

CURRICULUM VITAE: JEREMY JAMES SPROSTON

DATE OF BIRTH: 16-04-1974

CITIZENSHIP: BRITISH, ITALIAN

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Research interests

The use of formal methods to verify to correctness and reliability of computer systems, with emphasis on model checking of probabilistic, stochastic, timed and hybrid systems.

Employment

November 2002 – present

Ricercatore (assistant professor) at the Dipartimento di Informatica, University of Turin, Italy.

June 2001 – October 2002

Short-term researcher at the Dipartimento di Informatica, University of Turin, Italy.

May 2000 – May 2001

Research associate/fellow at the School of Computer Science, University of Birmingham, United Kingdom.

Education

- November 1996 - January 2001: *PhD in Computer Science*, School of Computer Science, University of Birmingham, United Kingdom. Thesis title: *Model Checking of Probabilistic Timed and Hybrid Systems*. Supervisor: Prof. M.Z. Kwiatkowska.
- September 1995 - September 1996: Master *MSc in Computer Science* (final mark: *Distinction*), School of Computer Science, University of Birmingham, United Kingdom. Dissertation title: *Automatic Verification of Safety Properties*.
- September 1992 - July 1995: *BSocSc in Mathematical Economics*, University of Birmingham, United Kingdom.

Visiting positions

- LIAFA, University of Paris Diderot, France (now IRIF, University of Paris): multiple visiting research positions held between 2012 and 2019, total 10 weeks.
- Laboratoire Spécification et Vérification (LSV), École Normale Supérieure de Cachan, France (now Laboratoire Méthodes Formelles, École Normale Supérieure Paris-Saclay): multiple visiting research positions held between 2003 and 2011, total 5 months.

Research projects

- Participant of the European project “*HoliDes - Holistic human factors and system Design of adaptive cooperative human-machine systems*” (research project funded by the ARTEMIS

Joint Undertaking). October 2013 - September 2016.

- Participant of the Italian project: “*CINA - Compositionality, Interaction, Negotiation, Autonomicity for the Future ICT Society*” (research project funded by Italian Ministry for Education, University, and Research under programme PRIN). February 2013 - January 2016.
- Participant of the Italian project: “*AMALFI - Advanced Methodologies for the Analysis and management of the Future Internet*” (research project funded by the University of Turin and the Compagnia di San Paolo foundation). February 2012 - August 2015.
- Local coordinator of the University of Turin research unit for the Italian project: “*PaCo - Performability-Aware Computing: Logics, Models, and Languages*” (research project funded by Italian Ministry for Education, University, and Research under programme PRIN). September 2008 - September 2010.
- Participant of the Italian Project: “*Performance Evaluation of Complex Systems: Techniques, Methodologies and Tools*” funded by the Italian Ministry of Education, University and Research (MIUR) under the FIRB (Fondo per gli Investimenti della Ricerca di Base) Programme. November 2002 - October 2005.
- Participant of the European IST Project: “*CRUTIAL - Critical UTility InfrastructurAL resilience*”. 2006 - 2008.
- Participant of the European IST Project: “*DepAuDE - Dependability for embedded Automation systems in Dynamic Environments with intra-site and inter-site distribution aspects*”. January 2001 - March 2003.
- Participant of the EPSRC Project: “*Verification of Quality of Service Properties in Timed Systems*”. May 2000 - July 2003.
- Participant of the Academic Research Collaboration project: “*Stochastic Modelling and Verification*”, (financed by the British Council/DAAD). June 1998 - June 2001.

Committees

- Program co-chair of international conferences and workshops:
 - FORMATS (Formal Modeling and Analysis of Timed Systems) 2023;
 - MoRe (Multi-objective Reasoning in Verification and Synthesis) 2019, 2018;
 - SUMo (Scalable and Usable Model Checking for Petri Nets and Other Models of Concurrency) 2010.
- Program committee member of international conferences:
 - FoSSaCS (Foundations of Software Science and Computation Structures) 2021;
 - QEST (Quantitative Evaluation of SysTems) 2019, 2015, 2014, 2011, 2010, 2008;
 - FORMATS (Formal Modeling and Analysis of Timed Systems) 2016, 2015, 2012;
 - SETTA (Dependable Software Engineering: Theories, Tools and Applications) 2022, 2021, 2020, 2019.
- Program committee member of international workshops and schools:
 - QAPL (Quantitative Aspects of Programming Languages) 2019, 2015, 2014, 2013, 2012, 2011, 2020, 2009, 2008;
 - MOVEP (School on Modeling and Verifying Parallel Processes) 2014, 2012, 2010, 2008.
- Member of the PhD committee of:
 - Mahsa Shirmohammadi (jointly awarded by LSV, ENS de Cachan, France and Université Libre Bruxelles, Belgium, 2014);
 - Najla Chamseddine (LSV, ENS de Cachan, France, 2009).

- Publicity chair for the international conference QEST (Quantitative Evaluation of SysTems), 2004.

Invited presentations

- OPCT 2023 (IFIP Working Group 1.8 research seminar on Open Problems in Concurrency Theory).
- FORMATS 2015 (International Conference on Formal Modeling and Analysis of Timed Systems).
- QAPL 2010 (International Workshop on Quantitative Aspects of Programming Languages, substituting an invited speaker who could not be present at the workshop).
- MOVEP 2004 (International School on Modeling and Verifying Parallel Processes).
- Presentations at the following Dagstuhl seminars:
 - Modeling, Verification, and Control of Complex Systems for Energy Networks, 2014;
 - Quantitative Models: Expressiveness, Analysis, and New Applications, 2014;
 - Quantitative and Qualitative Analysis of Network Protocols, 2010;
 - Probabilistic Methods in Verification, 2000.

Reviewing

- Journals (over 50 reviews), including: ACM Transactions on Computational Logic; ACM Transactions on Modeling and Computer Simulation; ACM Transactions on Modeling and Performance Evaluation of Computing Systems; ACM Transactions on Programming Languages and Systems; Acta Informatica; Formal Aspects of Computing; Formal Methods in System Design; Fundamenta Informaticae; IEEE Transactions on Reliability; IEEE Transactions on Software Engineering; Information and Computation; Journal of Automated Reasoning; Journal of Computer and System Sciences; Journal of Logic and Algebraic Programming; Journal of Logic and Computation; Logical Methods in Computer Science; Performance Evaluation; Theoretical Computer Science.
- Conferences and workshops (over 140 reviews), including: ATVA, CAV, CONCUR, DSN, FoSSaCS, FORMATS, FSTTCS, FMCAD, ICALP, LICS, MFCS, Petri Nets, QEST, RTSS, STACS, TACAS.
- Reviewer for the French agency of research (ANR), 2018.

Teaching activity

- 2013 - present: lecturer for the course “Linguaggi Formali e Traduttori” (Corso di Laurea Triennale in Informatica), Dipartimento di Informatica, University of Turin, Italy.
- 2002 - 2014: lecturer for multiple courses in the field of computer science, Dipartimento di Psicologia, University of Turin, Italy.

Miscellaneous

- Over 2500 citations, h-index 20 (source: Google Scholar, May 2023).
- Winner of the QEST 2007 Best Paper Award (for the paper CSL^{TA}: An Expressive Logic for Continuous-Time Markov Chains, written with S. Donatelli and S. Haddad).
- Representative of assistant professors in meetings of the Facoltà di Psicologia, University of Turin, January 2009 - September 2010, January 2011 - December 2011.

- Member of the “collegio docente del dottorato” (overseeing issues related to the departmental PhD program), Dipartimento di Informatica, University of Turin, from May 2014 to April 2015.
- Member of the teaching commission of the degree course in “Informatica”, Dipartimento di Informatica, University of Turin, from July 2015 to present.

Publications

Book chapters

- Modeling and Verification of Distributed Systems using Markov Decision Processes (with M. Beccuti and G. Franceschinis). In D. Bruneo and S. Distefano (editors), *Quantitative Assessments of Distributed Systems: Methodologies and Techniques*, pages 3–26. Scrivener - Wiley, 2015.
- Practical Applications of Probabilistic Model Checking to Communication Protocols (with M. Dufлот, M. Kwiatkowska, G. Norman, D. Parker, S. Peyronnet and C. Picaronny). In S. Gnesi and T. Margaria, editors, *Formal Methods for Industrial Critical Systems: A Survey of Applications*, pages 133–150. Wiley-IEEE Computer Society Press, 2012.
- Verification of Real-time Probabilistic Systems (with M. Kwiatkowska, G. Norman and D. Parker). In S. Merz and N. Navet, editors, *Modeling and Verification of Real-time Systems*, pages 257–297. ISTE - John Wiley & Sons, 2008.
- Model Checking for Probabilistic Timed Systems. In C. Baier, B. Haverkort, H. Hermanns, J.-P. Katoen, M. Siegle and F. Vaandrager, editors, *Validation of Stochastic Systems*, volume 2925 of *Lecture Notes in Computer Science*, pages 189–229. Springer-Verlag, 2004.

Journals

- Probabilistic Timed Automata with One Clock and Initialised Clock-Dependent Probabilities. *Logical Methods in Computer Science*, volume 17, number 4:6, 2021.
- Probabilistic Timed Automata with Clock-Dependent Probabilities. *Fundamenta Informaticae*, volume 178, number 1-2, pages 101-138, 2021.
- Verification and Control for Probabilistic Hybrid Automata with Finite Bisimulations. *Journal of Logical and Algebraic Methods in Programming*, volume 103, pages 46-61, 2019.
- Model Checking Probabilistic Timed Automata (with G. Norman and D. Parker). *Formal Methods in System Design*, volume 43, number 2, pages 164–190, September 2013.
- An Extension of the Inverse Method to Probabilistic Timed Automata (with É. André and L. Fribourg). *Formal Methods in System Design*, volume 42, number 2, pages 119–145, April 2013.
- Model Checking Timed and Stochastic Properties with CSL^{TA} (with S. Donatelli and S. Haddad). *IEEE Transactions on Software Engineering*, volume 35, number 2, pages 224-240, March-April 2009.
- Model Checking Probabilistic Timed Automata with One or Two Clocks (with M. Jurdziński and F. Laroussinie). *Logical Methods in Computer Science*, volume 4, number 3, September 2008.
- Symbolic Model Checking for Probabilistic Timed Automata (with M.Z. Kwiatkowska, G. Norman and F. Wang). *Information and Computation*, volume 205, number 7, pages 1027–1077, July 2007.
- State Explosion in Almost-Sure Probabilistic Reachability (with F. Laroussinie). *Information Processing Letters*, volume 102, number 6, pages 236–241, June 2007.

- Backward Bisimulation in Markov Chain Model Checking (with S. Donatelli). *IEEE Transactions on Software Engineering*, volume 32, number 8, pages 531–546, August 2006.
- Performance Analysis of Probabilistic Timed Automata using Digital Clocks (with M.Z. Kwiatkowska, G. Norman and D. Parker). *Formal Methods in System Design*, volume 29, number 1, pages 33–78, July 2006.
- Probabilistic Model Checking of Deadline Properties in the IEEE 1394 FireWire Root Contention Protocol (with M.Z. Kwiatkowska and G. Norman). *Formal Aspects of Computing*, volume 14, pages 295–318, May 2003.
- Automatic Verification of Real-Time Systems With Discrete Probability Distributions (with M.Z. Kwiatkowska, G. Norman, and R. Segala). *Theoretical Computer Science*, volume 282, pages 101–150, May 2002.

Conferences and workshops

- Timed Games with Bounded Window Parity Objectives (with James C. A. Main and Mickael Randour). In Sergiy Bogomolov and David Parker, editors, *Proceedings of the 20th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2022)*, volume 13465 of *Lecture Notes in Computer Science*, pages 165–182. Springer, 2022.
- Time Flies When Looking out of the Window: Timed Games with Window Parity Objectives (with James C. A. Main and Mickael Randour). In Serge Haddad and Daniele Varacca, editors, *Proceedings of the 32nd International Conference on Concurrency Theory (CONCUR 2021)*, Leibniz International Proceedings in Informatics (LIPIcs) 203, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2021.
- Probabilistic Timed Automata with One Clock and Initialised Clock-Dependent Probabilities. In Alexey Gotsman and Ana Sokolova, editors, *Proceedings of the 40th International Conference on Formal Techniques for Distributed Objects, Components, and Systems (FORTE 2020)*, volume 12136 of *Lecture Notes in Computer Science*, pages 150–168. Springer, 2020.
- Qualitative Reachability for Open Interval Markov Chains. In Igor Potapov and Pierre-Alain Reynier, editors, *Proceedings of the 12th International Conference on Reachability Problems (RP 2018)*, volume 11123 of *Lecture Notes in Computer Science*, pages 146–160. Springer, 2018.
- Probabilistic Timed Automata with Clock-Dependent Probabilities. In M. Hague and Igor Potapov, editors, *Proceedings of the 11th International Workshop on Reachability Problems (RP 2017)*, volume 10506 of *Lecture Notes in Computer Science*, pages 144–159. Springer, 2017.
- Analysis of Timed Properties Using the Jump-Diffusion Approximation (with P. Ballarini, M. Beccuti, E. Bibbona, A. Horváth and R. Sirovich). In A. Di Marco and P. Reinecke, editors, *Proceedings of the 14th European Performance Engineering Workshop (EPEW 2017)*, volume 10497 of *Lecture Notes in Computer Science*, pages 69–84. Springer, 2017.
- Qualitative Analysis of VASS-Induced MDPs (with P. A. Abdulla, R. Ciobanu, R. Mayr and A. Sangnier). In B. Jacobs and C. Löding, editors, *Proceedings of the 19th International Conference on Foundations of Software Science and Computation Structures (FoSSaCS 2016)*, volume 9634 of *Lecture Notes in Computer Science*, pages 106–120. Springer, 2016.

- Verification and Control of Probabilistic Rectangular Hybrid Automata. In S. Sankaranarayanan and E. Vicario, editors, *Proceedings of the 13th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2015)*, volume 9268 of *Lecture Notes in Computer Science*, pages 1–9. Springer, 2015.
- Exact and Approximate Abstraction for Classes of Stochastic Hybrid Systems. In M Huisman and J. van de Pol, editors, *Proceedings of the 14th International Workshop on Automated Verification of Critical Systems (AVOCS 2014)*. volume 70 of *Electronic Communications of the EASST*. European Association of Software Science and Technology, 2014.
- Solving Parity Games on Integer Vectors (with P. A. Abdulla, R. Mayr and A. Sangnier). In P. R. D’Argenio and H. C. Melgratti, editors, *Proceedings of the 24th International Conference on Concurrency Theory (CONCUR 2013)*, volume 8052 of *Lecture Notes in Computer Science*, pages 106–120. Springer, 2013.
- Discrete-Time Verification and Control for Probabilistic Rectangular Hybrid Automata. In C. Palamidessi and A. Riska, editors, *Proceedings of the 8th International Conference on Quantitative Evaluation of Systems (QEST 2011)*, pages 79–88. IEEE Computer Society Press, 2011.
- Performability Measure Specification: Combining CSRL and MSL (with A. Aldini and M. Bernardo). In G. Salaün and B. Schätz, editors, *Proceedings of the 16th International Workshop on Formal Methods for Industrial Critical Systems (FMICS 2011)*, volume 6959 of *Lecture Notes in Computer Science*, pages 165–179. Springer, 2011.
- Simulation and Bisimulation for Probabilistic Timed Automata (with A. Troina). In K. Chatterjee and T. Henzinger, editors, *Proceedings of the 8th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2010)*, volume 6246 of *Lecture Notes in Computer Science*, pages 213–227. Springer, 2010.
- An Extension of the Inverse Method to Probabilistic Timed Automata (with É. André and L. Fribourg). In M. Roggenbach, editor, *Proceedings of the 9th International Workshop on Automated Verification of Critical Systems (AVOCS 2009)*, Electronic Communications of the EASST 23. European Association of Software Science and Technology, 2009.
- Strict Divergence for Probabilistic Timed Automata. In M. Bravetti and G. Zavattaro, editors, *Proceedings of the 20th International Conference on Concurrency Theory (CONCUR 2009)*, volume 5710 of *Lecture Notes in Computer Science*, pages 620–636. Springer, 2009.
- Computing Expected Absorption Times for Parametric Determinate Probabilistic Timed Automata (with N. Chamseddine, M. Dufflot, L. Fribourg and C. Picaronny). In S. Donatelli and P. Panangaden, editors, *Proceedings of the 5th International Conference on Quantitative Evaluation of Systems (QEST 2008)*, pages 254–263. IEEE Computer Society Press, 2008.
- CSL^{TA}: An Expressive Logic for Continuous-Time Markov Chains (with S. Donatelli and S. Haddad). In M. Harchol-Balter, M. Kwiatkowska and M. Telek, editors, *Proceedings of the 4rd International Conference on Quantitative Evaluation of Systems (QEST 2007)*, pages 31–40. IEEE Computer Society Press, 2007.
- Model Checking Probabilistic Timed Automata with One or Two Clocks (with M. Jurdziński and F. Laroussinie). In M. Huth and O. Grumberg, editors, *Proceedings of the 13th International Conference on Tools and Algorithms for the Construction and Analysis of Systems*

- (TACAS 2007), volume 4424 of *Lecture Notes in Computer Science*, pages 170–184. Springer, 2007.
- From Time Petri Nets to Timed Automata: An Untimed Approach (with D. D’Aprile, S. Donatelli and A. Sangnier). In M. Huth and O. Grumberg, editors, *Proceedings of the 13th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2007)*, volume 4424 of *Lecture Notes in Computer Science*, pages 216–230. Springer, 2007.
 - CSL Model Checking for Generalized Stochastic Petri Nets (with D. Cerotti, A. Horvath and S. Donatelli). In P. D’Argenio, A. Miner and G. Rubino, editors, *Proceedings of the 3rd International Conference on Quantitative Evaluation of Systems (QEST 2006)*, pages 199–210. IEEE Computer Society Press, 2006.
 - Verifying Stochastic Well-formed Nets with CSL Model-Checking Tools (with D. Cerotti, D. D’Aprile and S. Donatelli). In K. Goossens and L. Petrucci, editors, *Proceedings of the 6th International Conference on Application of Concurrency to System Design (ACSD 2006)*, pages 143–152. IEEE Computer Society Press, 2006.
 - Model Checking Durational Probabilistic Systems (with F. Laroussinie). In V. Sassone, editor, *Proceedings of the 8th International Conference on Foundations of Software Science and Computation Structures (FOSSACS 2005)*, volume 3441 of *Lecture Notes in Computer Science*, pages 140–154. Springer, 2005.
 - CSL Model Checking for the GreatSPN Tool (with D. D’Aprile and S. Donatelli). In C. Aykanat, T. Dayar and I. Korpeoglu, editors, *Proceedings of the 19th International Symposium on Computer and Information Sciences (ISCIS 2004)*, volume 3280 of *Lecture Notes in Computer Science*, pages 543–552. Springer, 2004.
 - Symbolic Model Checking for Probabilistic Timed Automata (with M.Z. Kwiatkowska, G. Norman and F. Wang). In Y. Lakhnech and S. Yovine, editors, *Proceedings of the Joint Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2004) and Formal Techniques in Real-Time and Fault Tolerant System (FTRTFT 2004)*, volume 3253 of *Lecture Notes in Computer Science*, pages 293–308. Springer, 2004.
 - Backward Stochastic Bisimulation in CSL Model Checking (with S. Donatelli). In G. Franceschinis, J.-P. Katoen, and M. Woodside, editors, *Proceedings of the 1st International Conference on Quantitative Evaluation of Systems (QEST 2004)*, pages 220–229. IEEE Computer Society Press, 2004.
 - Performance Analysis of Probabilistic Timed Automata using Digital Clocks (with M.Z. Kwiatkowska, G. Norman and D. Parker). In K.G. Larsen and P. Niebert, editors, *Proceedings of the 1st International Workshop on Formal Modelling and Analysis of Timed Systems (FORMATS 2003)*, volume 2791 of *Lecture Notes in Computer Science*, pages 105–120. Springer-Verlag, 2004.
 - Probabilistic Model Checking of the IEEE 802.11 Wireless Local Area Network Protocol (with M.Z. Kwiatkowska and G. Norman). In H. Hermanns and R. Segala, editors, *Proceedings of the 2nd Joint International Workshop on Process Algebra and Performance Modelling and Probabilistic Methods in Verification (PAPM-PROBMIV 2002)*, volume 2399 of *Lecture Notes in Computer Science*, pages 169–187. Springer-Verlag, 2002.

- Symbolic Computation of Maximal Probabilistic Reachability (with M.Z. Kwiatkowska and G. Norman). In K. G. Larsen and M. Nielsen, editors, *Proceedings of the 12th International Conference on Concurrency Theory (CONCUR 2001)*, volume 2154 of *Lecture Notes in Computer Science*, pages 169–183. Springer-Verlag, 2001.
- Decidable Model Checking of Probabilistic Hybrid Automata. In M. Joseph, editor, *Proceedings of the 6th International School and Symposium on Formal Techniques in Real-Time and Fault-Tolerant Systems (FTRTFT 2000)*. Volume 1926 of *Lecture Notes in Computer Science*, pages 31-45. Springer-Verlag, 2000.
- Verifying Quantitative Properties of Continuous Probabilistic Timed Automata (with M.Z. Kwiatkowska, G. Norman, and R. Segala). In C. Palamidessi, editors, *Proceedings of the 11th International Conference on Concurrency Theory (CONCUR 2000)*. Volume 1877 of *Lecture Notes in Computer Science*, pages 123-137. Springer-Verlag, 2000.
- Automatic Verification of Real-Time Systems With Discrete Probability Distributions (with M.Z. Kwiatkowska, G. Norman, and R. Segala). In J.-P. Katoen, editor, *Proceedings of the 5th International AMAST Workshop on Real-Time and Probabilistic Systems (ARTS 1999)*, volume 1601 of *Lecture Notes in Computer Science*, pages 75-95. Springer-Verlag, 1999.

Thesis

- Model Checking of Probabilistic Timed and Hybrid Systems. PhD thesis. Technical report CSR-01-04, School of Computer Science, University of Birmingham, 2001.