Curriculum Vitae

Maximiliano Cristiá

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Education

- Licenciado en Matemática – Universidad Nacional de Rosario – Argentina.
- M.Sc. in Computer Science – Universidad de la República – Uruguay.
- PhD. in Informatics – Aix-Marseille Université – France.

Current Positions

Head Professor of Software Engineering and Computer Security since 1998 at Universidad Nacional de Rosario, Argentina. Faculty member at Universidad Nacional de Rosario since 1986.

Researcher at the French Argentine International Center for Information Systems and Sciences (CIFASIS), Rosario, Argentina.

Developer, with G. Rossi, of the programming language and satisfiability solver {*log*}('setlog').

Invited Professor to Parma University (Italy) in 2019 and 2020 and University of Luxembourg in 2023.

Research Interests

Software verification, model-based testing, formal notations for software development, formal methods, set constraint solving, software architecture and design, tools to automate software development.

Publications

Journal articles

[1] Maximiliano Cristiá and Gianfranco Rossi. A decision procedure for a theory of finite sets with finite integer intervals. *ACM Trans. Comput. Log.*, 25(1):3:1–3:34, 2024. doi: 10.1145/3625230. URL https://doi.org/10.1145/3625230.

[2] Maximiliano Cristiá, Guido De Luca, and Carlos Luna. An automatically verified prototype of the Android permissions system. *J. Autom. Reason.*, 67(2):17, 2023. doi: 10.1007/s10817-023-09666-2. URL https://doi.org/10.1007/s10817-023-09666-2.

[3] Maximiliano Cristiá, Andrea Fois, and Gianfranco Rossi. Declarative programming with intensional sets in java using JSetL. *Comput. J.*, 66(3):763–784, 2023. doi: 10.1093/comjnl/bxab195. URL https://doi.org/10.1093/comjnl/bxab195.

[4] Maximiliano Cristiá and Gianfranco Rossi. Integrating cardinality constraints into constraint logic programming with sets. *Theory Pract. Log. Program.*, 23(2):468–502, 2023. doi: 10.1017/S1471068421000521. URL https://doi.org/10.1017/S1471068421000521.

[5] Maximiliano Cristiá, Ricardo D. Katz, and Gianfranco Rossi. Proof automation in the theory of finite sets and finite set relation algebra. *Comput. J.*, 65(7):1891–1903, 2022. doi: 10.1093/comjnl/bxab030. URL https://doi.org/10.1093/comjnl/bxab030.

[6] Maximiliano Cristiá and Gianfranco Rossi. {*log*}: set formulas as programs. *Rend. Ist. Mat. Univ. Trieste*, 53:24, 2021. ISSN 0049-4704. doi: 10.13137/2464-8728/33309. Id/No 23.

[7] Gustavo Betarte, Maximiliano Cristiá, Carlos Luna, Adrián Silveira, and Dante Zanarini. Set-based models for cryptocurrency software. *CLEI Electron. J.*, 24(3), 2021. doi: 10.19153/cleiej.24.3.0. URL https://doi.org/10.19153/cleiej.24.3.0.

[8] Adrián Silveira, Gustavo Betarte, Maximiliano Cristiá, and Carlos Luna. A formal analysis of the MimbleWimble cryptocurrency protocol. *Sensors*, 21(17):5951, 2021. doi: 10.3390/s21175951. URL https://doi.org/10.3390/s21175951.

[9] Maximiliano Cristiá and Gianfranco Rossi. An automatically verified prototype of the Tokeneer ID station specification. *J. Autom. Reason.*, 65(8):1125–1151, 2021. doi: 10.1007/s10817-021-09602-2. URL https://doi.org/10.1007/s10817-021-09602-2.

[10] Maximiliano Cristiá and Gianfranco Rossi. Automated reasoning with restricted intensional sets. *J. Autom. Reason.*, 65(6):809–890, 2021. doi: 10.1007/s10817-021-09589-w. URL https://doi.org/10.1007/s10817-021-09589-w.

[11] Maximiliano Cristiá and Gianfranco Rossi. Automated proof of Bell-LaPadula security properties. *J. Autom. Reason.*, 65(4):463–478, 2021. doi: 10.1007/s10817-020-09577-6. URL https://doi.org/10.1007/s10817-020-09577-6.

[12] Maximiliano Cristiá and Gianfranco Rossi. Solving quantifier-free first-order constraints over finite sets and binary relations. *J. Autom. Reason.*, 64(2):295–330, 2020. doi: 10.1007/s10817-019-09520-4. URL https://doi.org/10.1007/s10817-019-09520-4.

[13] Maximiliano Cristiá, Diego A. Hollmann, and Claudia S. Frydman. A multi-target compiler for CML-DEVS. *Simulation*, 95(1), 2019. doi: 10.1177/0037549718765080. URL https://doi.org/10.1177/0037549718765080.

[14] Carlos Luna, Gustavo Betarte, Juan Diego Campo, Camila Sanz, Maximiliano Cristiá, and Felipe Gorostiaga. A formal approach for the verification of the permission-based security model of Android. *CLEI Electron. J.*, 21(2), 2018. doi: 10.19153/cleiej.21.2.3. URL https://doi.org/10.19153/cleiej.21.2.3.

[15] Maximiliano Cristiá, Joaquín Cuenca, and Claudia S. Frydman. Coverage criteria for set-based specifications. *RITA*, 22(2):316–335, 2015. URL http://www.seer.ufrgs.br/index.php/rita/article/view/RITA-VOL22-NR2-316.

[16] Maximiliano Cristiá, Gianfranco Rossi, and Claudia S. Frydman. Adding partial functions to constraint logic programming with sets. *Theory Pract. Log. Program.*, 15(4-5):651–665, 2015. doi: 10.1017/S1471068415000290. URL https://doi.org/10.1017/S1471068415000290.

[17] Diego A. Hollmann, Maximiliano Cristiá, and Claudia S. Frydman. CML-DEVS: A specification language for DEVS conceptual models. *Simul. Model. Pract. Theory*, 57:100–117, 2015. doi: 10.1016/j.simpat.2015.06.007. URL https://doi.org/10.1016/j.simpat.2015.06.007.

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[19] Diego A. Hollmann, Maximiliano Cristiá, and Claudia S. Frydman. A family of simulation criteria to guide DEVS models validation rigorously, systematically and semi-automatically. *Simul. Model. Pract. Theory*, 49:1–26, 2014. doi: 10.1016/j.simpat.2014.07.003. URL https://doi.org/10.1016/j.simpat.2014.07.003.

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[21] Alejandro Sartorio and Maximiliano Cristiá. First approximation to DHD design and implementation. *CLEI Electron. J.*, 12(3), 2009.

Book chapters

[1] Maximiliano Cristiá and Gianfranco Rossi. From computational logic to computational biology: Essays dedicated to Alfredo Ferro to celebrate his scientific career. chapter An Automatically Verified Prototype of a Landing Gear System, pages 56–81. Springer Nature Switzerland, 2024.

[2] Norbert Giambiasi, Diego Llarrull, and Maximiliano Cristiá. Discrete-event modeling and simulation: Theory and applications. chapter System State Identification Using DEVS, pages 85–108. Taylor & Francis, 2010.

International conferences

[1] Alfredo Capozzuca, Maximiliano Cristiá, Ross Horne, and Ricardo Katz. Brewer-Nash scrutinized: Mechanized checking of policies featuring write revocation. In *37th IEEE Computer Security Foundations Symoosium, CSF 2024, Enschede*. IEEE, 2024. *to appear*.

[2] Maximiliano Cristiá and Gianfranco Rossi. {*log*}: Programming and automated proof in set theory. In David S. Warren and Y. Annie Liu, editors, *Proceedings of the 3rd Workshop on Logic and Practice of Programming – Programming with High-Level Abstractions*, 2022. https://lpop.cs.stonybrook.edu/lpop2022/proceedings.

[3] Gustavo Betarte, Maximiliano Cristiá, Carlos Daniel Luna, Adrián Silveira, and Dante Zanarini. Towards a formally verified implementation of the MimbleWimble cryptocurrency protocol. In Jianying Zhou, Mauro Conti, Chuadhry Mujeeb Ahmed, Man Ho Au, Lejla Batina, Zhou Li, Jingqiang Lin, Eleonora Losiouk, Bo Luo, Suryadipta Majumdar, Weizhi Meng, Martín Ochoa, Stjepan Picek, Georgios Portokalidis, Cong Wang, and Kehuan Zhang, editors, *Applied Cryptography and Network Security Workshops - ACNS 2020 Satellite Workshops, AIBlock, AIHWS, AIoTS, Cloud S&P, SCI, SecMT, and SiMLA, Rome, Italy, October 19-22, 2020, Proceedings*, volume 12418 of *Lecture Notes in Computer Science*, pages 3–23. Springer, 2020.

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[11] Maximiliano Cristiá, Gianfranco Rossi, and Claudia S. Frydman. Helping programmers to adopt set-based specifications. In *Proceedings of the First Workshop on Formal Methods in Software Engineering Education and Training, FMSEE&T 2015, co-located with 20th International Symposium on Formal Methods (FM 2015), Oslo, Norway, June 23, 2015.*, pages 3–10, 2015.

[12] Maximiliano Cristiá. Why, how and what should be taught about formal methods? In *Proceedings of the First Workshop on Formal Methods in Software Engineering Education and Training, FMSEE&T 2015, co-located with 20th International Symposium on Formal Methods (FM 2015), Oslo, Norway, June 23, 2015.*, pages 1–2, 2015.

[13] Maximiliano Cristiá and Claudia S. Frydman. A functional verification of a web voting system. In Beniamino Murgante, Sanjay Misra, Ana Maria A. C. Rocha, Carmelo Maria Torre, Jorge Gustavo Rocha, Maria Irene Falcão, David Taniar, Bernady O. Apduhan, and Osvaldo Gervasi, editors, *ICCSA (1)*, volume 8579 of *Lecture Notes in Computer Science*, pages 640–655. Springer, 2014.

[14] Maximiliano Cristiá and Gianfranco Rossi. Rapid prototyping and animation of Z specifications using $\{log\}$. In *1st International Workshop about Sets and Tools (SETS 2014)*, pages 4–18, 2014. Informal proceedings: http://sets2014.cnam.fr/papers/sets2014.pdf.

[15] Maximiliano Cristiá, Joaquín Mesuro, and Claudia S. Frydman. Integration testing in the Test Template Framework. In Stefania Gnesi and Arend Rensink, editors, *FASE*, volume 8411 of *Lecture Notes in Computer Science*, pages 400–414. Springer, 2014.

[16] Maximiliano Cristiá, Gianfranco Rossi, and Claudia S. Frydman. $\{log\}$ as a test case generator for the Test Template Framework. In Robert M. Hierons, Mercedes G. Merayo, and Mario Bravetti, editors, *SEFM*, volume 8137 of *Lecture Notes in Computer Science*, pages 229–243. Springer, 2013.

[17] Maximiliano Cristiá and Claudia S. Frydman. Extending the Test Template Framework to deal with axiomatic descriptions, quantifiers and set comprehensions. In John Derrick, John A. Fitzgerald, Stefania Gnesi, Sarfraz Khurshid, Michael Leuschel, Steve Reeves, and Elvinia Riccobene, editors, *ABZ*, volume 7316 of *Lecture Notes in Computer Science*, pages 280–293. Springer, 2012.

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[19] Maximiliano Cristiá and Claudia S. Frydman. Applying SMT solvers to the Test Template Framework. In Alexander K. Petrenko and Holger Schlingloff, editors, *MBT*, volume 80 of *EPTCS*, pages 28–42, 2012.

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[21] Maximiliano Cristiá, Pablo Albertengo, Claudia S. Frydman, Brian Plüss, and Pablo Rodríguez Monetti. Applying the Test Template Framework to aerospace software. In James L. Rash and Christopher Rouff, editors, *SEW*, pages 128–137. IEEE Computer Society, 2011.

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[23] Maximiliano Cristiá, Pablo Albertengo, and Pablo Rodríguez Monetti. Pruning testing trees in the Test Template Framework by detecting mathematical contradictions. In José Luis Fiadeiro and Stefania Gnesi, editors, *SEFM*, pages 268–277. IEEE Computer Society, 2010.

[24] Maximiliano Cristiá and Brian Plüss. Generating natural language descriptions of Z test cases. In John D. Kelleher, Brian Mac Namee, Ielka van der Sluis, Anja Belz, Albert Gatt, and Alexander Koller, editors, *INLG*, pages 173–177. The Association for Computer Linguistics, 2010.

[25] Maximiliano Cristiá and Pablo Rodríguez Monetti. Implementing and applying the Stocks-Carrington framework for model-based testing. In Karin Breitman and Ana Cavalcanti, editors, *ICFEM*, volume 5885 of *Lecture Notes in Computer Science*, pages 167–185. Springer, 2009.

[26] Maximiliano Cristiá. Formalizing the semantics of modular DEVS models with temporal logic. In *7ème Conférence on Modélisation, Optimisation et Simulation des Systèmes MOSIM 08*, 2008.

[27] Maximiliano Cristiá. A TLA+ encoding of DEVS models. In *International Modeling and Simulation Multiconference*, pages 17–22, 2007.

[28] Maximiliano Cristiá. Teaching formal methods in a third world country: what, why and how. In *Proceedings of the 2006 conference on Teaching Formal Methods: practice and experience*, TFM'06, pages 10–10, Swinton, UK, UK, 2006. British Computer Society.

Latin American conferences

[1] Adrián Silveira, Gustavo Betarte, Maximiliano Cristiá, and Carlos Luna. An idealized model for the formal security analysis of the mimblewimble cryptocurrency protocol. In *XLVIII Latin American Computer Conference, CLEI 2022, Armenia, Colombia, October 17-21, 2022*, pages 1–10. IEEE, 2022.

[2] Ariel Gonzalez, Maximiliano Cristiá, and Carlos Luna. Mutants for metric temporal logic formulas. In Beatriz Marín, Isabel Sofia Brito, Miguel Katrib Mora, Andreia Malucelli, Estefanía Serral, Giovanni Giachetti, João Araújo, Miguel Goulão, Claudia P. Ayala, Marcela Genero, and Vitor Silva Souza, editors, *Proceedings of the XXII Iberoamerican Conference on Software Engineering, CIbSE 2019, La Habana, Cuba, April 22-26, 2019*, pages 349–362. Curran Associates, 2019.

[3] Gustavo Betarte, Juan Campo, Maximiliano Cristiá, Felipe Gorostiaga, Carlos Luna, and Camila Sanz. Towards formal model-based analysis and testing of Android's security mechanisms. In *XLIII Latin American Computing Conference, CLEI 2017, Córdoba, Argentina, September 4-8, 2017*.

[4] Maximiliano Cristiá, Valdivino Santiago, and N.L. Vijaykumar. On comparing and complementing two MBT approaches. In *Test Workshop (LATW), 2010 11th Latin American*, pages 1–6, 2010.

[5] Alejandro Sartorio and Maximiliano Cristiá. Primera aproximación al diseño e implementación de los DHD. In *Anales de la XXXIV Conferencia Latinoamericana de Informática*, Santa Fe, Argentina, 2008. CLEI.

[6] Maximiliano Cristiá. Formal verification of an extension of a secure, compatible UNIX file system. In *Anales de la XXIX Conferencia Latinoamericana de Informática*, La Paz, Bolivia, 2003. CLEI.

National conferences

[1] Maximiliano Cristiá and Catherine Dubois. Comparing EventB, {*log*}and Why3 models of sparse sets. In Delphine Demange and Adrien Guatto, editors, *JFLA 2024 - 35èmes Journées Francophones des Langages Applicatifs*, pages 40–50, Saint-Jacut-de-la-Mer, France, January 2024.

[2] Adrián Silveira, Gustavo Betarte, Maximiliano Cristiá, and Carlos Luna. A range proof scheme analysis for the Mimblewimble cryptocurrency protocol. In *2021 IEEE URUCON*, pages 329–333, 2021.

[3] Ariel Gonzalez, Maximiliano Cristiá, and Carlos Luna. Error finding in real-time systems using mutants of temporal properties. In *40th International Conference of the Chilean Computer Science Society, SCCC 2021, La Serena, Chile, November 15-19, 2021*, pages 1–8. IEEE, 2021.

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[5] Maximiliano Cristiá and Pablo Mata. Runtime enforcement of noninterference by duplicating processes and their memories. In *Workshop de Seguridad Informática WSEGI 2009*, Mar del Plata, Argentina, 2009. SADIO.

[6] Maximiliano Cristiá, Gisela Giusti, and Felipe Manzano. The implementation of Lisex, a MLS linux prototype. In *Proceedings of the 6th ASSE (34th JAIIO)*, Rosario, Argentina, 2005. SADIO.