

## Ashutosh Trivedi

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### A. Professional Preparation

University of Warwick	UK	Computer Science	Ph. D., 2009.
I.I.T. Bombay	India	Electrical Engineering	M. Tech., 2003
V.N.I.T. Nagpur	India	Computer Science & Engineering	B. Eng., 2000

### B. Appointments

2017–present	Assistant Professor, Department of Computer Science, University of Colorado, USA
2016–2017	Assistant Research Professor, Department of Computer Science, University of Colorado, USA
2012–2015	Assistant Professor, Department of Computer Science & Engg., IIT Bombay, India
2011–2012	Research Associate, University of Pennsylvania, USA
2009–2010	Postdoctoral Research Associate, University of Oxford , UK

### C. Teaching

Spring 2019	CSCI 2270: <i>Data Structures</i> , CU Boulder
Fall 2018	CSCI 5444: <i>Theory of Computation</i> , CU Boulder
Spring 2018	CSCI 5854: <i>Foundations of Cyber-Physical Systems</i> , CU Boulder
Fall 2017	CSCI 5454: <i>Design and Analysis of Algorithms</i> , CU Boulder
Spring 2017	CSCI 5444: <i>Theory of Computation</i> , CU Boulder
Fall 2016	CSCI 3434: <i>Theory of Computation</i> , CU Boulder

### D. Funding

#### Current Funding (2)

1. **DARPA project *Auditr: Securing Space/Time Defenses in Java Bytecode*. 2015-2019**
  - Total amount: \$2.8 M , Period: 2015–2019, Role: Co-PI

#### Past Funding (3)

1. **Toyota motors contract on automotive verification**
  - Total amount: \$102,087, Period: 06/01/2016 - 02/28/2017, My Role: Co-PI
2. **Algorithmic Verification of Real-Time Systems**
  - Indo-French targeted program, Dept. of Science & Technology, India and INRIA/CNRS, France.
  - Amount: INR 40, 00, 000(USD approx. \$80,000), Duration: 3 years, Role: Co-Investigator

### E. Awards/Honors

1. **Liverpool-India fellowship 2014-15.**

2. **HSCC 2012 best paper award** for the paper “Optimal Scheduling for Constant-Rate Multi-Mode Systems” co-authored with R. Alur and D. Wojtczak.
3. **PhD fellowship**, Department of Computer Science, University of Warwick.

#### F. Journal/ Top-Conference Publications

1. **Omega-Regular Objectives in Model-Free Reinforcement Learning** by Ernst Moritz Hahn, Mateo Perez, Sven Schewe, Fabio Somenzi, Ashutosh Trivedi, Dominik Wojtczak · TACAS 2019.
2. **Type-directed Bounding of Collections in Reactive Programs** by Tianhan Lu, Pavol Cern, Bor-Yuh Evan Chang, Ashutosh Trivedi · VMCAI 2019.
3. **Differential Performance Debugging With Discriminant Regression Trees** by Saeid Tizpaz-Niari, Pavol Cern, Bor-Yuh Evan Chang, Ashutosh Trivedi · AAI 2018: 2468-2475.
4. **Global Almost-Sure Reachability for Stochastic Constant-Rate Multi-Mode Systems** by Fabio Somenzi, Behrouz Touri, and **A. Trivedi** · HSCC 2018.
5. **The Reach-Avoid Problem for Constant-Rate Multi-mode Systems** by Shankara Narayanan Krishna, Aviral Kumar, Fabio Somenzi, Behrouz Touri, and **A. Trivedi** · 15th International Symposium on Automated Technology for Verification and Analysis (ATVA 2017).
6. **Analyzing neighborhoods of falsifying traces in cyber-physical systems** by R. D. Diwakaran, S. Sankaranarayanan, and **A. Trivedi** · International Conference on Cyber-Physical Systems (ICCPs 2017).
7. **Discriminating traces with time** by S. Tizpaz-Niari, P. Cerny, B.-Y. E. Chang, S. Sankaranarayanan, and **A. Trivedi**. International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2017).
8. **Schedulability of Bounded-Rate Multi-Mode Systems** by R. Alur, V. Forejt, S. Moarref, and **A. Trivedi** · ACM Transactions on Embedded Computing Systems 16(3): 85:1-85:27 (2017).
9. **FO-definable transformations of infinite strings** by V. Dave, Krishna S. and **A. Trivedi** · Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2016).
10. **Mean-Payoff Games on Timed Automata** by S. Guha, M. Jurdzinski, Krishna S. and **A. Trivedi** · Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2016).
11. **Expected reachability-time games** by V. Forejt, M. Kwiatkowska, G. Norman, **A. Trivedi** · Theoretical Computer Science (TCS) 631: 139-160, 2016.
12. **Stochastic Timed Games Revisited** by S. Akshay, P. Bouyer, Krishna S., L. Manasa and **A. Trivedi** · International Symposium on Mathematical Foundations of Computer Science (MFCS 2016).
13. **Incentive Stackelberg Mean-payoff Games** by A. Gupta, S. Schewe, **A. Trivedi**, S. K. D. Maram and B. K. Padarthy · International conference on Software Engineering and Formal Methods (SEFM 2016).
14. **Revisiting Robustness in Priced Timed Games** by S. Guha, S. Krishna, L. Manasa, and **A. Trivedi** · Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2015).
15. **Skolem Functions for Factored Formulas** by A. K. John, S. Shah, S. Chakraborty, **A. Trivedi**, and S. Akshay · International Conference on Formal Methods in Computer-Aided Design (FMCAD 2015).
16. **Compositional modeling and analysis of automotive feature product lines** by S. N. Krishna, G. K. Narwane, S. Ramesh, **A. Trivedi** · 52nd Design Automation Conference (DAC 2015).
17. **Symmetric Strategy Improvement Algorithm** by S. Schewe, **A. Trivedi**, and T. Varghese · 42nd International Colloquium on Automata, Languages, and Programming (ICALP 2015).

18. **Bounded-Rate Multi-Mode Systems Based Motion Planning** by D. Bhave, S. Jha, S. Krishna, S. Schewe, **A. Trivedi** · International conference on Hybrid systems: computation and control (HSCC'15).
19. **What's Decidable About Recursive Hybrid Automata?** by S. N. Krishna, L. Manasa, and **A. Trivedi** · International conference on Hybrid systems: computation and control (HSCC 2015).
20. **First-order definable string transformations** by E. Filiot, S. N. Krishna, and **A. Trivedi** · Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2014).
21. **Adding Negative Prices to Priced Timed Games** by T. Brihaye, G. Geeraerts, S. N. Krishna, L. Manasa, B. Monmege, and **A. Trivedi** · International conference on concurrency theory (CONCUR 2014).
22. **Hybrid Automata for Formal Modeling and Verification of Cyber-Physical Systems** by S. N. Krishna and **A. Trivedi** · Journal of the Indian Institute of Science, VOL 93:3, 2013, pages 419-440.
23. **From Monadic Second-Order Definable String Transformations to Transducers** by R. Alur, A. Durand-Gasselín, and **A. Trivedi** · Symposium on Logic in Computer Science (LICS 2013).
24. **Safe Schedulability of Bounded-Rate Multi-Mode Systems** by R. Alur, V. Forejt, S. Moarref, and **A. Trivedi** · International conference on Hybrid systems: computation and control (HSCC 2013).
25. **Playing Stochastic Games Precisely** by T. Chen, V. Forejt, M. Kwiatkowska, A. Simatis, **A. Trivedi**, and M. Ummels · International Conference on Concurrency Theory (CONCUR 2012).
26. **(Regular Transformations of Infinite Strings** by R. Alur, E. Filiot, and **A. Trivedi** · Logic in Computer Science (LICS 2012).
27. **Optimal Scheduling for Constant-Rate Multi-Mode Systems** by R. Alur, **A. Trivedi** and D. Wojtczak · Hybrid Systems: Computation and Control (HSCC 2012) · **Recipient of HSCC best paper award.**
28. **Relating average and discounted costs for quantitative analysis of timed systems** by R. Alur and **A. Trivedi** · International Conference on Embedded Software (EMSOFT 2011).
29. **Recursive Timed Automata** by **A. Trivedi** and D. Wojtczak · International Conference on Automated Technology for Verification and Analysis (ATVA 2010).
30. **Concavely-Priced Probabilistic Timed Automata** by M. Jurdzinski, M. Kwiatkowska, G. Norman, and **A. Trivedi** · International Conference on Concurrency Theory (CONCUR 2009).
31. **Average-Time Games** by M. Jurdzinski and **A. Trivedi** · Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2008).
32. **Reachability-Time Games on Timed Automata** by M. Jurdzinski and **A. Trivedi** · In 34th International Colloquium on Automata, Languages and Programming (ICALP 2007).

## G. Specialized Conferences/Workshops

1. **A Perfect Class of Context-Sensitive Timed Languages** by D. Bhave, V. Dave, S. N. Krishna, R. Phawade and **A. Trivedi** · Developments in Language Theory (DLT 2016).
2. **On Nonlinear Prices in Timed Automata** by D. Bhave, Krishna S., and **A. Trivedi** · International workshop on Verification and Validation of Cyber-Physical Systems (VVCPS 2016).
3. **A Logical Characterization for Dense-Time Visibly Pushdown Automata** by D. Bhave, V. Dave, S. N. Krishna, R. Phawade and **A. Trivedi** · International Conference on Language and Automata Theory and Applications (LATA 2016).
4. **Reachability Games on Recursive Hybrid Automata** by S. N. Krishna, L. Manasa, and **A. Trivedi** · International Symposium on Temporal Representation and Reasoning (TIME 2015).

5. **On Pure Nash Equilibria in Stochastic Games** by A. Das, S. N. Krishna, L. Manasa, **A. Trivedi** and Dominik Wojtczak · Theory and Applications of Models of Computation (TAMC 2015).
6. **Time-Bounded Reachability Problem for Recursive Timed Automata is Undecidable** by S. N. Krishna, L. Manasa, and **A. Trivedi** · International Conference on Language and Automata Theory and Applications (LATA 2015).
7. **Weak Singular Hybrid Automata** by S. N. Krishna, U. Mathur, and **A. Trivedi** · International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2014).
8. **Improved Undecidability Results for Reachability Games on Recursive Timed Automata** by S. N. Krishna, L. Manasa, and **A. Trivedi** · International symposium on games, automata, logics and formal verification (GandALF 2014).
9. **Timed Branching Processes** by **A. Trivedi** and D. Wojtczak · International Conference on Quantitative Evaluation of SysTems (QEST 2010).
10. **Expected Reachability-Time Games** by V. Forejt, M. Kwiatkowska, G. Norman, and **A. Trivedi** · International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2010).
11. **Concavely-Priced Timed Automata** by M. Jurdzinski and **A. Trivedi** · International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2008).

## H. Professional Activities

- Organizing Committee Chair:
  - Workshop on Algorithmic Verification of Real-Time Systems 2017. Co-located with ICALP 2017.
  - Workshop on Algorithmic Verification of Real-Time Systems 2016. Co-located with FSTTCS 2016.
  - Workshop on Verification and Validation of Cyber-Physical Systems 2016. Co-located with iFM'16.
  - Asian Logic Conference (ALC) 2015.
  - Indian Conference on Logic and its Applications (ICLA) 2015.
- Program Committee Membership:
  - ACSD 2019, NSV 2019, HSCC 2019, APLAS 2018, FORMATS 2018, MoRE 2018, SR 2018, HSCC 2018, ACSD 2018, ICCPS 2018, DIAS 2017, ACSD 2017, CONCUR 2016, HSCC 2015, FSTTCS 2014, FORMATS 2014, HSCC 2014, FORMATS 2013.
- External Reviewer for:
  - **Conferences:** SEFM '17, FSTTCS '17, ICALP'14, LICS'14, CAV'14, FORMATS'13, FSTTCS'13, FOSSACS'13, CAV'13, SODA' 13, Petri Nets' 12, TACAS'12, FOSSACS'11, AMCA-POP'10, FOSSACS'10, LICS'10, ICALP'10, LICS'09, TACAS'09, ATVA'09, IFM'09, LICS'06, CONCUR'06, CAV'05, ATVA'05.
  - **Journals:** ACM Transactions on Embedded Computing Systems (1), Information Processing Letters (3), International Journal of Foundations of Computer Science (1), Logical Methods in CS (1), Software Tools for Technology Transfer (1), and Theoretical Computer Science (6).

## I. Thesis Advisor

- **Juraj Culak, Taylor Dohmen, John Paul Martin, Jr., and John Komp** at University of Colorado Boulder as thesis advisor (ongoing)
- **Tianhan Lu and Saeid Tizpaz-Niari** at University of Colorado Boulder as thesis co-advisor (ongoing)
- **Devendra Bhave** at IIT Bombay as thesis co-advisor (ongoing)