Emmanuel Hainry

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current situation: Maître de conférences (associate professor) at Université de Lorraine and Loria.

Experience

2008- Associate Professor at Université Henri Poincaré, Nancy.

2007-2008 Post-doctoral stay at Université Henri Poincaré (now Université de Lorraine)

feb.-july 2007 Post-doctoral stay at Université Catholique de Louvain (Belgium)

2004-2007 Research grant for PhD and teachings at Institut National Polytechnique de Lorraine. Supérieure de Lyon.

Education

2006 Computer Science PhD at INPL entitled "Modèles de calcul sur les réels, résultats de comparaison". defended on december 7th, 2006 in front of:

- Jean-Yves Marion, PhD supervisor
- Olivier Bournez, PhD advisor
- Serge Grigorieff, rapporteur
- Giuseppe Longo, rapporteur
- Vincent Blondel, president
- José Félix Costa, examinator
- Jean-Paul Haton, examinator

2003-2006 LORIA (Laboratoire lorrain de recherche en informatique et ses applications), INPL (Institut National Polytechnique de Lorraine)
PhD, advisors: Olivier Bournez and Jean-Yves Marion

2002-2003 École Normale Supérieure de Lyon
DÉA d'Informatique Fondamentale (equiv: Master)

Publications

My publications can be obtained at https://members.loria.fr/ehainry/publi/Hainry.html.

International Journals

[1] Emmanuel Hainry, Bruce M. Kapron, Jean-Yves Marion, and Romain Péchoux. "A tier-based typed programming language characterizing Feasible Functionals". In: *Logical Methods in Computer Science* 18.1 (2022). DOI: 10.46298/lmcs-18(1:33)2022.

[2] Emmanuel Hainry and Romain Péchoux. "Theory of Higher Order Interpretations and Application to Basic Feasible Functions". In: *Logical Methods in Computer Science* 16.4 (Dec. 2020), p. 25. DOI: 10.23638/LMCS-16(4:14)2020.

[3] Emmanuel Hainry and Romain Péchoux. "A Type-Based Complexity Analysis of Object Oriented Programs". In: *Information and Computation*. Information and Computation 261.1 (Aug. 2018), pp. 78–115. DOI: 10.1016/j.ic.2018.05.006.

[4] Hugo Férée, Emmanuel Hainry, Mathieu Hoyrup, and Romain Péchoux. "Characterizing polynomial time complexity of stream programs using interpretations". In: *Theoretical Computer Science* 585 (2015), pp. 41–54. DOI: 10.1016/j.tcs.2015.03.008.

[5] Olivier Bournez, Daniel Graça, and Emmanuel Hainry. "Computation with perturbed dynamical systems". In: *Journal of Computer and System Sciences* 79.5 (2013), pp. 714–724. DOI: 10.1016/j.jcss.2013.01.025.

[6] Olivier Bournez, Walid Gomaa, and Emmanuel Hainry. "Algebraic Characterizations of Complexity-Theoretic Classes of Real Functions". In: *International Journal of Unconventional Computing* 7.5 (2011), pp. 331–351. URL: https://hal.inria.fr/hal-00644361.

[7] Olivier Bournez, Manuel L. Campagnolo, Daniel S. Graça, and Emmanuel Hainry. "Polynomial differential equations compute all real computable functions on computable compact intervals". In: *Journal of Complexity* 23.3 (2007), pp. 317–335. DOI: 10.1016/j.jco.2006.12.005.

[8] Olivier Bournez and Emmanuel Hainry. "Recursive Analysis Characterized as a Class of Real Recursive Functions". In: *Fundamenta Informaticae* 74.4 (2006), pp. 409–433. URL: http://hal.inria.fr/inria-00000515/en/.

[9] Olivier Bournez and Emmanuel Hainry. "Elementary computable functions over the real numbers and R-sub-recursive functions". In: *Theoretical Computer Science* 348.2-3 (Dec. 2005), pp. 130–147. DOI: 10.1016/j.tcs.2005.09.010.

International conferences

[1] Emmanuel Hainry and Romain Péchoux. "A General Noninterference Policy for Polynomial Time". In: *Principles of Programming Languages, POPL 2023*. Vol. 7. Proc. ACM Program. Lang. ACM, 2023, pp. 806–832. DOI: 10.1145/3571221.

[2] Emmanuel Hainry, Bruce M. Kapron, Jean-Yves Marion, and Romain Péchoux. "Complete and tractable machine-independent characterizations of second-order polytime". In: *Foundations of Software Science and Computation Structures (FoSSaCS 2022)*. Lecture Notes in Computer Science. Springer, 2022, pp. 368–388. DOI: 10.1007/978-3-030-99253-8_19.

[3] Emmanuel Hainry, Emmanuel Jeandel, Romain Péchoux, and Olivier Zeyen. "ComplexityParser: An Automatic Tool for Certifying Poly-Time Complexity of Java Programs". In: *ICTAC 2021 - 18th International Colloquium on Theoretical Aspects of Computing*. Ed. by Antonio Cerone and Peter Csaba Ölveczky. Vol. 12819. Lecture Notes in Computer Science. Nur-Sultan, Kazakhstan: Springer, Sept. 2021, pp. 357–365. DOI: 10.1007/978-3-030-85315-0_20.

[4] Emmanuel Hainry, Bruce M. Kapron, Jean-Yves Marion, and Romain Péchoux. "A tier-based typed programming language characterizing Feasible Functionals". In: *LICS '20 - 35th Annual ACM/IEEE Symposium on Logic in Computer Science*. Saarbrücken, Germany: ACM, July 2020, pp. 535–549. DOI: 10.1145/3373718.3394768.

[5] Emmanuel Hainry, Damiano Mazza, and Romain Péchoux. "Polynomial time over the reals with parsimony". In: *Functional and Logic Programming (FLOPS 2020)*. Akita, Japan, Apr. 2020. DOI: 10.1007/978-3-030-59025-3_4.

[6] Emmanuel Hainry and Romain Péchoux. "Higher order interpretation for higher order complexity". In: *LPAR-21. 21st International Conference on Logic for Programming, Artificial Intelligence and Reasoning*. Ed. by Thomas Eiter and David Sands. Vol. 46. EPiC Series in Computing. 2017, pp. 269–285. DOI: 10.29007/1tkw.

[7] Emmanuel Hainry and Romain Péchoux. "Objects in Polynomial Time". In: *APLAS 2015*. Ed. by Xinyu Feng and Sungwoo Park. Vol. 9458. Lecture Notes in Computer Science. Pohang, South Korea: Springer, Nov. 2015, pp. 387–404. DOI: 10.1007/978-3-319-26529-2_21.

[8] Emmanuel Hainry, Jean-Yves Marion, and Romain Péchoux. "Type-based complexity analysis for fork processes". In: *Foundations of Software Science and Computation Structures (FoSSaCS 2013)*. Ed. by Frank Pfenning. Vol. 7794. Rome, Italy: Springer, 2013, pp. 305–320. DOI: 10.1007/978-3-642-37075-5_20.

[9] Olivier Bournez, Daniel S. Graça, and Emmanuel Hainry. "Robust Computations with Dynamical Systems". In: *Mathematical Foundations of Computer Science, MFCS 2010*. Ed. by Petr Hliněný and Antonín Kučera. Vol. 6281. Lecture Notes in Computer Science. Springer, 2010, pp. 198–208. ISBN: 978-3-642-15154-5. DOI: 10.1007/978-3-642-15155-2_19.

[10] Hugo Férée, Emmanuel Hainry, Mathieu Hoyrup, and Romain Péchoux. "Interpretation of stream programs: characterizing type 2 polynomial time complexity". In: *International Symposium on Algorithms and Computation (ISAAC)*. Ed. by Ottfried Cheong, Kyung-Wong Chwa, and Kunsoo Park. Vol. 6506. Lecture Notes in Computer Science. Jeju Island, South Korea: Springer, 2010, pp. 291–303. DOI: 10.1007/978-3-642-17517-6_27.

[11] Emmanuel Hainry. "Computing omega-limit Sets in Linear Dynamical Systems". In: *Unconventional Computing, UC 2008*. Ed. by Cristian S. Calude, José Félix Costa, Rudolf Freund, Marion Oswald, and Grzegorz Rozenberg. Vol. 5204. Lecture Notes in Computer Science. 2008, pp. 83–95. DOI: 10.1007/978-3-540-85194-3_9.

[12] Emmanuel Hainry. "Reachability in Linear Dynamical Systems". In: *CiE 2008: Logic and Theory of Algorithms*. Ed. by Arnold Beckmann, Costas Dimitracopoulos, and Benedikt Löwe. Vol. 5028. Lecture Notes in Computer Science. 2008, pp. 241–250. DOI: 10.1007/978-3-540-69407-6_28.

[13] Olivier Bournez and Emmanuel Hainry. "On the computational capabilities of several models". In: *Machines, Computations, and Universality - MCU 2007, Orléans, France*. Ed. by Jérôme Durand-Lose and Maurice Margenstern. Vol. 4664. Lecture Notes in Computer Science. Springer, 2007, pp. 12–23. DOI: 10.1007/978-3-540-74593-8_2.

[14] Olivier Bournez, Manuel L. Campagnolo, Daniel S. Graça, and Emmanuel Hainry. "The General Purpose Analog Computer and Computable Analysis are Two Equivalent Paradigms of Analog Computation". In: *Theory and Applications of Models of Computation, TAMC 2006*. Ed. by Jin-Yi Cai, S. Barry Cooper, and Angsheng Li. Vol. 3959. Lecture Notes in Computer Science. Springer, 2006, pp. 631–643. DOI: 10.1007/11750321_60.

[15] Olivier Bournez and Emmanuel Hainry. "Real Recursive Functions and Real Extentions of Recursive Functions". In: *Machines, Computations, and Universality, MCU 2004*. Ed. by Maurice Margenstern. Vol. 3354. Lecture Notes in Computer Science. Springer-Verlag, 2005, pp. 116–127. DOI: 10.1007/978-3-540-31834-7_9.

[16] Olivier Bournez and Emmanuel Hainry. "An analog characterization of elementary computable functions over the real numbers". In: *International Colloquium on Automata, Languages and Programming (ICALP 2004)*. Ed. by Josep Díaz, Juhani Karhumäki, Arto Lepistö, and Donald Sannella. Vol. 3142. Lecture Notes in Computer Science. 2004, pp. 269–280. DOI: 10.1007/978-3-540-27836-8_25.

International Workshops

[1] Emmanuel Hainry, Bruce M. Kapron, Jean-Yves Marion, and Romain Péchoux. *Tiered complexity at higher order*. DICE-FOPARA 2019 - Joint international workshop on Developments in Implicit Computational complExity and Foundational and Practical Aspects of Resource Analysis. Prague, Czech Republic, Apr. 2019.

[2] Emmanuel Hainry, Bruce M. Kapron, Jean-Yves Marion, and Romain Péchoux. *Tiered complexity at higher order*. MLA'2019 - Third Workshop on Mathematical Logic and its Applications. Nancy, France, Mar. 2019.

[3] Emmanuel Hainry and Romain Péchoux. *Higher order interpretations for higher order complexity*. 8th Workshop on Developments in Implicit Computational complExity and 5th Workshop on Foundational and Practical Aspects of Resource Analysis. Uppsala, Sweden, Apr. 2017.

[4] Emmanuel Hainry and Romain Péchoux. *Higher order interpretations for Basic Feasible Functions*. DICE 2015 - Developments in Implicit Computational Complexity. London, United Kingdom, Apr. 2015.

[5] Emmanuel Hainry and Romain Péchoux. *Implicit computational complexity in Object Oriented Programs.* DICE 2015 - Developments in Implicit Computational Complexity. London, United Kingdom, Apr. 2015.

[6] Emmanuel Hainry and Romain Péchoux. *Types for controlling heap and stack in Java.* Third International Workshop on Foundational and Practical Aspects of Resource Analysis (FOPARA). Bertinoro, Italia, Aug. 2013.

[7] Emmanuel Hainry. *Recursive Analysis: Computability and Complexity.* Logic and Interaction 2012, Complexity Session. Marseille, France, Jan. 2012.

[8] Olivier Bournez, Walid Gomaa, and Emmanuel Hainry. *Implicit complexity in recursive analysis.* LCC'09 - Logic and Computational Complexity. Los Angeles, USA, Aug. 2009.

[9] Emmanuel Hainry. *Decidability in continuous time dynamical systems.* Workshop New Worlds of Computation. Orleans, France, Jan. 2009.

[10] Olivier Bournez and Emmanuel Hainry. *Subrecursion in recursive analysis.* Workshop on Implicit Computational Complexity. Villetaneuse, France, June 2008.

[11] Emmanuel Hainry. *Recursive analysis and real recursive functions.* Workshop Computation on the Continuum. Lisboa, Portugal, June 2005.

[12] Olivier Bournez and Emmanuel Hainry. *An analog Characterization of Elementarily Computable Functions Over the Real Numbers.* 2nd APPSEM II Workshop - APPSEM'2004. Tallinn, Estonia, Apr. 2004.

Theses

[1] Emmanuel Hainry. "Modèles de calcul sur les réels, résultats de comparaison". Thèse de doctorat. Institut National Polytechnique de Lorraine, Dec. 2006. URL: https://members.loria.fr/ehainry/papers/manuscrit.pdf.

Collective responsibilities

- Member of the informatics section committee for the *Conseil National des Universités*
- Co-organizer of "Conference on Computability and Complexity in Analysis" 2013. http://cca-net.de/cca2013/
- Leader of the *ComputR* Équipe Associée with SQIG-IT, Portugal (2009-2011).
- Co-organizer of the "Theory of Computer Viruses" 2007 workshop. http://tcv.loria.fr/
- Co-organizer of "Complexité, modèles finis et bases de données" 2007 workgroup. http://cmfbd2007.loria.fr/