SUGUMAN BANSAL (she/her/hers)

Assistant Professor
School of Computer Science
Georgia Institute of Technology

Website: https://suguman.github.io/
Email Address: suguman@gatech.edu

EMPLOYMENT

Assistant Professor in SCHOOL OF COMPUTER SCIENCE — Jan. 23 - Present
Georgia Institute of Technology, Atlanta, GA

NSF/CRA Computing Innovation Postdoc. in COMPUTER AND INFORMATION SC. — July. 20 - Aug. 22
University of Pennsylvania, Philadelphia, PA
Mentor: Prof. Rajeev Alur

EDUCATION

PhD in COMPUTER SCIENCE, **Rice University**, Houston, TX — Sept. 16 - June 20
Thesis: Automata-Based Quantitative Verification
Advisor: Prof. Moshe Y. Vardi

MS in COMPUTER SCIENCE, **Rice University**, Houston, TX — Aug. 14 - Sept. 16
Thesis: Algorithmic Analysis of Regular Repeated Games
Advisor: Prof. Swarat Chaudhuri

BSc (with **Honors**) in MATHEMATICS and COMPUTER SCIENCE — Aug. 11 - May 14
Chennai Mathematical Institute (CMI), Chennai, India

ALL PUBLICATIONS

Underlined names: Papers by students that I advise

[Under Submission] Inductive Framework for Generalization in Reinforcement Learning for Specifications
Vignesh Subramanian, Rohit Kushwah, Subajit Roy, Suguman Bansal
[GenPlan 23] NeurIPS 2023 Workshop on Generalization in Planning

[FMCAD 24] DAG-Based Compositional Approaches for LTLf to DFA Conversions
Suguman Bansal, Yash Kankariya, Yong Li
(To appear) Formal Methods in Computer-Aided Design (FMCAD) 2024

[ICML 24] Reinforcement Learning from Reachability Specifications: PAC Guarantees with Expected Conditional Distance
Jakub Svoboda, Suguman Bansal, Krishnendu Chatterjee
In Proc. of International Conference on Machine Learning (ICML) 2024

[ATVA 23] Model-Checking Strategies From Synthesis over Finite-Horizon Tasks
Suguman Bansal, Yong Li, Lucas M. Tabajara, Moshe Y. Vardi, and Andrew Wells
In Proc. of International Symposium on Automated Technology for Verification and Analysis (ATVA) 2023
Best Paper Award at ATVA 2023

[ACM SIGLOG News 23] Automata-Based Quantitative Reasoning

Suguman Bansal
In ACM SIGLOG News, Volume 10, Issue 3, July 2023

[IJCAI 23] Multi-Agent Systems with Quantitative Satisficing Goals
Senthil Rajasekaran, Suguman Bansal, and Moshe Vardi
In Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2023

[CAV 22] Specification-Guided Learning of Nash Equilibria with High Social Welfare
Kishor Jothimurugan, Suguman Bansal, Osbert Bastani, and Rajeev Alur
In Proc. of International Conference on Computer-Aided Verification (CAV) 2022

[AAAI 22] On Synthesis from Satisficing and Temporal Goals
Suguman Bansal, Lydia Kavraki, Moshe Y. Vardi, and Andrew Wells
In Proc. of AAAI Conference on AI (AAAI) 2022

[Henzinger-60] A Framework for Transforming Specifications in Reinforcement Learning
Rajeev Alur, Suguman Bansal, Osbert Bastani, and Kishor Jothimurugan
In Proc. of Principles of System Design 2022

[SAS 22] Specification-Guided Reinforcement Learning
Suguman Bansal
In Proc. of Static Analysis Symposium (SAS) 2022
Keynote Speaker Address

[VSTTE 22] Compositional Safety LTL Synthesis
Suguman Bansal, Giuseppe De Giacomo, Antonio Di Stasio, Yong Li, Moshe Vardi, and Shufang Zhu
In Proc. of International Conference on Verified Software: Theories, Tools, and Experiments (VSTTE) 2022

[LMCS 22] Comparator Automata in Quantitative Verification
Suguman Bansal, Swarat Chaudhuri, and Moshe Y. Vardi
In Journal of Logical Methods in Computer Science (LMCS) 2022

[NeurIPS 21] Compositional Reinforcement Learning from Logical Specifications
Kishor Jothimurugan, Suguman Bansal, Osbert Bastani, and Rajeev Alur
In Proc. of Advances in Neural Information Processing Systems (NeurIPS) 2021

[CAV 21] Adapting Behaviors via Reactive Synthesis
Gal Araman, Suguman Bansal, Dror Fried, Lucas M. Tabajara, Moshe Y. Vardi, and Gera Wiess
In Proc. of International Conference on Computer-Aided Verification (CAV) 2021

[TACAS 21] On Satisficing in Quantitative Games
Suguman Bansal, Krishnendu Chatterjee, and Moshe Y. Vardi
In Proc. of Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2021

[AAAI 20] Hybrid Compositional Reasoning for Reactive Synthesis from Finite-Horizon Specifications
Suguman Bansal, Yong Li, Lucas M. Tabajara, and Moshe Y. Vardi
In Proc. of AAAI Conference on AI (AAAI) 2020

[POPL 20] Synthesis of Coordination Programs from Linear Temporal Specifications
Suguman Bansal, Kedar S. Namjoshi, and Yaniv Sa'ar
In Proc. of the ACM on Programming Languages (POPL), 2020

[CAV 19] Safety and Co-safety Comparator Automata for Discounted-Sum Inclusion
Suguman Bansal and Moshe Y. Vardi
In Proc. of International Conference on Computer-Aided Verification (CAV) 2019

[CAV 18] Automata vs Linear-Programming Discounted-Sum Inclusion
Suguman Bansal, Swarat Chaudhuri, and Moshe Y. Vardi
In Proc. of International Conference on Computer-Aided Verification (CAV) 2018

[CAV 18] Synthesis of Asynchronous Reactive Programs from Temporal Specifications
Suguman Bansal, Kedar S. Namjoshi, and Yaniv Sa'ar
In Proc. of International Conference on Computer-Aided Verification (CAV) 2018

[FoSSaCS 18] Comparator Automata in Quantitative Verification
Suguman Bansal, Swarat Chaudhuri, and Moshe Y. Vardi
In Proc. of Int. Conf. on Foundations of Software Science and Computation Structures (FoSSaCS) 2018

TUTORIALS

[AAAI 23] Specification-Guided Reinforcement Learning
Co-presented with Rajeev Alur, Osbert Bastani, and Kishor Jothimurugan at AAAI 23

OPEN SOURCE TOOLS

Lisa | Github Link
Reactive synthesis for finite-horizon tasks and efficient DFA generation from logical formulas
3rd place in LTLf Track of SYNTCOMP 2023 [Results]

DiRL | Github Link
Compositional reinforcement learning from temporal specifications

ADVISING

PhD Students

[1] Vignesh Subramanian (Georgia Tech) Aug. 23 - Present

Topic: Generalizable Reinforcement Learning from Logical Specifications

Masters Students

[2] Kaushik Arcot (Georgia Tech) Jan 24 - Present

Topic: Policy iteration for Generalizable Reinforcement Learning

Alumni

[3] Ramneet Singh, Undergraduate + Masters (IIT Delhi) April 23 - April 24

- Next: Predoctoral Fellow, Microsoft Research India
- Master's thesis: INTERLEAVE : An Empirically Faster Symbolic Algorithm for Maximal End Component Decomposition of MDPs (pdf)

[4] Yash Kankariya, Undergraduate (Georgia Tech) April 23 - Dec 23

- Next: MS (with Research), Stanford University
- (FMCAD 2024) DAG-Based Compositional Approaches for LTLf to DFA Conversions
- (AAAI 24 Student Abstract) Decompositions in Compositional Translation of LTLf to DFA

- Georgia Tech's President's Undergraduate Research Award (PURA) for Fall 2023

TEACHING

CS 8803. Logic in Computer Science

Fall 23, Georgia Tech — Overall Course Effectiveness 4.4/5, Overall Lecturer Effectiveness 4.7/5

CS 4510. Automata and Complexity

Spring 24, Georgia Tech — Overall Course Effectiveness 4.5/5, Overall Lecturer Effectiveness 5/5

Spring 23, Georgia Tech (Hon.) — Overall Course Effectiveness 4.7/5, Overall Lecturer Effectiveness 4.7/5

(Anonymous) Student Testimonials

- "Looking back, I remember the automata class quite fondly ... To be honest, at first I resented the structure of the class, with mandatory attendance and no devices. It felt a bit patronizing, like a return to high school to pass the time (I think I can finally admit to this now). I don't know if you noticed, but I would write notes on a sheet of paper. I still have them, and they make me smile when I look at them. I don't have the bandwidth to attend many classes, usually 1-2 per semester these days, but I have to admit being compelled to go to class helps with learning the material."
- "The best part, according to me, is that the instructor encourages participation. We spent as much time on a topic as was required to get the entire class up to speed, not what was allocated."
- "This class was the first time at GT that I've been in a small class and have had this level of professor interaction. Lectures were exceptionally good, maybe the best I've taken here. I really enjoyed how the class took tangents to explore problems from different angles while still staying relevant."

FUNDING

IIT-Bombay/GaTech Collaboration — Jan. 24 - Dec. 24
PI: S. Akshay, Suguman Bansal, **INR 1000000 ($\sim$ USD 12000)**

CRA/NSF Computing Innovation Fellow Award — Sept. 20 - Aug. 22
PI: Rajeev Alur, **USD 240,910**

AWARDS

Best Paper Award, ATVA 2023 — 2023

Thank-a-Teacher Certificate — Fall 2023
GaTech's official certificate presented by individual students to show their appreciation to a teacher

MIT EECS Rising Star — 2021, 2018

CRA Computing Innovation (CI) Fellow — 2020
Awarded by the CRA and NSF for postdoctoral research

Future Faculty Fellow — 2019
Awarded by the School of Engineering, Rice University

Rice Engineering Alumni Graduate Grant — 2017
Awarded by the Rice Engineering Alumni to one graduate student each year

Gold Medal at the **ACM Student Research Competition** at **POPL 2016** — 2016

Andrew Ladd Graduate Fellowship — 2015
Awarded by the Rice CS Department and Ken Kennedy Institute for excellence in CS

CMI Undergraduate Scholarship 2011 - 2014
Awarded by CMI to undergraduate students for excellence in academics

KVPY Science Fellowship (Govt. of India) 2008
Awarded by the Ministry of Science and Technology, Govt. of India, for excellence in Basic Sciences

Travel grants
AAAI Scholarship (2020), SIGPLAN PAC Travel Grant POPL (2020), CAV Student Travel Fellowship (2019), Rice Dean's Travel Award (2019), WiL SIGLOG/VCLA Travel Award (2019, declined), MIT EECS Rising Stars Travel Grant (2018), NSF-CAV/VMW Travel Grant (2015, 2018), ETAPS Student Scholarship (2018), Google Student Research Summit Travel Grant (2017), LMW-LICS Scholarship (2017, declined), CRA-W Grad Cohort Graduate Grant (2017), ACM SRC (POPL) Travel Grant (2016), MSR Faculty Summit Travel Grant (2016), Off The Beaten Track Travel Grant (2016), MSR Summer School Travel Grant (2012)

HONORS

Invited Speaker at 44th Conference on FSTTCS 2024 Dec. 24

Keynote Speaker at 29th Symposium of Static Analysis (SAS) 2022 Dec. 22

Invited to **Dagstuhl Seminar** on Automated Synthesis: Functional, Reactive and Beyond April 24

Invited to **Dagstuhl Seminar** on Scalable Analysis of Probabilistic Models and Programs June 23

Invited to **Simons Institute** for program on Real-Time Decision Making Spring 18

Invited to **Google Student Research Summit 2017** Sept. 17

Invited to **Dagstuhl Seminar** on Game Theory, AI, Logic and Algorithms March 17

Invited to **MSR Faculty Summit 2016** July 16

RESEARCH VISITS

National University of Singapore May 23
Visiting Faculty
Host: Prof. Umang Mathur

NOKIA Bell Labs, Murray Hill, New Jersey, USA June 18 - July 18
Research Intern
Mentor: Dr. Kedar S. Namjoshi

Simons Institute, University of California - Berkeley, California, USA March 18 - May 18
Visiting Graduate Student
Spring 2018 program on Real-Time Decision Making

NOKIA Bell Labs, Murray Hill, New Jersey, USA June 17 - Aug. 17
Research Intern
Mentors: Dr. Kedar S. Namjoshi and Dr. Michael Emmi

RESEARCH TALKS

Model Checking Finite-Horizon Properties

Simons Workshop on "Synthesis of Models and Systems" June 24

Dagstuhl Seminar on "Automated Synthesis: Functional, Reactive and Beyond" April 24

PLSE Seminar, National University of Singapore (NUS) May 23

Formal Reasoning in Reinforcement Learning: A Boon or Bane

[INVITED] Center of Signal Processing (CSIP), GaTech — Oct. 23

EECS, UC Berekeley — April 23

[KEYNOTE] Static Analysis Symposium (SAS) 2022 — Dec. 22

Reinforcement Learning from Logical Specifications

[INVITED] ActSynt@ECAI2024 — Oct. 24

Dagstuhl Seminar on "Scalable Analysis of Probabilistic Models and Programs" — June 23

Department of Computer Science - IIT Delhi — Oct. 22

[INVITED] Workshop on Open Problems in Learning and Verification of Neural Networks — Aug. 22

Specification-Guided Policy Synthesis — Jan. 22 - April 22

[INVITED] Carnegie Mellon University, CISPA Saarland, ETH Zurich, Georgia Institute of Technology, IST Austria, Max Plank Institute - SWS, National University of Singapore, New York University, Pennsylvania State University, Purdue University, Tufts University, TU Graz, University of Illinois - Chicago, University of Southern California, University of Toronto, University of Waterloo (ECE), Washington University at St. Louis, Yale University

Reactive Synthesis from Quantitative Constraints: An Automata Approach

[INVITED] IARCS Verification Seminar Series — Oct. 21

[INVITED] Workshop on Continuity, Computability, Constructivity: From Logic to Algorithms — Sep. 21

Compositional Reinforcement Learning from Logical Specifications

[INVITED] Sapienza University of Rome — June 21

Reactive Synthesis for Coordination

[INVITED] Simons Institute (UC Berkeley): Workshop on Synthesis of Models and Systems — March 21

On Satisficing in Quantitative Games

Hebrew University — June 21

[INVITED] Formal Methods Seminar, Ben Gurion University — March 21

Designing Intelligent Machines Via Reactive Synthesis

[INVITED] Machine Learning Seminar Series, Rice University — March 20

[INVITED] ICES, University of Texas at Austin — Feb. 20

Nokia Bell Labs, Murray Hill — Feb. 20

Department of Computer Science - IIT Delhi — April 19

School of Computing, National University of Singapore — April 19

Automata-Based Quantitative Reasoning

[INVITED] Department of Computer Science, University of Pennsylvania — Jan. 20

Verification Seminar Series, University of Oxford — Nov. 19

[INVITED] RiSE Seminar, IST Austria — April 18

Comparators for Quantitative Verification

University of California, Berkeley — April 18

Student Spotlight, Winter School in CS and Eng.on Formal Methods, IIAS, Jerusalem Dec. 17

[INVITED] Saarland University March 17

[INVITED] Dagstuhl Seminar on Game Theory in AI, Logic and Algorithms, March 17

Asynchronous synthesis: The Ugly, the Bad and the ?

Application Platforms and Software Systems Group, Nokia Bell Labs, Murray Hill July 17

Reasoning About Incentive Compatibility

[INVITED] Google Student Research Summit, YouTube Headquarters, San Bruno Sept. 17

Conference and Workshop Presentations

AAAI-SSS 2023, ATVA 2023, Highlights of Logic, Games, and Automata 2023, AAAI 2022, NeurIPS 2021, Highlights of Logic, Games, and Automata 2021, SYNT 2021, TACAS 2021, Highlights of Logic, Games, and Automata 2020, AAAI 2020, POPL 2020, CAV 2019, SYNT 2019, CAV 2018 (a), CAV 2018 (b), FoSSaCS 2018, Off the Beaten Track 2016, ACM Student Research Competition at POPL 2016

SERVICE

RESEARCH COMMUNITY

NSF Panel 2024 | 2023

Organizing Committee

Co-Chair. AAAI Spring Symposium Series 2023: On the Effectiveness of Temporal Logics on Finite Traces

Co-Organizer. Verification Mentoring Workshop @ CAV 2021

Program Committee

2024. AAAI 2024, CAV 2024, NeurIPS 2024, POPL 2024, TACAS 2024, Women in Logic (WiL) 2024

2023. AAAI 2023, CAV 2023, CONCUR 2023, ESOP 2023, Highlights of Automata, Logic, and Games 2023, Nasa FM 2023, NeurIPS 2023

2022. GandALF 2022, SYNT 2022

2021. IJCAI 2021, LAMAS&SR 2021, SPLASH SRC 2021, SYNT 2021

Thesis Committee

Ritam Raha (University of Antwerp, University of Bordeaux). PhD. August 2023
Thesis title: Verification of Complex Systems against Learnt Specifications

Guy Hefetz (ITC Herzila). Masters. April 2020
Thesis title: Discounted-sum automata with multiple discount factors

Journal Reviewer

2023 LMCS

2022. Foundations and Trends in TCS, Henzinger-60

2021. ACM ToCL, FMSD, JACM, LMCS

2020. Acta Informatica

Conference Reviewer

2023. FoSSaCS 2023, L4DC 2023 **2021.** FMCAD 2021, FOCS 2021 **2020.** CONCUR 2020, ICALP 2020, IJCAI 2020 **2019.** ISAAC 2019 **2018.** FSTTCS 2018, LPAR 2018 **2017.** CP 2017, TACAS 2017 **2016.** IJCAI 2016

Artifact Evaluation Committee 2021. CAV 2021, SAS 2021