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MIHAELA SIGHIREANU

Born: November 13, 1970
Citizenship: French and Romanian
Marital status: married
Children: two (13 and 11 years old)

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Current Position

since September 1999: *Associate Professor (french Maître de conférences)*
at the Computer Science Department of
University Paris Diderot;
Member of laboratory LIAFA, CNRS UMR 7089

Research Interests

General interest on the theoretical and practical application of formal models (mathematical logic, automata, Petri nets, process algebra, rewriting) to software design.

Particular focus on algorithmic verification of infinite state systems by testing, static analysis, model-checking, deductive methods.

Education

September 1994	Engineer degree (M.Sc.) in Computer Science from “Politehnica” University of Bucharest
September 1995	M.Sc. degree in Computer Science from University of Grenoble
January 1999	Ph.D. in Computer Science from University of Grenoble
October 2014	HDR in Computer Science from University of Paris Diderot

Grants

1994–1995	M.Sc. scholarship from the French government
1995–1998	Ph.D. scholarship from the French government
1998–1999	grant from INRIA for post-doctoral studies project “Fault Tolerance in Synchronous Systems” at INRIA Rocquencourt
2002–2005	grant from French Research Agency Program “Young Researcher” (in french ACI Jeunes Chercheurs) Project title: “Qualitative and quantitative program verification”
2011	grant from CNRS for sabbatical from teaching

Participation to Research Projects

2001–2004	member of the European project ADVANCE (coordinator A. Bouajjani, LIAFA) Contributions: publications [24 , 25 , 36 , 22], software TREX
2004–2006	member of the french ACI project PERSEE (coordinator Ph. Schnoebelen, LSV) Contributions: internal report [35], publications [5 , 21], software SPADE
2006–2008	member of the french ANR project AMAES (coordinator S. Bensalem, Verimag) Contributions: publications [18 , 16]
2007–2009	member of the french ANR project AVERISS (coordinator A. Bouajjani, LIAFA) Contributions: publications [19 , 20 , 34 , 4 , 17], software CMRS
2009–2012	member of the french ANR project Veridyc (coordinator R. Iosif, Verimag) Contributions: publications [15 , 13 , 12 , 11 , 9 , 10], software CELIA toolbox
2014–2018	member of the french ANR project Vecolib (coordinator R. Iosif, Verimag) Subject: verification of libraries of containers

Service to the Profession

Conference Committee

- P.C. member and organizer of the international workshop FMICS'01 (Paris), 80 participants
- P.C. member of the international workshop FMICS'02 (Spain)
- P.C. member of the international workshop RT-TOOLS'02 (Denmark)
- P.C. member of the international conferences JITC'07 (Spain) and ICSEA'07 (France)
- O.C. member of the international conference CONCUR'10 (Paris), 200 participants
- O.C. of the first international competition on Separation Logic Solvers, SL-COMP'14, FLOC Olympic Games, Vienna

Journals reviewing

- Computer Journal (CompJ): 2003
- Computer Networks Journal (COMPUT NETW): 2005
- International Journal of Foundations of Computer Science (IJFCS): 2003
- Information Processing Letters (IPL): 2007
- Journal of Information Technologies and Control (JITC): 2007
- Journal of Systems and Software (JSS): 2007
- Theoretical Computer Science Journal (TCS): 2002
- Transactions on Software Engineering (TSE): 2010, 2011

Conferences reviewing

- International Conference on Automated Technology for Verification and Analysis (ATVA): 2010, 2011, 2014
- International Conference on Computer Aided Verification (CAV): 2006-2013
- International Conference on Concurrency Theory (CONCUR): 2006, 2010-2011
- Formal Modeling and Analysis of Timed Systems (FORMATS): 2006-2007
- World Congress on Formal Methods (FM): 2012
- Foundations of Software Science and Computation Structures (FOSSACS): 2003, 2006-2007, 2010
- International Colloquium on Automata, Languages and Programming (ICALP): 2009, 2011
- International Conference on Distributed Computing Systems (ICDCS): 2004
- International Conference on Software Engineering Advances (ICSEA): 2007-2008

- International Colloquium on Theoretical Aspects of Computing (ICTAC): 2006
- Logic in Computer Science (LICS): 2012
- Annual Doctoral Workshop on Mathematical and Engineering Methods in Computer Science (MEMICS): 2005, 2008
- Symposium on Principles of Distributed Computing (PODC): 2010
- Symposium on Principles of Programming Languages (POPL): 2009, 2014
- International Static Analysis Symposium (SAS): 2012
- Symposium on Theoretical Aspects of Computer Science (STACS): 2002
- International Workshop on Reachability Problems (RP): 2009
- International Workshop on Real-Time Tools (RT-TOOLS): 2002
- International Conference on Software Engineering and Formal Methods (SEFM): 2003
- International Conference on Tools and Algorithms for Construction and Analysis of Systems (TACAS): 2002-2003, 2008-2010
- International Workshop on Verification and Evaluation of Computer and Communication Systems (VECOS): 2008
- International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI): 2006-2007

Other reviewing

- The Netherlands Organization for Scientific Research (NWO): 2005
- French National Research Agency (ANR): 2011
- Selection Committee of the Computer Science Department (french “comité de sélection”): 2003, 2005, 2006, 2009, 2010, 2013, 2015

External Thesis Committees

- Ahmed Rezine, Ph.D., Uppsala University, 2008
- Mathias Peron, Ph.D., Grenoble University, 2010
- Damien Thivolle, Ph.D., “Politehnica” University of Bucharest, 2011

Administrative Duties at University Paris Diderot

- Member of the Administration Council of C.S. Dept.: 2000-2004, 2008-2012
- In charge of first year of master internships at C.S. Dept.: 2005-2007
- Member of the Administration Council of U. Paris Diderot: 2005-2009
- Co-chair of the budget committee of U. Paris Diderot: 2007-2009
- Member of the Administration Council of EIDD (the engineering school of U. Paris Diderot): since November 2010
- Member of the Teaching Committee of EIDD: since November 2010
- In charge of M.Sc. internships at EIDD: since November 2012

Teaching

At the C.S. Dept. of U. Paris Diderot, teaching is organized in main lecture (C), directed works (TD), or practical works (TP). The level of the lecture is given by the Bologna system, i.e., L1-3 & M1-2. More informations (e.g., teaching material, organization, hours) are available at www.liafa.univ-paris-diderot.fr/~sighirea/teaching.html

1999-2002, 2004-2005, 2014-2015	L1	Introduction to programming with C and Java (C,TD,TP)
1999-2002, 2004-2005	L3	Program semantics (TD)
1999-2004	M1	Computer Networks (C,TD,TP)
1999-2001	M2	Symbolic verification (C)
1999-2001, 2013	M1	Logic and verification (TD,TP)
2001-2004	M1	Internet (C,TP)
2003-2005	M1	Graph algorithmics (TD)
2004-2006	M1	Programming project: a web searching robot (C,TP)
2004-2010	M1	Concurrency: theory and practice (C,TD)
2005-2015	M2	Synchronous programming (C,TD)
2005-2010	M2	Models and specifications (TD)
2005-2007, 2013-2015	M2	Testing methods (C,TD)
2006-2007	L3	Developing environments (C,TP)
2007-2012	L2	Programming project: board games in Java (C,TD)
2008-2010	M2	Infinite systems verification (C)
2009-2010	L1	Data structures (TD,TP)
2012-2013	L3	Compilation in Ocaml (TD,TP)
2009-2010, 2012-2015	M1	Software engineering (C,TD)
2009-2010	M2	Program analysis (C,TD)
2012-2015	M2	Programming in Ada (TD)
2012-2015	L2	Introduction to algorithms (TD)
2013-2015	M2	Formal verification methods (C,TD)

Graduate Student Advisor

- Bruno Vivien[†] (M.Sc. Internship CNAM 1998):
Compilation of E-LOTOS data types
- Selma Saïdi (M.Sc. Internship Univ. H. Boumedién, Algeria, 2007):
Verification of parameterized systems with infinite data
- Maria Abramiuc[†] (M.Sc. Internship Univ. Iași, Romania, 2011):
Weakest pre-condition computation in a fragment of Separation Logic
- Cezara Drăgoi[†] (U. Paris Diderot, **Ph.D.**, Nov. 2007– Dec. 2011):
Automatic verification of programs with dynamic memory and infinite data
- Vlad Saveluc[†] (B.Sc. Internship 2011; M.Sc. Internship MPRI 2012):
Abstract domains for the analysis of programs with dynamic data structures

[†] Co-advisor

Talks & Seminars

June 1997	COST 247 meeting, Zagreb, Croatia
March 1998	CSST'98 workshop, Nantes, France
June 1999	TOLERE meeting, INRIA Rocquencourt, France
July 2001	RT-TOOLS'01, Aalborg, Denmark
June 2001	CAV'01, Paris, France
November 2001	LSV seminar, ENS Cachan, Paris
September 2003	FM'03, Pisa, Italy
November 2003	PERSEE meeting, Paris, France
June 2005	SENVA (CWI & INRIA) Workshop, Invited talk
September 2006	INFINITY'06, Bonn, Germany
September 2006	AMAES meeting, Grenoble, France
January 2007	AMAES meeting, Toulouse, France
November 2007	STIC'07, Paris, France
February 2008	AMAES meeting, Toulouse, France
November 2008	SSIA meeting, Paris, France
July 2009	TIME'09, Bressanone-Brixen, Italy
February 2010	VERIDYC meeting, Grenoble, France
May 2010	LCFS seminar, University of Edinburgh, UK
January 2011	VERIDYC meeting, Grenoble, France
May 2011	ALGOTEL'11, Cap Esterel, France
July 2011	ICDCS'11, Minneapolis, USA
June 2012	IRILL Workshop, Paris, France
November 2013	ECNU Group, Shanghai University, China
Mai 2014	Didactic seminar of LIAFA & PPS, Paris
July 2014	Presentation of the SL-COMP'14 at SMT-COMP'14, FLOC, Vienna
November 2014	Vecolib meeting, Paris, France

Main Software Packages

- CADP (www.inrialpes.fr/vasy/cadp)
toolbox for finite state model-checking; participation at 5% in 1998
- TRAIAN (www.inrialpes.fr/vasy/traian)
compilation of Extended-LOTOS modeling language; participation at 80% in 1999.
- TREX (www.liafa.univ-paris-diderot.fr/trex)
symbolic verification of extended automata (with counters, clocks, and FIFO queues); participation at 60% in 2006, developed with Aurore Collomb-Annichini and Ahmed Bouajjani
- PRESS (www.liafa.univ-paris-diderot.fr/~sighirea/press)
reachability analysis of concurrent programs with recursive procedures using tree automata; participation at 80% in 2006, developed with Tayssir

Touili

- SPADE (www.liafa.univ-paris-diderot.fr/spade)
reachability analysis of concurrent programs with rendez-vous communication and recursive procedures using tree automata; participation at 40% in 2007, developed with Gaël Patin and Tayssir Touili
- CMRS (www.liafa.univ-paris-diderot.fr/~sighirea/cmrs)
invariant checker (including decision procedure) for rewriting systems over multisets with infinite data; participation at 80% in 2008, developed with Selma Saïdi and Ahmed Bouajjani
- CELIA (www.liafa.univ-paris-diderot.fr/celia)
toolbox of static analysis and verification of C programs with dynamic lists, includes libraries of abstract domains and independent decision procedures; participation at 80% in 2015, developed with Cezara Drăgoi, Constantin Enea, Vlad Saveluc, and Ahmed Bouajjani.
- SPEN (www.liafa.univ-paris-diderot.fr/spen)
solver for checking entailments in a fragment of Separation Logic with recursive definitions for complex lists; participation at 70% in 2015, developed with Ondraj Lengal (Univ of Brno) and Constantin Enea.

Publications

Book Chapters

- [1] Ken J. Turner and **Mihaela Sighireanu**. “(E)-LOTOS”. In: *Software Specification Methods – An Overview Using a Case Study*. Ed. by Henri Habrias and Marc Frappier. ISTE Hermes and Lavoisier, Apr. 2006, pp. 233–258.
- [2] Guy Leduc, Alan Jeffrey, and **Mihaela Sighireanu**. “Introduction à E-LOTOS”. In: *Ingénierie des protocoles et qualité de service*. Ed. by Ana Cavalli. IC2. Hermes, 2001, pp. 213–253.
- [3] Ken J. Turner and **Mihaela Sighireanu**. “ELOTOS: (Enhanced) Language Of Temporal Ordering Specification”. In: *Software Specification Methods*. Ed. by Marc Frappier and Henri Habrias. Springer, 2001, pp. 165–190.

Refereed Journal Publications

- [4] Ahmed Bouajjani, Cezara Dragoi, Constantin Enea, Yan Jurski, and **Mihaela Sighireanu**. “A Generic Framework for Reasoning about Dynamic Networks of Infinite-State Processes”. In: *Logical Methods in Computer Science* 5.2 (2009).

- [5] **Mihaela Sighireanu** and Tayssir Touili. “Bounded Communication Reachability Analysis of Process Rewrite Systems with Ordered Parallelism”. In: *Electr. Notes Theor. Comput. Sci.* 239 (2009), pp. 43–56.
- [6] Radu Mateescu and **Mihaela Sighireanu**. “Efficient on-the-fly model-checking for regular alternation-free mu-calculus”. In: *Sci. Comput. Program.* 46.3 (2003), pp. 255–281.
- [7] **Mihaela Sighireanu** and Radu Mateescu. “Verification of the Link Layer Protocol of the IEEE-1394 Serial Bus (FireWire): An Experiment with E-LOTOS”. In: *STTT 2.1* (1998), pp. 68–88.

Refereed International Conference Publications

- [8] Constantin Enea, Ondřej Lengál, **Mihaela Sighireanu**, and Tomáš Vojnar. “Compositional Entailment Checking for a Fragment of Separation Logic”. In: *APLAS*. Vol. 8858. Lecture Notes in Computer Science. Springer, 2014, pp. 314–333.
- [9] Constantin Enea, Vlad Saveluc, and **Mihaela Sighireanu**. “Compositional Invariant Checking for Overlaid and Nested Linked Lists”. In: *ESOP*. Vol. 7792. Lecture Notes in Computer Science. Springer, 2013, pp. 129–148.
- [10] Cezara Dragoi, Constantin Enea, and **Mihaela Sighireanu**. “Local Shape Analysis for Overlaid Data Structures”. In: *SAS*. Vol. 7935. Lecture Notes in Computer Science. 2013, pp. 150–171.
- [11] Ahmed Bouajjani, Cezara Dragoi, Constantin Enea, and **Mihaela Sighireanu**. “Accurate Invariant Checking for Programs Manipulating Lists and Arrays with Infinite Data”. In: *ATVA*. Vol. 7561. Lecture Notes in Computer Science. Springer, 2012, pp. 167–182.
- [12] Ahmed Bouajjani, Cezara Dragoi, Constantin Enea, and **Mihaela Sighireanu**. “Abstract Domains for Automated Reasoning about List-Manipulating Programs with Infinite Data”. In: *VMCAI*. Vol. 7148. Lecture Notes in Computer Science. Springer, 2012, pp. 1–22.
- [13] Ahmed Bouajjani, Cezara Dragoi, Constantin Enea, and **Mihaela Sighireanu**. “On inter-procedural analysis of programs with lists and data”. In: *PLDI*. ACM, 2011, pp. 578–589.
- [14] Julien Clément, Carole Delporte-Gallet, Hugues Fauconnier, and **Mihaela Sighireanu**. “Guidelines for the Verification of Population Protocols”. In: *ICDCS*. IEEE Computer Society, 2011, pp. 215–224.
- [15] Ahmed Bouajjani, Cezara Dragoi, Constantin Enea, Ahmed Rezine, and **Mihaela Sighireanu**. “Invariant Synthesis for Programs Manipulating Lists with Unbounded Data”. In: *CAV*. Vol. 6174. Lecture Notes in Computer Science. Springer, 2010, pp. 72–88.

- [16] Yasmina Abdeddaïm, Eugene Asarin, and **Mihaela Sighireanu**. “Simple Algorithm for Simple Timed Games”. In: *TIME*. IEEE Computer Society, 2009, pp. 99–106.
- [17] Ahmed Bouajjani, Cezara Dragoi, Constantin Enea, and **Mihaela Sighireanu**. “A Logic-Based Framework for Reasoning about Composite Data Structures”. In: *CONCUR*. Vol. 5710. Lecture Notes in Computer Science. Springer, 2009, pp. 178–195.
- [18] Yasmina Abdeddaïm, Eugene Asarin, Matthieu Gallien, Félix Ingrand, Charles Lesire, and **Mihaela Sighireanu**. “Planning Robust Temporal Plans: A Comparison Between CBTP and TGA Approaches”. In: *ICAPS*. AAAI, 2007, pp. 2–9.
- [19] Ahmed Bouajjani, Yan Jurski, and **Mihaela Sighireanu**. “A Generic Framework for Reasoning About Dynamic Networks of Infinite-State Processes”. In: *TACAS*. Vol. 4424. Lecture Notes in Computer Science. Springer, 2007, pp. 690–705.
- [20] Ahmed Bouajjani, Peter Habermehl, Yan Jurski, and **Mihaela Sighireanu**. “Rewriting Systems with Data”. In: *FCT*. Vol. 4639. Lecture Notes in Computer Science. Springer, 2007, pp. 1–22.
- [21] Gaël Patin, **Mihaela Sighireanu**, and Tayssir Touili. “Spade: Verification of Multithreaded Dynamic and Recursive Programs”. In: *CAV*. Vol. 4590. Lecture Notes in Computer Science. Springer, 2007, pp. 254–257.
- [22] Marc Boyer and **Mihaela Sighireanu**. “Synthesis and Verification of Constraints in the PGM Protocol”. In: *FME*. Vol. 2805. Lecture Notes in Computer Science. Springer, 2003, pp. 264–281.
- [23] Alain Girault, Hamoudi Kalla, **Mihaela Sighireanu**, and Yves Sorel. “An Algorithm for Automatically Obtaining Distributed and Fault-Tolerant Static Schedules”. In: *DSN*. IEEE Computer Society, 2003, pp. 159–168.
- [24] Aurore Annichini, Ahmed Bouajjani, and **Mihaela Sighireanu**. “TRex: A Tool for Reachability Analysis of Complex Systems”. In: *CAV*. Vol. 2102. Lecture Notes in Computer Science. Springer, 2001, pp. 368–372.
- [25] Ahmed Bouajjani, Aurore Collomb-Annichini, Yassine Lakhnech, and **Mihaela Sighireanu**. “Analyzing Fair Parametric Extended Automata”. In: *SAS*. Vol. 2126. Lecture Notes in Computer Science. Springer, 2001, pp. 335–355.
- [26] Alain Girault, Christophe Lavarenne, **Mihaela Sighireanu**, and Yves Sorel. “Generation of Fault-Tolerant Static Scheduling for Real-Time Distributed Embedded Systems with Multi-Point Links”. In: *IPDPS*. IEEE Computer Society, 2001, p. 125.

- [27] Alain Girault, Christophe Lavarenne, Yves Sorel, and **Mihaela Sighireanu**. “Fault-Tolerant Static Scheduling for Real-Time Distributed Embedded Systems”. In: *ICDCS*. IEEE Computer Society, 2001, pp. 695–698.
- [28] Hubert Garavel and **Mihaela Sighireanu**. “A Graphical Parallel Composition Operator for Process Algebras”. In: *FORTE*. Vol. 156. IFIP Conference Proceedings. Kluwer, 1999, pp. 185–202.
- [29] Jean-Claude Fernandez, Hubert Garavel, Alain Kerbrat, Laurent Mounier, Radu Mateescu, and **Mihaela Sighireanu**. “CADP - A Protocol Validation and Verification Toolbox”. In: *CAV*. Vol. 1102. Lecture Notes in Computer Science. Springer, 1996, pp. 437–440.
- [30] Hubert Garavel and **Mihaela Sighireanu**. “On the Introduction of Exceptions in E-LOTOS”. In: *FORTE*. Vol. 69. IFIP Conference Proceedings. Chapman & Hall, 1996, pp. 469–484.

Thesis

- [31] **Mihaela Sighireanu**. “Contribution à la définition et à l’implémentation de la norme “Extended LOTOS””. PhD thesis. Université Joseph Fourier, Grenoble, France, 1999.
- [32] **Mihaela Sighireanu**. “Compilation efficace des types abstraits de données LOTOS”. MA thesis. Université Joseph Fourier, Grenoble, France, 1995.
- [33] **Mihaela Sighireanu**. “Algorithmic Software Verification and Analysis”. Habilitation à diriger la recherche. Université Paris Diderot, 2014.

Other Publications

- [34] Ahmed Bouajjani, Cezara Dragoi, Yan Jurski, and **Mihaela Sighireanu**. “Rewriting Systems over Nested Data Words”. In: *MEMICS*. Vol. 13. OASICS. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany, 2009.
- [36] Aurore Collomb-Annichini and **Mihaela Sighireanu**. “Parameterized Reachability Analysis of the IEEE 1394 Root Contention Protocol using TReX”. In: *International Workshop RT-TOOLS*. Aalborg University, 2001.
- [37] Alain Girault, Christophe Lavarenne, **Mihaela Sighireanu**, and Yves Sorel. “Generation of Fault-Tolerant Static Scheduling for Real-Time Distributed Embedded Systems with Multi-Point Links”. In: *IEEE Workshop on Fault-Tolerant Parallel and Distributed Systems, FTPDS’01, San Francisco (USA)*. IEEE, 2001.
- [38] Radu Mateescu and **Mihaela Sighireanu**. “Validation of the Link Layer Protocol of the IEEE-1394 Serial Bus (“FireWire”): an Experiment with E-LOTOS”. In: *International Workshop FMICS*. Apr. 2000.

- [39] Hubert Garavel and **Mihaela Sighireanu**. “Towards a Second Generation of Formal Description Techniques — Rationale for the Design of E-LOTOS”. In: *International Workshop FMICS*. Ed. by J.-F. Groote, B. Luttik, and Jos van Wamel. May 1998, pp. 187–230.
- [40] **Mihaela Sighireanu**. “Model-Checking Validation of the LOTOS Descriptions of the Invoicing Case Study”. In: *International Workshop on Comparing System Specification Techniques*. Ed. by Henri Habrias. Mar. 1998, pp. 99–114.
- [41] Hubert Garavel, Marc Jorgensen, Radu Mateescu, Charles Pecheur, **Mihaela Sighireanu**, and Bruno Vivien. “CADP’97 – Status, Applications and Perspectives”. In: *COST 247 International Workshop on Applied Formal Methods in System Design*. Ed. by Ignac Lovrek. IEEE, June 1997.
- [42] **Mihaela Sighireanu** and Radu Mateescu. “Validation of the Link Layer Protocol of the IEEE-1394 Serial Bus (“FireWire”): an Experiment with E-LOTOS”. In: *COST 247 International Workshop on Applied Formal Methods in System Design*. Ed. by Ignac Lovrek. IEEE, June 1997, pp. 57–72.