Curriculum Vitae

Hossein Hojjat

Assistant Professor
Department of Computer Science
Tehran Institute for Advanced Studies (TEIAS)
https://teias.institute/people/faculty/cs/hossein-hojjat/

Research Interests

- Formal Methods, Software Verification, Analysis and Synthesis, Automated Reasoning

Work Experience Summary

- **University of Tehran** — Tehran, Iran
  Part-time Assistant Professor — *Aug. 2018-*
- **Rochester Institute of Technology** — Rochester, United States
  Tenure-Track Assistant Professor — *Aug. 2016 - Jul. 2018*
- **Cornell University** — Ithaca, United States
  Visiting Assistant Professor — *2019, 2021, 2022, 2023, 2024-2025 (Sabbatical)*
- **Cornell University** — Ithaca, United States
  Postdoctoral Researcher — *Feb. 2014 - Jul. 2016*
  - Under supervision of Prof. Nate Foster
  - NYC ASCENT Fellow
- **EPFL** — Lausanne, Switzerland
  Postdoctoral Researcher — *Sep. 2013 - Dec. 2013*
  - Under supervision of Prof. Joseph Sifakis

Education Background

- **EPFL** — Lausanne, Switzerland
  PhD Student — *Sep. 2008 - Aug. 2013*
  - Ph.D. Dissertation: "Automatic Verification with Abstraction and Theorem Proving" under supervision of Prof. Viktor Kuncak
  - Member of ProgLab.Net project funded by Microsoft Research

Education (Cont.)

- **University of Tehran** Tehran, Iran
  MEng., Software Engineering (Grades: 18.99 / 20) *Sep. 2005 - Nov. 2007*
  - Enrolled as a top student without passing the entrance examinations
  - Thesis title: "Formal verification of the object-based systems using process algebra" under supervision of Prof. Marjan Sirjani and Prof. Mohammad Reza Mousavi
  - Defended with honors (19.8 / 20)
- **University of Tehran** Tehran, Iran
  Bs. Software Engineering (Grades 17.69 / 20) *Sep. 2001 - Sep. 2005*
  - Graduated with Honors, second position

Funding Awarded

- SaTC: CORE: Small: Collaborative: A New Approach to Federated Network Security, National Science Foundation. September 2017-August 2020 ($167,450.00)
- Minseok Kwon, Hossein Hojjat, and Matthew Wright: Real-Time Validation of BGP Route Updates in Programmable Control Planes, SIRA - RIT Center for Computing Security ($12,960)

Invited Presentations

- RIT CS Colloquium (December 2024)
- National Informatic Conference of Iran (NIC) (December 2023)
- Analysis of Computer Systems Group, NYU Courant (February 2023)
- FMT Group Colloquia, University of Twente (December 2022)
- EPFL, School of Computer and Communication Sciences Seminar (November 2019)
- Networks and Systems Summer School, TEIAS (August 2018)
- University of Rochester, Department of Computer Science Seminar (July 2017)
- University at Buffalo, Department of Computer Science and Engineering Seminar (May 2017)

Editorial and Review Activities

- Editorial Board
  - Information Processing Letters (since 2019)
- Program Chair
  - International Conference on Fundamentals of Software Engineering (FSEN'19,'21,'23,'25)
  - Workshop on Horn Clauses for Verification and Synthesis 2021
  - FMCAD'16 Student Forum
- Program Committee Member
  - CAV'25, SETTA'25, HCVS'25, TACAS'24, VMCAI'24, HCVS'24, NETYS'23, CAV'23, FFSPIN'22, TACAS'21, SV-COMP'21, TTCS'20, PLDI (AE)'19, SBMF'18, SEFM'17, VSTTE'17, TTCS'17, FSEN'15,'17 (also Publicity Chair), CSSE'13.
- Guest Editor
  - Science of Computer Programming (Special issue devoted to FSEN'13,'15,'19,'21,'23)

Graduated Students

- Ali Shamakhi (M.Eng. 2021), CTO at SynApps
- Amir Hossein Seyhani (M.Eng. 2022), PhD Student at University of Waterloo
- Faezeh Labbaf (M.Eng. 2023), PhD Student at University of Lugano
- Mahrokh Mirani (M.Eng. 2023), PhD Student at Gran Sasso Science Institute
- Hossein Zeynali (M.Eng. 2023), AI Solution Architect
- Mahdi Haddad (M.Eng. 2023), Radin Bourse
- Mahyar Karimi (B.Eng. 2023), PhD Student at IST Austria
- Daneshvar Amrollahi (B.Eng. 2023), PhD Student at Stanford University
- Meyssam Rostamzadeh (M.Eng. 2024), AI Researcher, Iran University of Science and Technology

Publications

Conference Papers

- Sebastian Wolff, Ekanshdeep Gupta, Zafer Esen, Hossein Hojjat, Philipp Rümmer, Thomas Wies: "Arithmetizing Shape Analysis", Proceedings of the 37th International Conference on Computer Aided Verification (CAV 2025)
- Mahboubeh Samadi, Aryan Bastany, Hossein Hojjat: "Compositional Learning for Synchronous Parallel Automata", Proceedings of the 28th International Conference on Fundamental Approaches to Software Engineering (FASE 2025)
- Meyssam Rostamzadeh, Mahboubeh Samadi, Fatemeh Ghassemi, Hossein Hojjat: "Ranch: Rebeca On Chip", Lee, E.A., Mousavi, M.R., Talcott, C. (eds) Rebeca for Actor Analysis in Action. LNCS, vol 15560.
- Eric Hayden Campbell, Hossein Hojjat, Nate Foster: "Computing Precise Control Interface Specifications", Proceedings of the ACM on Programming Languages (OOPSLA): 905-934 (2024)
- Fatemeh Ghassemi, Marjan Sirjani, Ehsan Khamespanah, Mahrokh Mirani, Hossein Hojjat: "Transparent Actor Model", 11th IEEE/ACM International Conference on Formal Methods in Software Engineering (FormaliSE@ICSE 2023)
- Daneshvar Amrollahi, Hossein Hojjat, Philipp Rümmer: "An Encoding for CLP problems in SMT-LIB", Proceedings 10th Workshop on Horn Clauses for Verification and Synthesis (HCVS 2023)
- Faezeh Labbaf, Jan Friso Groote, Hossein Hojjat, Mohammadreza Mousavi: "Compositional Learning for Interleaving Parallel Automata", Proceedings of the 26th International Conference on the Foundations of Software Science and Computation Structures (FoSSaCS 2023).
- Georgiana Caltais, Hossein Hojjat, Mohammad Reza Mousavi, Hünkar Can Tunç: "DyNetKAT: An Algebra of Dynamic Networks", Proceedings of the 25th International Conference on the Foundations of Software Science and Computation Structures (FoSSaCS 2022).
  EASST best paper award nominee
- Hossein Hojjat, Philipp Rümmer: "OptiRica: Towards an Efficient Optimizing Horn Solver", Proceedings 9th Workshop on Horn Clauses for Verification and Synthesis (HCVS 2022)
- Maryam Bagheri, Marjan Sirjani, Ehsan Khamespanah, Hossein Hojjat, Ali Movaghar: "Partial Order Reduction for Timed Actors", Proceedings of the 13th International Conference on Verified Software: Theories, Tools and Experiments (VSTTE'21)
- Eric Hayden Campbell, William T. Hallahan, Priya Srikumar, Carmelo Cascone, Jed Liu, Vignesh Ramamurthy, Hossein Hojjat, Ruzica Piskac, Robert Soulé, Nate Foster: "Avenir: Managing Data Plane Diversity with Control Plane Synthesis", Proceedings of the 18th USENIX

Symposium on Networked Systems Design and Implementation (NSDI '21) **Featured in the Cornell CS News**

- Ali Shamakhi, Hossein Hojjat, Philipp Rümmer: "Towards String Support in JayHorn (Competition Contribution)", Proceedings of the 27th International Conference on Tools and Algorithms for Construction and Analysis of Systems (TACAS '21)
- Hossein Hojjat, Philipp Rümmer, Ali Shamakhi: "On Strings in Software Model Checking", Proceedings of the 17th Asian Symposium on Programming Languages and Systems (APLAS 2019)
- Hossein Hojjat, Philipp Rümmer: "The Eldarica Horn Solver", Proceedings of the 18th International Conference on Formal Methods in Computer-Aided Design (FMCAD'18)
- Hossein Hojjat, Philipp Rümmer: "Deciding and Interpolating Algebraic Data Types by Reduction", Proceedings of the 19th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC'17)
- Jedidiah McClurg, Hossein Hojjat, Pavol Cerny: "Synchronization Synthesis for Network Programs", Proceedings of the 29th International Conference on Computer Aided Verification (CAV'17)
- Shrutarshi Basu, Nate Foster, Hossein Hojjat, Paparao Palacharla, Christian Skalka, Xi Wang: "Life on the Edge: Unraveling Policies into Configurations", Proceedings of the ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS'17)
- Hossein Hojjat: "The FMCAD 2016 graduate student forum", Proceedings of the 16th International Conference on Formal Methods in Computer-Aided Design (FMCAD'16)
- Hossein Hojjat, Philipp Rümmer, Jedidiah McClurg, Pavol Cerny, Nate Foster: "Optimizing Horn Solvers for Network Repair", Proceedings of the 16th International Conference on Formal Methods in Computer-Aided Design (FMCAD'16)
- Jedidiah McClurg, Hossein Hojjat, Nate Foster, Pavol Cerny: "Event-driven Network Programming" , Proceedings of the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'16)
- Jedidiah McClurg, Hossein Hojjat, Pavol Černý, Nate Foster: "Efficient Synthesis of Network Updates", Proceedings of the 36th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'15)
- Sudip Roy, Lucja Kot, Gabriel Bender, Bailu Ding, Hossein Hojjat, Christoph Koch, Nate Foster, Johannes Gehrke: "The Homeostasis Protocol: Avoiding Transaction Coordination Through Program Analysis", Proceedings of the 2015 ACM SIGMOD International Conference on Management of Data (SIGMOD'15)
- Hossein Hojjat, Jedidiah McClurg, Pavol Černý, Nate Foster: "Network Updates for the Impatient: Eliminating Unnecessary Waits", Proceedings of the First Workshop on Programming Languages and Verification Technology for Networking (PLVNET'15)

- Hossein Hojjat, Philipp Rümmer, Pavle Subotic, Wang Yi: "Horn Clauses for Communicating Timed Systems", Proceedings of the First Workshop on Horn Clauses for Verification and Synthesis (HCVS'14)
- Philipp Rümmer, Hossein Hojjat, Viktor Kuncak: "Classifying and Solving Horn Clauses for Verification", Proceedings of the 5th International Conference on Verified Software: Theories, Tools, Experiments (VSTTE'13)
- Philipp Rümmer, Hossein Hojjat, Viktor Kuncak: "Disjunctive Interpolants for Horn-Clause Verification", Proceedings of the 25th International Conference on Computer Aided Verification (CAV'13)
- Hossein Hojjat, Radu Iosif, Filip Konečný, Viktor Kuncak and Philipp Rümmer: "Accelerating Interpolants", Proceedings of the 10th International Symposium on Automated Technology for Verification and Analysis (ATVA'12)
- Hossein Hojjat, Filip Konečný, Florent Garnier, Radu Iosif, Viktor Kuncak and Philipp Rümmer: "Verification Toolkit for Numerical Transition Systems (tool paper)", Proceedings of the 18th International Symposium on Formal Methods (FM'12)
- Bahman Pourvatan, Marjan Sirjani, Hossein Hojjat and Farhad Arbab: "Analysis of Reo Circuits using Symbolic Execution", Proceedings of the 8th International Workshop on the Foundations of Coordination Languages and Software Architectures (FOCLASA'09)
- Hossein Hojjat, Mohammad Reza Mousavi, Marjan Sirjani: "Process Algebraic Verification of SystemC Codes", Proceedings of the 8th International Conference on Application of Concurrency to System Design (ACSD'08)
- Hossein Hojjat, Mohammad Reza Mousavi, Marjan Sirjani: "A Framework for Performance Evaluation and Verification in Stochastic Process Algebras", Proceedings of the 22nd ACM Symposium on Applied Computing, Software Verification Track (SV'08)
- Hossein Hojjat, Marjan Sirjani, Mohammad Reza Mousavi and Jan Friso Groote: "Sarir: A $\mathcal{R}$ebeca to mCRL2 Translator", Proceedings of the 7th IEEE International Conference on Application of Concurrency to System Design (ACSD'07)
- Fahimeh Raja , Hadi Amiri , Samira Tasharofi, Hossein Hojjat and Farhad Oroumchian: "Evaluation of part of speech tagging on Persian text", Proceedings of the Second Workshop on Computational Approaches to Arabic Script-based Languages (CAASL2'07)
- Hadi Amiri, Hosein Hojjat, Farhad Oroumchian: "Investigation on a Feasible Corpus For Persian POS Tagging" (in Persian), Proceedings of the 12th International CSI Computer Conference (CSICC'07)
- Hossein Hojjat, Hootan Nakhost, Marjan Sirjani: "Formal Verification of the IEEE 802.1D Spanning Tree Protocol Using Extended Rebeca", Proceedings of the First IPM International Workshop on Foundations of Software Engineering (FSEN'05)

Journal Papers

- Philipp Rümmer, Hossein Hojjat, Viktor Kuncak: "On recursion-free Horn clauses and Craig interpolation", Formal Methods in System Design, v.47, n. 1, pp. 1-25, 2015.
- Bahman Pourvatan, Marjan Sirjani, Hossein Hojjat and Farhad Arbab: "Symbolic Execution of Reo Circuits using Constraint Automata", Science of Computer Programming, Elsevier, v. 77, n. 7-8, pp. 848-869, 2012.
- Hossein Hojjat, Mohammad Reza Mousavi, Marjan Sirjani: "Formal Analysis of SystemC Designs in Process Algebra", Fundamenta Informaticae, v. 107, n. 1, pp. 19-42, 2011.
- Hossein Hojjat, Hootan Nakhost, Marjan Sirjani: "Integrating Module Checking and Deduction in a Formal Proof for the Perlman Spanning Tree Protocol (STP)", J.UCS Journal of Universal Computer Science, v. 13, n. 13, pp. 2076-2104, 2007.

Technical Reports

- Jedidiah McClurg, Hossein Hojjat, Nate Foster, Pavol Černý: "Specification and Compilation of Event-driven SDN Programs", CoRR abs/1507.07049, 2015.
- Hossein Hojjat, Philipp Rümmer, Pavle Subotic, Wang Yi: "Uniform Analysis for Communicating Timed Systems (Extended Technical Report)", EPFL-REPORT-190680, 2013.
- Hossein Hojjat, Mohammad Reza Mousavi Mousavi, Marjan Sirjani: "Application of process algebraic verification and reduction techniques to SystemC designs", Computer Science Report No. 08-15, Technische Universiteit Eindhoven, 2008.
- Farhad Oroumchian, Samira Tasharofi, Hadi Amiri, Hossein Hojjat, Fahimeh Raja: "Creating a Feasible Corpus for Persian POS Tagging", Technical Report Number TR 3/2006, University of Wollongong in Dubai, 2006.

Management and Leadership

- Attended "Postdoc Leadership Development Program", Cornell University (2014-2015)
  - `http://postdocs.cornell.edu/professional-development`
- Vice Chair of University of Tehran ACM Student Chapter (2003-2004)
  - `http://acm.ut.ac.ir/acm/flats/officers?lang=en`

National Prizes

- Graduated with Honors (second position in the Computer Engineering), University of Tehran (2005)
- Enrolled in the graduate school as a top student without passing the entrance examinations, University of Tehran (2005)

Software Development

- Eldarica Model Checker

  `https://rise4fun.com/Eldarica/`

Courses Taught

Undergraduate

- Programming Languages and Compilers: Fall 2018, Spring 2019 (UT)
- Programming Language Concepts (CSCI-344): Fall 2016 (RIT)
- Theory of Computation: every semester since Fall 2019 (UT)

Graduate

- Compiler Construction (CSCI-742): Spring 2017, Spring 2018 (RIT)
- Programming Language Theory (CSCI-740): Fall 2017 (RIT)
- Advanced Algorithms: Fall 2020, Fall 2021, Fall 2022 (TeIAS)
- Introduction to Formal Methods (with Fatemeh Ghassemi): Fall 2018, Fall 2019 (UT)
- Program Synthesis: Spring 2019, Spring 2020, Spring 2021, Spring 2023 (UT & TeIAS)

Committee Service

- RIT Computer science colloquium committee

References

- Prof. Dr. Nate Foster, Cornell University
- Prof. Dr. Viktor Kuncak, EPFL
- Prof. Dr. Marjan Sirjani, Malardalen University