Mircea Marin

Professor

West University of Timişoara, Blvd. Vasile Pârvan 4, Timişoara, Romania

mircea.marin@e-uvt.ro | https://staff.fmi.uvt.ro/~mircea.marin/

Personal Data

Place of birth *Sînpetru German, Romania*

Date of birth *09/10/1967*

- Nationality: Romanian
- Gender: Male
- Marital status: Married
- Languages spoken: Romanian (native), English (fluent), German (basic)

Education

West University of Timişoara *Timişoara, Romania*

Habilitation for Doctoral Studies in Informatics *04/06/2018*

- Order 3783 from 04.06.2018 of the Romanian Ministry of Education

University of Tsukuba *Tsukuba, Japan*

Postdoc in Computer Science *06/2000 - 05/2002*

- Postdoc fellowship granted by the Japanese Society for the Promotion of Science (JSPS)
- Advisor: Prof. Dr. Tetsuo Ida

Research Institute for Symbolic Computation (RISC-Linz) *Schloss Hagenberg, Austria*

PhD in Computer Science *10/1995 - 05/2000*

- PhD in Computer Science from Johannes Kepler University of Linz, in 17/05/2000
- Thesis: *Functional Logic Programming with Distributed Constraint Solving*
- Advisor: Prof. Dr.Dr.h.c.mult. Bruno Buchberger

University of Timişoara *Timişoara, Romania*

BS and MS in Informatics *10/1987 - 06/1992*

- Student at the Faculty of Mathematics, specialization Informatics, University of Timişoara, Romania
- Master Thesis: *Pyramidal Structures and Pattern Recognition*
- Advisor: Radu Fantaziu

Fellowships

06/2000-05/2002: Postdoc Fellowship from Japan Society for the Promotion of Science (JSPS)

- Host institution: University of Tsukuba, Japan.
- Budget: 270 000 JPY/month
- Research subject: development of a computational model for distributed constraint solving in open environments.

Professional Experience

Since 2022	**Professor**, West University of Timişoara, Romania
Since 2015	**Associate Professor**, West University of Timişoara, Romania
Since 2018	**Member of the Doctoral School of Informatics**, West University of Timişoara, Romania
2011-2015	**Assistant Professor**, West University of Timişoara, Romania
05/2011-09/2011	**Scientific Researcher III**, West University of Timişoara, Romania
04/2011-09/2012	**Software developer**, GM Analytic Software SRL, Timişoara, Romania
09/2004-03/2011	**Assistant Professor**, Dept. of Computer Science of Graduate School of Systems and Information Engineering, University of Tsukuba, Japan
03/2003-09/2004	**Scientific researcher in the Symbolic Computation group**, RICAM Institute of Austrian Academy of Sciences
1993-1995	**Tutor (preparator)**, Department of Informatics, Faculty of Mathematics, University of Timişoara, Romania
07/1992-09/1993	**Programmer Analyst**, Postal Office, Arad, Romania

Other Professional Activities

- 2008-2013: Steering committee member of UNIF workshop, `https://www.irif.fr/~treinen/unif/steering-committee.html`
- 2011: Guest editor of a Special issue on unification of the Logic Journal of the IGPL. Volume 9, issue 6, year 2011
- since 2015: Coach and trainer of students participating at student programming contests (ACM, ONIS, CISM)
- 2020-2021: Guest editor of a Special issue of the Journal of Logical and Algebraic Methods in Programming (JLAMP), with extended versions of selected papers and talks from FROM 2019.
- 2021-2022: Editor of Proceedings of International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC)
- 2021-2023: Programme Chair of the International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC)
- since 2022: Responsible with the Master program Artificial Intelligence and Distributed Computing (AIDC) at the Department of Computer Science of West University of Timişoara.

Research Interests

- Study and implementation of computational models for various declarative programming styles, including: functional logic programming and rule-based programming. In particular, I am interested in (1) narrowing calculi for higher-order theories specified by conditional term rewrite systems, (2) schemas for collaborative constraint solving over various constraint domains, (3) and calculi for rule-based programming with conditional rewrite rules whose application is controlled by strategies.
- Algorithms to solve unification and matching problems with new kinds of variables that increase the expressive power of the language; matching problems between regular and possibly infinite tree languages.
- Reasoning with incomplete, imperfect information in theories where exact equality is replaced by fuzzy proximity and similarity relations. In particular, I am interested in unification, anti-unification, and matching techniques for proximity and (multiple) similarity relations.
- Cyber-physical systems, robotics.
- Models and algorithms for problems of production planning, scheduling, and sequencing.

Publications

Dissertations

M. Marin. Computational Models for Declarative Programming.
Habilitation thesis. West University of Timişoara. November 17, 2017.

M. Marin. Functional Logic Programming with Distributed Constraint Solving.
PhD thesis in Computer Science. Johannes Kepler University, Linz, Austria, May 17, 2000.
Thesis advisor: Prof. Dr. Dr.h.c.mult. Bruno Buchberger.

M. Marin. Pyramidal Structures and Pattern Recognition.
MSc thesis in Computer Science. West University of Timişoara, Romania. June, 1992.
Thesis advisor: Radu Fantaziu.

Journal publications

G. Sénizergues, **M. Marin**, B. Dundua, V. Diekert, C. Camino. 2022. Regular matching problems for infinite trees. Logical Methods in Computer Science, 18, pp. 25-1-25-38. DOI: 10:46298/LMCS-18(1:25)2022

B. Dundua, T. Kutsia, **M. Marin**. 2021. Variadic equational matching in associative and commutative theories. JSC 106:78-109. DOI: 10.1016/j.jsc.2021.01.001

B. Dundua, M. Florido, T. Kutsia, **M. Marin**. 2016. CLP (H): Constraint logic programming for hedges. TPLP 16(2), 141-162. DOI: 10.1017/S1471068415000071

T. Kutsia, **M. Marin**. 2015. Regular Expression Order-sorted Unification and Matching. JSC 67, pg. 62-67. DOI: 10.1016/j.jsc.2014.08.002.

M Marin, G. Istrate. 2014. Learning cover context-free grammars from structural data. Scientific Annals of Computer Science XXIV (2), pg 253-286. DOI: 10.7561/SACS.2014.2.253.

M. Marin, T. Kutsia. 2010. On the computation of quotients and factors of regular languages. Frontiers of Computer Science in China 4(2), 173-184. DOI: https://doi.org/10.1007/s11704-010-0154-8.

M. Marin, T. Kutsia. 2006. Foundations of the rule-based system ρLog. Journal of Applied and Nonclassical Logic 6(1-2):151-168. DOI: 10.3166/jancl.16.151-168

N. Kobayashi, **M. Marin**, Y. Tanaka, H. Urushihara. 2006. On the Development of an Analysis System for Upstream Sequences in Dictyostelium discoideum Genome. Information and Media Technologies 1(2):742-747. DOI: https://doi.org/10.11185/imt.1.742

M. Marin, F. Piroi. 2003. Deduction and Presentation in ρLog. ENTCS 93:161-182. DOI: 10.1016/j.entcs.2003.12.033

N. Kobayashi, **M. Marin**, T. Ida. 2003. Collaborative constraint functional logic programming system in an open environment. IEICE Trans. on Information and Systems 86(1):63-70 .

M. Marin, T. Ida. W. Schreiner. 2001. CFLP: A Mathematica Implementation of a Distributed Constraint Solving System. The Mathematica Journal, 8(2):287-300

T. Ida, **M. Marin**, N. Kobayashi. 2001. An Open Environment for Cooperative Equational Solving. Wuhan China. Wuhan University Journal of Natural Sciences, 6(1-2):169-174 .

Articles in conference proceedings

O. Maghiar, A. Copie, T. Selea, **M. Marin**, F. Micota, D. Zaharie, I. Ţepeneu. 2024. Behaviour Analysis of Trajectory and Population-based Metaheuristics on Flexible Assembly Scheduling. Procs. of the 15th Metaheurisic International Conference (MIC 2024). *To appear*

M. Marin, T. Kutsia, C. Pau, M. Rukhaia. 2023. Enumerating All Maximal Clique-Partitions of an Undirected Graph. Procs. of 7th Symposium on Working Formal Methods, EPTCS 389:65-79. DOI:10.4204/EPTCS.389.6

O. Maghiar, T. Selea, A. Copie, F. Micota, **M. Marin**. 2023. Procs. of the 18th Conference on Computer Science and Intelligence Systems (FedCSIS 2023), IEEE, pp. 615-625. DOI: 10.15439/2023F2715

B. Dundua, T. Kutsia, **M. Marin**, C. Pau. 2020. Constraint solving over multiple similarity relations. FSCD, Volume 167 of LIPIcs, Schloss Dagstuhl, 2020. 30:1–30:19. DOI: 10.4230/LIPIcs.FSCD.2020.30

M. Marin, B. Dundua, T. Kutsia. 2020. A rule-based system for computation and deduction in Mathematica. Procs. of 13th International Workshop on Rewriting Logic and Applications (WRLA), Springer, pp. 57-74. DOI: 10.1007/978-3-030-63595-4_4

A. Cărunta, M. Pleşu, **M. Marin**. 2019. Antimicrobial Resistance Patterns Detection Using Gene Interaction Networks Analysis. Procs. of EHB 2019, pg. 1-4.

M. Marin, T. Kutsia, B. Dundua. 2019. A Rule-based Approach to the Decidability of Safety of $ABAC_\alpha$. Procs. of SACMAT 2019, pg. 173-178. DOI: https://doi.org/10.1145/3322431.3325416

B. Dundua, T. Kutsia, **M. Marin**. 2019. Variadic equational matching. In: C. Kaliszyk, E. Brady, A. Kohlhase, and C. Sacerdoti Coen, editors, Intelligent Computer Mathematics, pages 77–92, Cham. LNAI 11617. Springer International Publishing.

B. Dundua, T. Kutsia, **M. Marin**, C. Pau. 2019. Extending the ρLog calculus with proximity relations. In G. Jaiani, D. Natroshvili, editors, Applications of Mathematics and Informatics in Natural Sciences and Engineering. AMINSE 2019. Springer Proceedings in Mathematics and Statistics, vol 334, pages 83-100. Springer, Cham. DOI: 10.1007/978-3-030-56356-1_6

B. Dundua, T. Kutsia, **M. Marin**, M. Rukhaia. 2019. Specification and Analysis of ABAC Policies in a Rule-Based Framework. In G. Jaiani, D. Natroshvili, editors, Applications of Mathematics and Informatics in Natural Sciences and Engineering. AMINSE 2019. Springer Proceedings in Mathematics and Statistics, vol 334, pages 101-116. Springer, Cham. DOI: 10.1007/978-3-030-56356-1_7

B. Dundua **M. Marin**, T. Kutsia, B. Dundua. 2016. A rewrite-based computational model for functional logic programming. Procs.of SCSS 2016, pages 95-106. DOI: 10.29007/3ks9

M. Marin. 2015. Extending Mathematica with anti-patterns. Procs. of IMS 2015, pages 1-6.

B. Dundua, M. Florido, T. Kutsia, **M. Marin**. 2014. Constraint Logic Programming for Hedges: a Semantic Reconstruction. Procs. of FLOPS 2014. LNCS 8475, pp. 285-301. Springer. Kanazawa, Japan.

M. Marin, G. Istrate. 2014. Learning cover context-free grammars from structural data. Procs. of ICTAC 2014, LNCS 8687, pp. 241-258. DOI: 10.1007/978-3-319-10882-7_15

T. Kutsia, **M. Marin**. 2012. Solving, Reasoning, and Programming in Common Logic. Procs. of SYNASC 2012, pp. 119-126. IEEE.

M. Marin, A. Crăciun. 2010. Type Inference for Regular Expression Pattern Matching. Procs. of SYNASC 2010, pp. 366-373. IEEE.

M. Marin, T. Kutsia. 2010. Regular hedge language factorization revisited. In Sheng Yu, editor, Procs. of DLT 2010. LNCS 6224, pages 328-339. Springer. London, Ontario, Canada.

T. Kutsia, **M. Marin**. 2010. Order-Sorted Unification with Regular Expression Sorts. In Ch. Lynch, editor, Procs. of RTA 2010, Edinburgh, UK. Leibniz International Procs. in Informatics (LIPIcs), pages 193-208.

M. Marin, A. Crăciun. 2009. Factorizations of Regular Hedge Languages. Procs. of SYNASC 2009, pp. 307-314. IEEE.

B. Dundua, T. Kutsia, **M. Marin**. 2009. Strategies in Pρlog. In M. Fernandez, editor, Procs. of 9th Intl. Workshop on Reduction Strategies in Rewriting and Programming (WRS 2009). ENTCS 15:32-43. Brasilia, Brazil.

M. Marin, T. Kutsia. 2009. Linear systems for regular hedge languages. In J. Grundspenkis, M. Kirikova, Y. Manolopoulos, and L. Novickis, editors, Advances in Databases and Information Systems. Associated Workshops and Doctoral Consortium of the 13th East-European Conference, ADBIS2009.Proceedings. LNCS 5968, pages 104-112. Riga, Latvia. DOI: 10.1007/978-3-642-12082-4_14

T. Kutsia, **M. Marin**. 2008. Matching with Membership Constraints for Hedge and Context Variables. Procs. of UNIF 2008, pages 55-68. Hagenberg, Austria.

T. Ida, **M. Marin**, H. Takahashi, F, Ghourabi. 2008. Computational origami construction as constraint solving and rewriting. ENTCS 216:31-44.

A. Kasem, H. Takahashi, **M. Marin**, T. Ida. 2007. weborigami2: A system for origami construction and proving using web 2.0 technologies. Procs. of the Annual Symposium of Japan Society for Software Science and Technology. 7 pages.

T. Ida, H. Takahashi, **M. Marin**, F. Ghourabi. 2007. Modeling origami for computational construction and beyond. International Conference on Computational Science and Its Applications, pp. 653-665.

F. Ghourabi, T. Ida, H. Takahashi, **M. Marin**, A. Kasem. 2007. Logical and algebraic view of Huzita's origami axioms with applications to computational origami. Procs. of the ACM symposium on Applied Computing, pp. 767-772.

T. Ida, H. Takahashi, **M. Marin**, F. Ghourabi, A. Kasem. 2006. Computational construction of a maximum equilateral triangle inscribed in an origami. International Congress on Mathematical Software (ICMS), pp. 361-372.

T. Kutsia, **M. Marin**. 2006. Solving regular constraints for hedges and contexts. Procs. of 20th International Workshop on Unification (UNIF'06), pp. 89-107.

T. Ida, H. Takahashi, **M. Marin**, A. Kasem, F. Ghourabi. 2006. Computational origami system Eos. Procs. of 4th International Conference on Origami, Science, Mathematics and Education. 12 pages.

T. Kutsia, **M. Marin**. 2005. Matching with Regular Constraints. In: G. Sutcliffe and A. Voronkov, editors, Procs. of LPAR 2005. Montego Bay, Jamaica. Volume 3835 of LNAI. Springer, pp. 215–229.

M. Marin, T. Ida. Rule-based programming with ρLog. Procs. of SYNASC 2005, 8 pages. IEEE. DOI: 10.1109/SYNASC.2005.61

T. Ida, **M. Marin**, H. Takahashi. 2005. Computational origami of a Morley's triangle. Procs. of MKM 2005, LNAI, vol. 3863, pp. 267-282.

T. Kutsia, **M. Marin**. 2005. Can Context Sequence Matching be Used for XML Querying? Procs. of UNIF 2005, pages 77-95.

T. Ida, H. Takahashi, D. Ţepeneu, **M. Marin**. 2005. Morley's theorem revisited through computational origami. Procs. of IMS 2005, 22 pages.

M. Marin, A. Middeldorp. 2004. New completeness results for lazy conditional narrowing. Procs. of 6th ACM SIGPLAN intl. conference on Principles and practice of declarative programming (PPDP 2004), pp. 120-131

M. Marin, F. Piroi. 2004. Rule-based programming with Mathematica. In Procs. of 5th Mathematica symposium (IMS 2004), pp. 1-5 .

T. Kutsia, **M. Marin**. 2004. Unification procedure for terms with sequence variables and sequence functions. Procs. of UNIF 2004, 13 pages.

M. Marin, F. Piroi. 2004. Deduction and presentation in ρLog. ENTCS 93:161-182.

M. Marin, T. Kutsia. 2004. A rule-based approach to the implementation of evaluation strategies. Procs. of SYNASC 2004, pp. 227-241. IEEE.

T. Ida, **M. Marin**, H. Takahashi. 2003. Constraint functional logic programming for origami construction. Procs. of Asian Symposium on Programming Languages and Systems (APLAS), pp. 73-88.

M. Marin. 2003. Functional Programming with Sequence Variables: The Sequentica Package. Procs. of UNIF 2003, pp. 65-78.

M. Marin, D. Ţepeneu. 2003. Programming with Sequence Variables: The Sequentica Package. Procs. of International Mathematics Symposium (IMS) published in the book *Challenging The Boundaries Of Symbolic Computation (with CD-ROM)*. pp. 17-24.

T. Ida, **M. Marin**. 2003. Functional Logic Origami Programming with Open CFLP. Procs. of International Mathematics Symposium (IMS) published in the book *Challenging The Boundaries Of Symbolic Computation (with CD-ROM)*. pp. 397-404

M. Marin, T. Kutsia. 2004. On the implementation of a rule-based programming system and some of its applications. Proc. of the 4th Intl. Workshop on the Implementation of Logics (WIL'03), pp. 55-68.

T. Ida, **M. Marin**, T. Suzuki. 2002. Reducing search space in solving higher-order equations. In S. Arikawa and A. Shinohara, editors, Progress in Discovery Science, Final Report of the Japanese Discovery Science Project, LNCS 2281, pp. 19-30. Springer.

T. Ida, **M. Marin**, T. Suzuki. 2001. Higher-order Lazy Narrowing Calculus: a Solver for Higher-order Equations. In R. Moreno-Diaz, B. Buchberger, J. L. Freire, editors, Procs.of the 8th International Conference on Computer Aided Systems (EUROCAST2001). LNCS 2178, pp. 478-493. Canary Islands, Spain.

M. Marin, T. Ida, T. Suzuki. 2000. Cooperative Constraint Functional Logic Programming. In T. Katayama, T. Tamai, N. Yonezaki, editors, Procs. of ISPSE2000, pp. 223-230, Kanazawa, Japan. IEEE.

M. Marin, T. Ida, T. Suzuki. 1999. On Reducing the Search Space of Higher-Order Lazy Narrowing. In A. Middeldorp, T. Sato, editors, Procs. of FLOPS'99. LNCS 1722, pp. 319-334. Springer.

W. Schreiner, W. Danielczyck-Landerl, **M. Marin**, W. Stöcher. 1998. A Generic Programming Environment for High Performance Mathematical Libraries. Workshop on Generic Programming, Castle Dagstuhl, Wadern, Germany. R. Loos, D. Musser, editors, LNCS 1766, pp. 256-267. Springer Berlin.

M. Marin, W. Schreiner. 1998.CFLP: A distributed constraint solving system for functional logic programming. Procs. of Austrian-Hungarian Workshop on Distributed and Parallel Systems (DAPSYS'98). Budapest, Hungary. pp. 133-136

B. Buchberger, K. Aigner, C. Dupre, T. Jebelean, F. Kriftner, **M. Marin**, K. Nakagawa. 1998. Theorema: An Integrated System for Computation and Deduction in Natural Style. Proceedings of CADE 98 (International Conference on Computer Aided Deduction).

B. Buchberger, **M. Marin**. 1997. Proving by Simplification. In Procs. of the First International Theorema Workshop, RISC-Linz Technical Report 97-20.

B. Buchberger, T. Jebelean, F. Kriftner, **M. Marin**, E. Tomuţa, D. Văsaru. 1997. A survey of the *Theorema* project. In Procs. of ISSAC, pp. 384-391. DOI: 10.1145/258726.258853

Books

M. Marin, V. Negru, I. Drămnesc. 2016. *Principles and Practice of Functional Programming*. Editura UVT, Colecţia Amfiteatru. 317 pages. ISBN 978-973-125-451-7

M. Marin. 2021. *Combinatorică şi Teoria Grafurilor*. Editura UVT, Colecţia Amfiteatru. 306 pages. ISBN: 978-973-125-829-4

Research Projects

At institute RISC-Linz, Austria

I was a key personnel member of the following projects:

1. **Stereo-videometry and Spatial Object Recognition (10/1995 – 08/1996)**

   Subproject hosted by institute RISC-Linz and coordinated by Sabine Stifter, in the frame of the Austrian research project "Theory and Applications of Digital Image Processing and Pattern Recognition".

   My contribution was to implement a viewer of surfaces represented by dexel models.

2. **High Performance Generic Programming (09/1996 – 02/1998)**

   Project coordinated by Wolfgang Schreiner and Hoon Hong.

   - Funder: Austrian Science Foundation, FWF grant P11414-OTE
   - Goal: to construct a generic compilation system for the construction of high performance mathematical software libraries for scientific and technical application domains, based on the concept of higher-order functor.
   - My contribution: module specification of basic types and data structures.
   - Website: `https://risc.jku.at/pj/high-performance-generic-programming-hpgp/`

3. **Distributed Constraint Solving for Functional Logic Programming (07/1997 – 09/1999)**.
   - Funder: Japanese Research Institute for Advanced Information Technology (AITEC)
   - Host institution: RISC-Linz institute
   - Goal: to develop a distributed software system which integrates a functional logic interpreter with many constraint solvers running on different machines in a distributed environment.
   - My contribution: to define the computational model and to implement it in the language of Mathematica.
   - Website: `https://www3.risc.jku.at/projects/distcon/`

Also, in 1996-2000 I was a voluntary member of the project **Theorema**

- Goal: the development of a system for computer-supported theorem proving and theory exploration, which reflects the view of Bruno Buchberger of doing mathematics.
- Website: `https://www3.risc.jku.at/research/theorema/software/`

At University of Tsukuba, Japan

4. **Rule-based Programming: Design and Applications (04/2008 - 03/2011)**
   - Funder: Japan Society for the Promotion of Science.
     JSPS Grant-in-Aid for Young Researchers (B); Project number 17700025.

- Budget (JPY): 1300 000 (2008), 1100 000 (2009), 1000 000 (2010).
- My role: main investigator.

5. **Applications of rule-based programming to verification and transformation of XML (04/2005 - 03/2007)**
   - Funder: Japan Society for the Promotion of Science.
     JSPS Grant-in-Aid for Scientific Research (C); Project number 20500025.
   - Budget (JPY): 1200 000 (2005), 1100 000 (2006).
   - My role: main investigator.
   - Goal: design and implementation of a system for rule-based programming, featuring capabilities such as: advanced pattern matching mechanism (sequence variables, function variables), support for strategic programming and automated deduction and proof generation.

With international partners

6. **FR17_439: Rule-Based Approach to Attribute-Based Access Control (12/2017 - 12/2020)**
   - Funder: Shota Rustaveli National Science Foundation of Georgia.
   - Budget: 72076.4 USD
   - My role: main investigator.
   - Goal: specifying attribute-based access control to (ABAC) operational and administrative models in a formalism which combines the power of conditional rewriting and logic programming, based on the ρLog calculus.
   - Website: `https://viam.science.tsu.ge/new/index.php?lang=eng&page=projects&subpage=16`
7. **Tolerance-based techniques for approximate reasoning (03/2022 – 02/2025)**
   - Funder: Shota Rustaveli National Science Foundation of Georgia
   - Budget: 182 208.97 GEL
   - My role: key personnel member.
   - Goal: development of novel symbolic techniques for supporting automated or semi-automated reasoning activities in theories modulo proximity and similarity relations.
8. **SCAMP-ML: Advanced Computational Statistics for planning and tracking of production environments (09/2021 – 12/2023)**
   - Funder: Ministry of Investments and European Projects in the frame of the Competitiveness Operational Programme (COP)
   - Budget: 1 381 797 RON (West University of Timisoara partner)
   - My role: CS1/CS2 scientific researcher.
   - Goals: to develop and improve the competencies of specialists from Information Technologies and Communication, to increase their performance at the workplace, to improve the competitiveness of the companies where they activate, and to assist their professional development.
   - Website: https://planning.uvt.services.scamp.roiot.ro

At West University of Timişoara, Romania

Key personnel member in the following ongoing projects:

9. **SYMSAFE: Symbolic rewriting methods for safety and security of critical cyber-physical systems (11/2023 - 10/2026)**
   - Funder: the Emerging Security Challenges division of NATO in the frame of the programme Science for Peace and Security.
   - Budget: 48 000 EUR – for travel and the payment of a a stipendium.
   - My role: co-director.
   - Goal: the development of new automatic mathematical methods to analyse the security and correctness of modern complex cyber-physical [computer] systems (CPSs). The methods will be based on symbolic rewriting techniques such as rewriting with SMT solving and narrowing analysis, and on domain-specific complexity-reduction methods.

10. **Automated Reasoning in the Class (02/2019 - 07/2022)**
    - FUNDER: the European Commission in the frame of Erasmus+ program.
    - GOAL: to elaborate teaching materials (text, software, and practical recommendations) for using deductive tools in university courses about mathematical logic, automated theorem proving, and formal methods. The main contribution of this project will be a book with the tentative title "*Computational Logic: A Practical Approach*".
    - MY MAIN CONTRIBUTION: description of declarative programming styles and related software tools, to be included in this book.

Invited Lectures and Invited Talks

September, 2022. *Rule-based programming with Rholog*. Lecturer at 13th International School on Rewriting, Tbilisi, Georgia.
`https://viam.science.tsu.ge/clas2022/isr/`

March 25, 2021. *Matching problems for infinite trees*. Invited talk presented at the seminar of logic of Faculty of Mathematics and Informatics from Bucharest University.
`https://los.cs.unibuc.ro/seminar-logic.html`

September 2019. *Specification and Analysis of ABAC Policies in a Rule-Based Framework*. Plenary speaker at The Fourth International Conference on Applications of Mathematics and Informatics in Natural Sciences and Engineering (AMINSE 2019), Ivane Javakhishvili Tbilisi State University (TSU), Tbilisi, Georgia.
`http://www.viam.science.tsu.ge/aminse2019/plenary/`

March 11 2019. *Generalizations of factorization theory to tree languages*. Invited talk at the Informatics Colloquium, Fakultät fur Informatik, Elektrotechnik und Informationstechik, Stuttgart University.

February 2019. *Foundations of Programming Languages*. Lecturer at Winter School on Theoretical Foundations of Computer Science (WSTFCS 2019), Tbilisi, Georgia.
`https://cte.ibsu.edu.ge/wstfcs2019/index.php`

June 2018. *Unification and matching in unranked term algebras with regular expression sorts*. Invited talk presented at the Working Formal Methods Symposium (FROM 2018), Iaşi, Romania.
`https://fmse.info.uaic.ro/event/from-2018/`

December 2017. *Rule-based Programming: The Mathematica Experience*. Invited talk presented at the Third International Conference on Applications of Mathematics and Informatics in Natural Sciences and Engineering (AMINSE 2017), Ivane Javakhishvili Tbilisi State University (TSU), Tbilisi, Georgia.
`http://www.viam.science.tsu.ge/aminse2017/`

March 1, 2002. *Collaborative Constraint Functional Logic Programming in Open Environments*. Invited talk at seminar on Principles of Programming, Carnegie Mellon University, Pittsburgh, USA.
`https://www.cs.cmu.edu/~popseminar/`

Teaching Experience

1993-1994	**Data Structures**, Tutor, West University of Timişoara	*Timişoara*
1993-1994	**Artificial Inteligence**, Tutor, West University of Timişoara	*Timişoara*
1993-1994	**Logic Programming**, Tutor, West University of Timişoara	*Timişoara*
1993-1994	**Functional Programming**, Tutor, West University of Timişoara	*Timişoara*
2004-2011	**Mathematics for Computer Science**, Assistant Professor, University of Tsukuba	*Tsukuba*
2004-2011	**English in Technologies**, Assistant Professor, University of Tsukuba	*Tsukuba*
2004-2011	**Information Processing**, Assistant Professor, University of Tsukuba	*Tsukuba*
2004-2011	**Models of Computation**, Assistant Professor, University of Tsukuba	*Tsukuba*
2005	**Advanced Topics in Term Rewriting**, Assistant Professor, University of Tsukuba	*Tsukuba*
2006-2010	**Advanced Topics in Symbolic Computation**, Assistant Professor, University of Tsukuba	*Tsukuba*
2006-2009	**Equational Reasoning Programming**, Tutor, University of Tsukuba	*Tsukuba*
2011-2015	**Logic Programming**, Assistant Professor, West University of Timişoara	*Timişoara*
2011-2015	**Functional Programming**, Assistant Professor, West University of Timişoara	*Timişoara*
2011-2015	**Graph Theory and Combinatorics**, Assistant Professor, West University of Timişoara	*Timişoara*
2011-2015	**Symbolic Computation**, Assistant Professor, West University of Timişoara	*Timişoara*
2011-2015	**Special Chapters of Informatics**, Assistant Professor, West University of Timişoara	*Timişoara*
2015-2020	**Functional Programming**, Associate Professor, West University of Timişoara	*Timişoara*
2015-2020	**Logic Programming**, Associate Professor, West University of Timişoara	*Timişoara*
Since 2020	**Functional and Logic Programming**, (Associate Professor), West University of Timişoara	*Timişoara*
Since 2015	**Advanced Functional and Logic Programming**, (Associate) Professor, West University of Timişoara	*Timişoara*
Since 2015	**Advanced Data Structures**, (Associate) Professor, West University of Timişoara	*Timişoara*
Since 2015	**Graph Theory and Combinatorics**, (Associate) Professor, West University of Timişoara	*Timişoara*
Since 2022	**Formal Languages and Automata Theory**, Professor, West University of Timişoara	*Timişoara*

In 2014 and 2016 I gave invited talks and lectures on Advanced Functional Logic Programming and Rule-Based Programming as visiting professor at Johannes Kepler University, in the frame of the Erasmus+ outgoing mobility program for teaching.

Software development

- **CFLP** and **Open CFLP** (1998-2003): prototype implementations of a computational model proposed by me for constraint functional logic programming in distributed environments. They were implemented in Mathematica. CFLP was described in detail in my PhD thesis (2000). Open CFLP was the outcome of my postdoctoral studies (2000-2002).
- **Sequentica** (2003-2004): a Mathematica package to work with strategies for matching with sequence variables.
- ρ**Log** (since 2004): a system for rule-based programming with reduction strategies. It is implemented in the Wolfram Language as an add-on package that extends the rule-based programming capabilities of Mathematica in significant ways. Its theoretical foundation is a calculus for rule-based programming designed by us in 2004, which was called ρLog too.
  - The ρLog calculus was also used to implement PρLog, an experimental tool that extends logic programming with strategic conditional transformation rules. PρLog combines Prolog with the ρLog calculus.
  - Website: `https://staff.fmi.uvt.ro/~mircea.marin/rholog/`