

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:

- 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.

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: **Professor (maître de conférence)**, at LIPN, Université Paris 13, Villetaneuse, France.

2015-2016: **Iria 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.

Other research experience

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.

Grants and Awards

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

83 rue de la république – Saint Denis, France
(+33)6 66 15 63 49 • flavien.breuvart@lipn.univ-paris13.fr
<http://www.lipn.univ-paris13.fr/~breuvart/>
Université Paris 13, Institut Galilée, LIPN, team LCR

- 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.

Publications

Conference papers

- [C1] Flavien Breuvert, Ugo Dal Lago, and Agathe Herrou. "On Higher-Order Probabilistic Subrecursion". In: *Foundations of Software Science and Computation Structures - 20th International Conference, FOSSACS 2017, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2017, Uppsala, Sweden, April 22-29, 2017, Proceedings*. 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: *Proceedings of the 21st ACM SIGPLAN International Conference on Functional Programming, ICFP 2016, Nara, Japan, September 18-22, 2016*. 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*. Ed. by Stephan Kreutzer. Vol. 41. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2015, pp. 567–581. ISBN: 978-3-939897-90-3. DOI: 10.4230/LIPIcs.CSL.2015.567. URL: <https://doi.org/10.4230/LIPIcs.CSL.2015.567>.
- [C5] Flavien Breuvert. "On the characterization of models of H^* ". In: *Joint Meeting of the Twenty-Third EACSL Annual Conference on Computer Science Logic (CSL) and the Twenty-Ninth Annual ACM/IEEE Symposium on Logic in Computer Science (LICS), CSL-LICS '14, Vienna, Austria, July 14 - 18, 2014*. 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

- [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).

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 and Ugo Dal Lago. “On Intersection Types and Probabilistic Lambda Calculi”. submitted. URL: <https://lipn.univ-paris13.fr/~breuvert/articles/ProbIntTyp.pdf>.
- [S3] 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>.
- [S4] Flavien Breuvert et al. “Relational Graph Models at Work”. journal version, submitted.

non peer-reviewed

- [A1] 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>.
- [A2] 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>.

Responsibilities

- 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.
- 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

- 06/08/2017 **“Theory seminar”**, School of Computer Science, University of Birmingham, Birmingham, UK.
“Toward a general theory of graded types”
- 26/04/2017 **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 composÃ© de termes ou un terme composÃ© de types? ”
- 06/09/2016 **Workshop LC&A**, Innsbruck, Austria.
“On Higher-Order Probabilistic Subrecursion”
- 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 coeffects”
- 32/10/2015 **PhD Defence**, Paris, France.
 “Dissecting Denotational Semantics”
- 10/09/2015 **CSL’2015**, 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 **CSL-LICS**, Vienna, Austria.
 “On the characterization of models of \mathcal{H}^* ”
- 04/04/2014 **seminar of team LCR**, in *LIPN*, Univerisity Paris Nort, Paris, France.
 “De la caractérisation des modèles de \mathcal{H}^* ”
- 09/04/2014 **LIAFA-PPS’ PHD seminar**, 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 **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 **PPS’ anual meating**, 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?!!”

Education

- 2010-2011: **PHD thesis in Paris Diderot**, Paris, France.
- 2010-2011: **M2 in MPRI**, Cachan, France.
- 2009-1010: **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.

83 rue de la république – Saint Denis, France
 (+33)6 66 15 63 49 • flavien.breuvart@lipn.univ-paris13.fr
<http://www.lipn.univ-paris13.fr/~breuvart/>
 Université Paris 13, Institut Galilée, LIPN, team LCR

- 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.

Associative activities

- 2016–: **Academic referent**, for *MATH.en.JEANS*, In two high schools, Bobigny 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.