie, Chambéry, France.
"On the characterization of models of \mathcal{H}^* "
- 17/07/2014 **Conference CSL-LICS**, Vienna, Austria.
"On the characterization of models of \mathcal{H}^* "
- 04/04/2014 **Seminar of team LCR**, *in LIPN*, University Paris Nord, Paris, France.
"De la caractérisation des modèles de \mathcal{H}^* "
- 09/04/2014 **PHD seminar LIAFA-PPS**, University Paris Diderot, Paris, France.
"Basic notions on weighted models"
- 14/03/2014 **"Theory seminar"**, *School of Computer Science*, University of Birmingham, Birmingham, UK.
"A bridge between semirings"
- 03/12/2013 **BLL'workshop**, Fontainebleau, France.
"A bridge between semirings"
- 27/06/2013 **Conference TLCA**, Eindhoven, Netherlands.
"The resource lambda calculus is short-sighted in its relational model"
- 15/02/2013 **GEOCAL Meeting**, Lyon, France.
"Une bien étrange caractérisation de l'adéquation complète dans les domaines de Scott"
- 24/10/2012 **LIAFA-PPS' PHD seminar**, University Paris Diderot, Paris, France.
"Petites histoires entre modèles et syntaxes"
- 12/09/2012 **Annual meeting of laboratory PPS**, University Paris Diderot, Trouville, France.
"Petites histoires entre modèles et syntaxes"
- 02/09/2011 **LIAFA-PPS' PHD seminar**, University Paris Diderot, Paris, France.
"Et si les PPSiens se mettaient à faire de l'algèbre?!"

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Education

- 2010-2011: **PHD thesis in Paris Diderot**, Paris, France.
2010-2011: **M2 in MPRI**, Cachan, France.
2009-2010: **M1 in MPRI**, Cachan, France.
2008-2009: **L3 in computer sciences and in mathematics**, at ENS Cachan, Cachan, France.
2008: **admission at ENS Cachan**, Cachan, France.
2006-2008: **CPGE MPSI and MP***, at Lycée Fénélon, Paris 5^{iem}, France.
2006: **French baccalaureate**, "mention bien", at Lycée W.A.Mozart., Le Blanc Mesnil, France.

Research Internships

- 2011-2012: **12 months internship**, with Antonio Bucciarelli, at PPS, University Paris Diderot, Paris, France.
2011: **5 months internship**, with Thomas Ehrhard and Antonio Bucciarelli, at PPS, University Paris Diderot, Paris, France.
2010: **5 months internship**, with Peter Selinger, at Dalhousie University, Halifax, Canada.
2009: **2 months internship**, with Achim Jung, at University of Birmingham, Birmingham, UK.

Associative activities

- 2016–: **Academic referent**, for MATH.en.JEANS, In two high schools, Bobogny and Fresne, France.
2016–: **active member**, of Sciences Ouvertes, Drancy, France.
2010-2011: **president of PRACCIS project**, in SONO, Cachan, France.
2009-2010: **active member**, of BDE ENS Cachan, with high implication in the clubs BDA, Mediatek, PRACCIS, Cachan, France.
2007-2008: **active member**, of Sciences Ouvertes, Drancy, France.
2005-2007: **board of directors**, of the association MJC Daniel André, Drancy, France.