

# Kuldeep S. Meel

## Academic Appointment

- 11.24–Present **Stephen Fleming Early-Career Associate Professor (with Tenure)**, School of Computer Science, Georgia Institute of Technology
- 07.23–Present **Associate Professor (with Tenure)**, Department of Computer Science, University of Toronto  
On Leave since Nov 2024
- 07.23 –12.24 **Associate Professor (with Tenure)**, School of Computing, National University of Singapore
- 12.17–06.23 **Assistant Professor**, School of Computing, National University of Singapore
- 03.21–06.23 **NUS Presidential Young Professor**
- 07.18–06.21 **Sung Kah Kay Assistant Professor**

## Visiting Appointment

- 01.21–05.21; 03.23–05.23 *Visiting Scientist*, Simons Institute for Theory of Computing, UC Berkeley
- 05.24–Present *Visiting Associate Professor*, Indian Institute of Technology, Bombay
- 12.18–04.24 *Visiting Assistant Professor*, Indian Institute of Technology, Bombay
- 12.21–Present *Honorary Adjunct Professor*, TCG Crest

## Education

- 05.14–09.17 *Ph.D. in Computed Science*, Rice University  
Thesis Advisors: Prof. Supratik Chakraborty and Prof. Moshe Y. Vardi
- 01.13–05.14 *M.S. in Computed Science*, Rice University  
Thesis Advisors: Prof. Supratik Chakraborty and Prof. Moshe Y. Vardi
- 08.08–08.12 *B. Tech. (Honors) in Computer Science & Engineering*, Indian Institute of Technology, Bombay

## Research Interests

My research focuses on the development of *scalable* automated reasoning techniques to enable the design of robust, reliable, and trustworthy systems.

## Teaching Recognition

- 2023 NUS Annual Teaching Excellence Award for the academic year 2021/22
- 2023 Faculty Teaching Excellence Award for the academic year 2021/22
- 2022 NUS Annual Teaching Excellence Award for the academic year 2020/21
- 2022 Faculty Teaching Excellence Award for the academic year 2020/21
- 2021 Faculty Teaching Excellence Award for the academic year 2019/20

## Individual Research Honors & Awards

- 2022 ACP Early Career Research Award
- 2022 IJCAI-22 Early Career Spotlight
- 2020 AI's 10 to Watch, IEEE Intelligent Systems
- 2019 NRF Fellowship for AI, *accompanied with SGD 2.5 million funding*
- 2018 Ralph Budd Award for the best doctoral thesis in the School of Engineering
- 2018 Honorable Mention, ACP Doctoral Dissertation Award

- 2016 IBM PhD Fellowship
- 2016 Lodieska Stockbridge Vaughn Fellowship
- 2014 Vienna Center for Logic and Algorithms Outstanding Masters Thesis Award

## Research Paper Recognition

- 2023 [Praise from Donald E. Knuth](#) on our algorithm for Distinct Element Estimation.
- 2024 **ICLP-24 Best Paper Award**, [On Lower Bounding Minimal Model Count](#)
- 2024 **CAV-24 Distinguished Paper Award**, [Formally Certified Approximate Model Counting](#)
- 2024 ICDT-24 paper, Conjunctive Queries on Probabilistic Graphs: The Limits of Approximability invited to LMCS issue dedicated to the best papers from ICDT 2024
- 2023 **CAV-23 Distinguished Paper Award**, [Rounding meets Approximate Model Counting](#)
- 2023 **DATE-23 Best Paper Award Nomination**, [Synthesis with Explicit Dependencies](#)
- 2023 **CACM Research Highlight Award 2023**, [Model Counting meets  \$F\_0\$  Estimation](#), selected as CACM Research Highlight
- 2023 CAV-22 Paper, [A Scalable Shannon Entropy Estimator](#), invited to FMSD issue dedicated to the best papers from CAV 2022
- 2022 **ACM SIGMOD 2022 Research Highlight**, [Model Counting meets  \$F\_0\$  Estimation](#)
- 2021 PODS 2021 paper, [Model Counting meets  \$F\_0\$  Estimation](#), invited as “Best of PODS 2021” by ACM TODS
- 2021 **ICCAD-21 Best Paper Award Nomination**, [Engineering an Efficient Boolean Functional Synthesis Engine](#)
- 2020 CAV 2020 paper, [Approximate Counting of Minimal Unsatisfiable Subsets](#), invited to FMSD issue dedicated to the best papers from CAV 2020
- 2019 CP 2013 paper, [A Scalable Approximate Model Counter](#), selected as one of the 25 papers across 25 years of CP anniversary volume (2019).
- 2019 CP 2018 paper, [Not All FPRASs are Equal: Demystifying FPRASs for DNF-Counting](#), invited to IJCAI-19 Sister Conferences Best Paper Award Track
- 2015 **CP 2015 Best Student Paper Award**, [On computing Minimal Independent Support and its applications to sampling and counting](#)

## Tool Awards

- 2024 1st place in **All Tracks** of Model Counting Competition
- 2023 1st place in Projected Model Counting Track of Model Counting Competition
- 2022 1st place in Model Counting and Projected Model Counting Tracks of Model Counting Competition
- 2021 2nd place in Model Counting Track of Model Counting Competition
- 2021 2nd place in EDA Challenge Competition
- 2020 1st place in Model Counting and Projected Model Counting Tracks of Model Counting Competition
- 2020 3rd place (Main Track) in SAT Competition

## Research Grants

- 2024-29 NSERC Discovery Grant., Sole PI, *CAD 180,000*
- 2022 Amazon Research Award, Co-PI, *USD 40,000*, Amazon
- 2020-25 NRF Fellowship for AI: Provably Verified and Explainable Probabilistic Reasoning., Sole PI, *SGD 2,605,200*, National Research Foundation (NRF)
- 2018-21 Scaling Discrete Integration via SAT and CSP, PI, *SGD 498,696*, (Share: 50%), AI Singapore
- 2021-24 Scalable Methodologies for Risk Assessment and Resilience of Critical Infrastructure During Pandemics, PI, *SGD 500,000*, (Share: 50%)
- 2021-24 Symbolic Reasoning Based Resilience of Critical Infrastructure, co-PI, *SGD 652,990*, (Share: 50%), Ministry of Education

- 2021 Amazon Research Award, Sole PI, *USD 40,000*, Amazon
- 2021 Microsoft Research Asia Collaborative Project Award, Sole PI, *USD 30,000*, Microsoft
- 2019-22 Machine Learning Aided Design of SAT solver for weakened AES and Grain, Sole PI, *SGD 180,000*, Defense Service Organization

## Book Chapter

- 2021 [Approximate Model Counting](#)  
Supratik Chakraborty, Kuldeep S. Meel, and Moshe Y. Vardi  
Handbook of Satisfiability, 2nd Edition

## Full List of Conference and Journal Publications

**Formal Methods:** CAV:11×, SAT:6×, CP:8×, TACAS: 3×, ICSE: 2×, CCS:1×

**Design Automation:** ICCAD:2×, DAC:3×, DATE:2×

**AI/ML:** AAAI:24×, IJCAI:13×, NeurIPS: 6×, KR: 2×

**Logic/Databases:** PODS:7×, LICS:2×, ICALP:1×, LPAR:4×

The list of publications categorized by research areas is available [here](#)

Underlined names: my research group members and me

Ⓡ indicates random author ordering.

2025

- CAV-25 128. [Engineering an Efficient Probabilistic Exact Model Counter](#)  
Mate Soos and Kuldeep S. Meel  
Proc. of International Conference on Computer-Aided Verification (CAV) 2025
- CAV-25 127. [Panini: An Efficient and Flexible Knowledge Compiler](#)  
Yong Lai, Kuldeep S. Meel, and Roland Yap  
Proc. of International Conference on Computer-Aided Verification (CAV) 2025
- CAV-25 126. [Assessing the Quality of Binomial Samplers: A Statistical Distance Framework](#)  
Uddalok Sarkar, Sourav Chakraborty, and Kuldeep S. Meel  
Proc. of International Conference on Computer-Aided Verification (CAV) 2025
- PODS-25 125. [Towards Practical FPRAS for #NFA: Exploiting the Power of Dependence](#)  
Kuldeep S. Meel Ⓡ Alexis de Colnet  
Proceedings of Proc. of ACM Symposium on Principles of Database Systems (PODS), 2025
- ICLR-25 124. [Computational Explorations of Total Variation Distance](#)  
Arnab Bhattacharyya, Sutanu Gayen, Kuldeep S. Meel, Dimitrios Myrisiotis, A. Pavan, N. V. Vinodchandran  
Proceedings of International Conference on Learning Representations (ICLR) 2025
- DAC-25 123. [Approximate SMT Counting Beyond Discrete Domains](#)  
Arijit Shaw and Kuldeep S. Meel  
Proceedings of Design Automation Conference (DAC) 2025
- ICDT-25 122. [An FPRAS for Model Counting for Non-Deterministic Read-Once Branching Programs](#)  
(Random) Kuldeep S. Meel Ⓡ Alexis de Colnet  
Proceedings of International Conference on Database Theory (ICDT) 2025
- AISTATS-25 121. [Distance Estimation for High-Dimensional Discrete Distributions](#)  
(Random) Gunjan Kumar Ⓡ Kuldeep S. Meel Ⓡ Yash Pote  
Proceedings of International Conference on Artificial Intelligence and Statistics (AISTATS) 2025
- AAAI-25 120. [Towards Projected and Incremental Pseudo-Boolean Model Countings](#)  
Suwei Yang and Kuldeep S. Meel  
Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2025

- AAAI-25 119. [Probabilistic Explanations for Linear Models](#)  
 (Random) Bernardo Subercaseaux (R) Marcelo Arenas (R) Kuldeep S. Meel  
 Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2025
- AAAI-25 118. [Towards Real-Time Approximate Counting](#)  
 (Random) Yash Pote (R) Kuldeep S. Meel (R) Jiong Yang  
 Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2025  
 2024
- CAV-24 117. [Formally Certified Approximate Model Counting](#)  
 Yong Kiam Tan, Jiong Yang, Mate Soos, Magnus O. Myreen and and Kuldeep S. Meel  
**CAV 2024 Distinguished Paper Award**  
 Proc. of International Conference on Computer-Aided Verification (CAV) 2024
- ICLP-24 116. [On Lower Bounding Minimal Model Count.](#)  
Mohimenu Kabir and Kuldeep S. Meel  
**Best Paper Award**  
 Proceedings of the International Conference on Logic Programming (ICLP) 2024.
- PODS-24 115. [On the Feasibility of Forgetting in Data Streams](#)  
 (Random) A. Pavan (R) Sourav Chakraborty (R) N. V. Vinodchandran (R) and Kuldeep S. Meel  
 Proc. of ACM Symposium on Principles of Database Systems (PODS), 2024
- PODS-24 114. [A faster FPRAS for #NFA](#)  
 (Random) Kuldeep S. Meel (R) Sourav Chakraborty (R) Umang Mathur  
 Proc. of ACM Symposium on Principles of Database Systems (PODS), 2024
- DAC-24 113. [Engineering an Efficient Preprocessor for Model Counting](#)  
Mate Soos and Kuldeep S. Meel  
 Proceedings of Design Automation Conference (DAC) 2024.
- ICDT-24 112. [Conjunctive Queries on Probabilistic Graphs: The Limits of Approximability](#)  
 (Alphabetical) Antoine Amarilli, Timothy van Bremen, and Kuldeep S. Meel  
 Proceedings of International Conference on Database Theory (ICDT) 2024.
- KR-24 111. [Model Counting in the Wild](#)  
Arijit Shaw and Kuldeep S. Meel  
 Proceedings of International Conference on Knowledge Representation and Reasoning (KR) 2024.
- ECAI-24 110. [Locally-Minimal Probabilistic Explanations](#)  
Yacine Izza, Kuldeep S. Meel, and Joao Marques-Silva  
 Proceedings of European Conference on Artificial Intelligence(ECAI) 2024.
- APPROX-24 109. [Improved Streaming Algorithm for the Klee's Measure Problem and Generalizations](#)  
 (Random) Mridul Nandi (R) N. V. Vinodchandran (R) Arijit Ghosh (R) Kuldeep S. Meel (R) Soumit Pal (R)  
Sourav Chakraborty  
 Proceedings of the International Conference on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2024.
- ICML-24 108. [Total Variation Distance Meets Probabilistic Inference](#)  
 Arnab Bhattacharyya, Sutanu Gayen, Kuldeep S. Meel, Dimitrios Myrasiotis, A. Pavan and N. V. Vinodchandran  
 Proceedings of the International Conference on Machine Learning (ICML) 2024.
- AAAI-24 107. [Auditable Algorithms for Approximate Model Counting](#)  
Kuldeep S. Meel (R) Supratik Chakraborty (R) S. Akshay  
 Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2024
- AAAI-24 106. [Engineering an Exact Pseudo-Boolean Model Counter](#)  
Suwei Yang and Kuldeep S. Meel  
 Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2024

- AAAI-24 105. [An Approximate Skolem Function Counter](#)  
Arijit Shaw, Brendan Juba, and Kuldeep S. Meel  
 Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2024
- AAAI-24 104. [Exact ASP Counting with Compact Encodings](#)  
Mohimenu Kabir, Supratik Chakraborty, and Kuldeep S. Meel  
 Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2024
- AISTATS-24 103. [Equivalence Testing: The Power of Bounded Adaptivity](#)  
 (Alphabetical) Diptarka Chakraborty, Sourav Chakraborty, Gunjan Kumar, Kuldeep S. Meel  
 Proc. of International Conference on Artificial Intelligence and Statistics (AISTATS), 2024.
- TSE 102. [A Scalable t-Wise Coverage Estimator: Algorithms and Applications](#)  
 (Alphabetical) Eduard Baranov and Sourav Chakraborty and Axel Legay and Kuldeep S. Meel and N. Variyam Vinodchandran  
 IEEE Transactions on Software Engineering 2024.
- 2023
- ICALP-23 101. [Approximate Model Counting: Is SAT Oracle More Powerful than NP Oracle?](#)  
 (Alphabetical) Diptarka Chakraborty, Sourav Chakraborty, Gunjan Kumar and Kuldeep S. Meel  
 Proc. of EATCS International Colloquium on Automata, Languages and Programming (ICALP), 2023
- PODS-23 100. [Probabilistic Query Evaluation: the Combined FPRAS Landscape](#)  
Suwei Yang, Victor Liang and Kuldeep S. Meel  
 Proc. of ACM Symposium on Principles of Database Systems (PODS), 2023
- CAV-23 99. [Rounding meets Approximate Model Counting](#)  
Jiong Yang and Kuldeep S. Meel  
**CAV 2023 Distinguished Paper Award and Invited to FMSD special issue on CAV 2023**  
 Proc. of International Conference on Computer-Aided Verification (CAV) 2023
- DATE-23 98. [Synthesis with Explicit Dependencies](#)  
**Best Paper Award Nomination**  
Priyanka Golia, Subhajit Roy and Kuldeep S. Meel  
 Proceedings of Design, Automation, and Test in Europe (DATE), 2023
- SAT-23 97. [Explaining SAT Solving Using Causal Reasoning](#)  
Jiong Yang, Arijit Shaw, Teodora Baluta, Mate Soos, and Kuldeep S. Meel  
 Proc. of the Theory and Applications of Satisfiability Testing (SAT), 2023
- FaaCT-23 96. [“How Biased are Your Features?”: Computing Fairness Influence Functions with Global Sensitivity Analysis](#)  
Bishwamitra Ghosh, Debabrota Basu and Kuldeep S. Meel  
 Proc. of the ACM Conference on Fairness, Accountability, and Transparency (FAccT), 2023.
- LPAR-23 95. [A Fast and Accurate ASP Counting Based Network Reliability Estimator](#)  
Mohimenu Kabir and Kuldeep S. Meel  
 Proc. of Logic for Programming Artificial Intelligence and Reasoning (LPAR) 2023
- LPAR-23 94. [Scalable Probabilistic Routes.](#)  
Suwei Yang, Victor Liang and Kuldeep S. Meel  
 Proc. of Logic for Programming Artificial Intelligence and Reasoning (LPAR) 2023
- IJCAI-23 93. [Engineering an Efficient Approximate DNF-Counter](#)  
Mate Soos, Divesh Aggarwal, Sourav Chakraborty, Kuldeep S. Meel and Maciej Obremski.  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2023
- IJCAI-23 92. [Solving the Identifying Code Set Problem with Grouped Independent Support](#)  
Anna Latour, Arunabha Sen and Kuldeep S. Meel  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2023

- IJCAI-23 91. [On Approximating Total Variation Distance](#)  
(Alphabetical) Arnab Bhattacharyya, Sutanu Gayen, Kuldeep S. Meel, Dimitrios Myrasiotis, Pavan A. and N. V. Vinodchandran.  
Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2023
- AAAI-23 90. [Constraint Optimization over Semirings](#)  
(Random) A. Pavan  $\textcircled{r}$  Kuldeep S. Meel  $\textcircled{r}$  N. V. Vinodchandran  $\textcircled{r}$  Arnab Bhattacharyya  
Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2023
- AAAI-23 89. [Fast Converging Anytime Model Counting](#)  
Yong Lai, Kuldeep S. Meel, and Roland Yap  
Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2023
- AISTATS-23 88. [On Testing of Horn Samplers.](#)  
Ansuman Banerjee, Shayak, Chakraborty, Sourav Chakraborty, Kuldeep S. Meel, Uddalok Sarkar and Sayantan Sen  
Proc. of International Conference on Artificial Intelligence and Statistics (AISTATS), 2023.
- FMSD 87. [Hashing-based approximate counting of minimal unsatisfiable subsets](#)  
Jaroslav Bendik and Kuldeep S. Meel  
Formal Methods in System Design, 2023.  
  
2022
- CAV-22 86. [A Scalable Shannon Entropy Estimator](#)  
**Invited to FMSD issue dedicated to the best papers of CAV 2022**  
(Alphabetical) Priyanka Golia, Brendan Juba, and Kuldeep S. Meel  
Proc. of International Conference on Computer-Aided Verification (CAV) 2022
- ICCAD-22 85. [Arjun: An Efficient Independent Support Computation Technique and its Applications to Counting and Sampling](#)  
Mate Soos and Kuldeep S. Meel  
Proc. of IEEE/ACM Conference on Computer-Aided Design (ICCAD) 2022
- LICS-22 84. [On Almost-Uniform Generation of SAT Solutions: The power of 3-wise independent hashing](#)  
Remi Delannoy and Kuldeep S. Meel  
Proc. of Logic in Computer Science (LICS) 2022
- ESA-22 83. [Distinct Elements in Streams: An Algorithm for the \(Text\) Book](#)  
Sourav Chakraborty  $\textcircled{r}$  N.V. Vinodchandran  $\textcircled{r}$  Kuldeep S. Meel  
Proc. of European Symposium of Algorithms (ESA) 2022
- NeurIPS-22 82. [A scalable tester for samplers](#)  
(Random) Yash Pote  $\textcircled{r}$  Kuldeep S. Meel  
Proc. of Advances in Neural Information Processing Systems(NeurIPS), 2022
- IJCAI-22 81. [Counting, Sampling, and Synthesis: The Quest for Scalability](#)  
Kuldeep S. Meel  
Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2022.
- FMCAD-22 80. [INC: A Scalable Incremental Weighted Sampler](#)  
Suwei Yang and Kuldeep S. Meel  
Proc. of Formal Methods in Computer-Aided Design (FMCAD) 2022
- ATVA-22 79. [Projected Model Counting: Beyond Independent Support](#)  
Jiong Yang, Supratik Chakraborty, and Kuldeep S. Meel  
Proc. of International Symposium on Automated Technology for Verification and Analysis (ATVA) 2022
- CP-22 78. [On Quantitative Testing of Uniform Samplers](#)  
Mate Soos, Priyanka Golia, Sourav Chakraborty, and Kuldeep S. Meel  
Proc. of International Conference on Constraint Programming (CP) 2022

- PODS-22 77. [Estimation of the Size of Union of Delphic Sets: Achieving Independence from Stream Size](#)  
(Random) Kuldeep S. Meel (R) Sourav Chakraborty (R) N.V. Vinodchandran  
Proc. of Principles of Database Systems (PODS) 2022
- ICSE-22 76. [A Scalable t-wise Coverage Estimator](#)  
(Alphabetical) Eduard Baranov, Sourav Chakraborty, Axel Legay, Kuldeep S. Meel, and N. V. Vinodchandran  
Proc. of International Conference on Software Engineering (ICSE) 2022
- AAAI-22 75. [Algorithmic Fairness Verification with Graphical Models](#)  
Bishwamittra Ghosh, Debabrota Basu, and Kuldeep S. Meel  
Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2022
- AAAI-22 74. [ApproxASP - A Scalable Approximate Answer Set Counter](#)  
Mohimenu Kabir, Flavio Everardo, Ankit K Shukla, Markus Hecher, Johannes Fichte, and Kuldeep S Meel  
Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2022
- AAAI-22 73. [Constraint-Driven Explanations of Black-Box ML Models](#)  
Aditya Shrotri, Nina Narodytska, Alexey Ignatiev, Kuldeep S. Meel, Joao Marques-Silva, and Moshe Y. Vardi  
Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2022
- SIGMOD Record 72. [Model Counting Meets Distinct Elements in a Data Stream](#)  
(Random) A. Pavan (R) N. V. Vinodchandran (R) Arnab Bhattacharya (R) Kuldeep S. Meel  
SIGMOD Rec. 51(1) 2022
- JAIR 71. [Efficient Learning of Interpretable Classification Rules](#)  
Bishwamittra Ghosh, Dmitry Malioutov, and Kuldeep S. Meel  
Journal of Artificial Intelligence Research  
2021
- ICCAD-21 70. [Engineering an Efficient Boolean Functional Synthesis Engine](#)  
**Best Paper Award Nomination**  
Priyanka Golia, Friedrich Slivovsky, Subhajit Roy and Kuldeep S. Meel  
Proc. of IEEE/ACM Conference on Computer-Aided Design (ICCAD) 2021
- PODS-21 69. [Model Counting meets  \$F\_0\$  Estimation](#)  
**CACM Research Highlight 2023**  
**ACM SIGMOD 2021 Research Highlight; Invited as “Best of PODS-21” by ACM TODS**  
(Random) A. Pavan (R) N. V. Vinodchandran (R) Arnab Bhattacharya (R) Kuldeep S. Meel  
Proc. of Principles of Database Systems (PODS) 2021
- PODS-21 68. [Estimating the Size of Unions of Sets in Streaming Models](#)  
Kuldeep S. Meel (R) N.V. Vinodchandran (R) Sourav Chakraborty  
Proc. of Principles of Database Systems (PODS) 2021
- CAV-21 67. [Counting Minimal Unsatisfiable Subsets](#)  
Jaroslav Bendik and Kuldeep S. Meel  
Proc. of International Conference on Computer-Aided Verification (CAV), 2021.
- ICSE-21 66. [Scalable Quantitative Verification For Deep Neural Networks](#)  
Teodora Baluta, Zheng Leong Chua, Kuldeep S. Meel, and Prateek Saxena  
Proc. of IEEE/ACM International Conference on Software Engineering (ICSE) 2021
- SAT-21 65. [Leveraging GPUs for Effective Clause Sharing in Parallel SAT Solving](#)  
Nicolas Prevot, Mate Soos, and Kuldeep S. Meel  
Proc. of the Theory and Applications of Satisfiability Testing (SAT), 2021.
- CP-21 64. [Engineering an Efficient PB-XOR Solver](#)  
Jiong Yang and Kuldeep S. Meel  
Proc. of International Conference on Constraint Programming (CP), 2021.
- FMCAD-21 63. [Designing Samplers is Easy: The Boon of Testers](#)  
Priyanka Golia, Mate Soos, Sourav Chakraborty, and Kuldeep S. Meel  
Proc. of Formal Methods in Computer-Aided Design (FMCAD) 2021

- KR-21 62. [Gaussian Elimination meets Maximum Satisfiability](#)  
Mate Soos and Kuldeep S. Meel  
 Proc. of Principles of Knowledge Representation and Reasoning (KR) 2021
- NeurIPS-21 61. [Testing Probabilistic Circuits](#)  
 (Random) Yash Pote (R) Kuldeep S. Meel  
 Proc. of Advances in Neural Information Processing Systems(NeurIPS), 2021.
- AAAI-21 60. [Justicia: A Stochastic SAT Approach to Formally Verify Fairness](#)  
Bishwamittra Ghosh, Debabrota Basu, and Kuldeep S. Meel  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2021
- AAAI-21 59. [Symmetric Component Caching for Model Counting on Structured Instances](#)  
Timothy van Bremen, Vincent Derkinderen, Shubham Sharma, Subhajit Roy, and Kuldeep S. Meel  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2021
- AAAI-21 58. [Counting Maximal Satisfiable Subsets](#)  
Jaroslav Bendik and Kuldeep S. Meel  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2021
- AAAI-21 57. [The Power of Literal Equivalence in Model Counting](#)  
Yong Lai, Kuldeep S Meel, and Roland Yap  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2021
- AAAI-21 56. [Predicting Forest Fire Using Remote Sensing Data And Machine Learning](#)  
Suwei Yang, Massimo Lupascu, and Kuldeep S Meel  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2021
- IJCAI-21 55. [Program Synthesis as Dependency Quantified Formula Modulo Theory](#)  
Priyanka Golia, Subhajit Roy, and Kuldeep S. Meel  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2021.
- IJCAI-21 54. [Partition Function Estimation: A Quantitative Study](#)  
Durgesh Agrawal, Yash Pote, and Kuldeep S. Meel  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2021.
- CPAIOR-21 53. [On the Usefulness of Linear Modular Arithmetic in Constraint Programming](#)  
Gilles Pesant, Kuldeep S. Meel, and Mahshid Mohammadalita jrishi  
 Proc. of International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR), 2021.
- 2020
- LICS-20 52. [Sparse Hashing for Scalable Approximate Model Counting: Theory and Practice](#)  
 (Random) Kuldeep S. Meel (R) S. Akshay  
 Proc. of Logic in Computer science (LICS), 2020.
- CAV-20 51. [Tinted, Detached, and Lazy CNF-XOR solving and its Applications to Counting and Sampling](#)  
Mate Soos, Stephan Gocht, and Kuldeep S. Meel  
 Proc. of International Conference on Computer-Aided Verification (CAV), 2020.
- CAV-20 50. [Manthan: A Data-Driven Approach for Boolean Function Synthesis](#)  
Priyanka Golia, Subhajit Roy, and Kuldeep S. Meel  
 Proc. of International Conference on Computer-Aided Verification (CAV), 2020.
- CAV-20 49. [Approximate Counting of Minimal Unsatisfiable Subsets](#)  
**Invited to FMSD issue dedicated to the best papers from CAV 2020**  
Jaroslav Bendik and Kuldeep S. Meel  
 Proc. of International Conference on Computer-Aided Verification (CAV), 2020.
- FSE-20 48. [Baital: An Adaptive Weighted Sampling Approach for Improved t-wise Coverage](#)  
 (Alphabetical) Eduard Baranov, Axel Legay, and Kuldeep S. Meel  
 Proc. of ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), 2020



- TACAS-20 47. [A Study of Symmetry Breaking Predicates and Model Counting](#)  
Wenxi Wang, Muhammad Usman, Alyas Almaawi, Kaiyuan Wang, Kuldeep S. Meel, and Sarfraz Khurshid  
Proc. of Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2020.
- SAT-20 46. [Designing New Phase Selection Heuristics](#)  
Arijit Shaw and Kuldeep S. Meel  
Proc. of the Theory and Applications of Satisfiability Testing (SAT), 2020.
- SAT-20 45. [On the Sparsity of XORs in Approximate Model Counting](#)  
(**Alphabetical**) Durgesh Agrawal, Bhavishya, and Kuldeep S. Meel  
Proc. of the Theory and Applications of Satisfiability Testing (SAT), 2020.
- CP-20 44. [Phase Transition Behavior in Knowledge Compilation](#)  
Rahul Gupta, Subhajit Roy, and Kuldeep S. Meel  
Proc. of International Conference on Constraint Programming (CP), 2020.
- NeurIPS-20 43. [On Testing of Samplers](#)  
(**Random**) Kuldeep S. Meel (✉) Yash Pote (✉) and Sourav Chakraborty  
Proc. of Advances in Neural Information Processing Systems (NeurIPS), 2020.
- NeurIPS-20 42. [Efficient Distance Approximation for Structured High-Dimensional Distributions via Learning](#)  
(**Alphabetical**) Arnab Bhattacharyya, Sutanu Gayen, Kuldeep S. Meel, and N. V. Vinodchandran  
Proc. of Advances in Neural Information Processing Systems (NeurIPS), 2020.
- NeurIPS-20 41. [Taming Discrete Integration via the Boon of Dimensionality](#)  
(**Alphabetical**) Jeffrey M. Dudek, Dror Fried, and Kuldeep S. Meel  
Proc. of Advances in Neural Information Processing Systems (NeurIPS), 2020.
- AAAI-20 40. [A MaxSAT-based Framework for Group Testing](#)  
Lorenzo Ciampiconi, Bishwamitra Ghosh, Jonathan Scarlett, and Kuldeep S. Meel  
Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2020
- ECAI-20 39. [Classification Rules in Relaxed Logical Form](#)  
Bishwamitra Ghosh, Dmitry Malioutov, and Kuldeep S. Meel  
In Proc of European Conference on Artificial Intelligence (ECAI), 2020.
- LPAR-20 38. [Induction Models on N](#)  
(**Alphabetical**) A. Dileep, Kuldeep S. Meel, and Ammar F. Sabili  
Proc. of of International Conference on Logic for Programming Artificial Intelligence and Reasoning (LPAR), 2020.
- 2019
- NeurIPS-19 37. [Embedding Symbolic Knowledge into Deep Networks](#)  
Yaqi Xie, Ziwei Xu, Mohan S Kankanhalli, Kuldeep S. Meel, and Harold Soh  
Proc. of Neural Information Processing Systems (NeurIPS), 2019
- IJCAI-19 36. [Not All FPRASs are Equal: Demystifying FPRASs for DNF-Counting](#)  
**Sister Conferences Best Paper Award Track**  
(**Alphabetical**) Kuldeep S. Meel, Aditya A. Shrotri, and Moshe Y. Vardi  
Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2019
- IJCAI-19 35. [A Scalable Probabilistic Exact Model Counter](#)  
Shubham Sharma, Subhajit Roy, Mate Soos, and Kuldeep S. Meel  
Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2019
- IJCAI-19 34. [Phase Transition Behavior of Cardinality and XOR Constraints](#)  
Yash Pote, Sourabh Joshi, and Kuldeep S. Meel  
Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2019
- AAAI-19 33. [BIRD: Engineering an Efficient CNF-XOR SAT Solver and its Applications to Approximate Counting](#)  
Mate Soos and Kuldeep S. Meel  
Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2019

- AAAI-19 32. [On Testing of Uniform Samplers](#)  
 (Alphabetical) Sourav Chakraborty and Kuldeep S. Meel  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2019
- AAAI-19 31. [On the hardness of Probabilistic Inference Relaxations](#)  
 (Alphabetical) Supratik Chakraborty, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of AAAI Conference on Artificial Intelligence (AAAI) 2019
- AIES-19 30. [IMLI: An Incremental Framework for MaxSAT-Based Learning of Interpretable Classification Rules](#)  
Bishwamittra Ghosh and Kuldeep S. Meel  
 Proc. of AAAI/ACM Conference on AI, Ethics, and Society (AIES), 2019
- CCS-19 29. [Quantitative Verification of Neural Networks And its Security Applications](#)  
Teodora Baluta, Shiqi Shen, Shweta Shine, Kuldeep S. Meel, and Prateek Saxena  
 Proc. of ACM Conference on Computer and Communications Security (CCS), 2019
- CP-19 28. [Dual Hashing-based Algorithms for Discrete Integration \(Extended Abstract\)](#)  
 (Alphabetical) Alexis de Colnet and Kuldeep S. Meel  
 Proc. of International Conference on Constraint Programming (CP), 2019.
- SAT-19 27. [CrystalBall: Gazing in the Black Box of SAT Solving](#)  
Mate Soos, Raghav Kulkarni and Kuldeep S. Meel  
 Proc. of the International Conference on Theory and Applications of Satisfiability Testing (SAT), 2019
- SAT-19 26. [Assessing Heuristic Machine Learning Explanations with Model Counting](#)  
Nina Narodytska, Aditya Shrotri, Kuldeep S. Meel, Alexey Ignatiev, and Joao Marques Silva  
 Proc. of Theory and Applications of Satisfiability Testing (SAT), 2019
- RESS-19 25. [Principled Network Reliability Approximation: A Counting-Based Approach](#)  
Roger Paredes, Leonardo Duenas-Osorio, Kuldeep S. Meel, and Moshe Y. Vardi  
 Reliability Engineering and System Safety, 2019
- TACAS-19 24. [WAPS: Weighted and Projected Sampling](#)  
Rahul Gupta, Shubham Sharma, Subhajit Roy and Kuldeep S. Meel  
 Proc. of International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2019
- DATE-19 23. [Bosphorus: Bridging ANF and CNF Solvers](#)  
Davin Choo, Mate Soos, Kian Ming A. Chai, and Kuldeep S. Meel  
 In Proc. of Design, Automation and Test in Europe (DATE) 2019  
 2018
- LPAR-18 22. [Knowledge Compilation meets Uniform Sampling](#)  
Shubham Sharma, Rahul Gupta, Subhajit Roy and Kuldeep S. Meel  
 Proc. of Logic for Programming, Artificial Intelligence and Reasoning (LPAR), 2018
- CP-18 21. [MLIC: A MaxSAT-Based framework for learning interpretable classification rules](#)  
 (Alphabetical) Dmitry Malioutov and Kuldeep S. Meel  
 Proc. of International Conference on Constraint Programming (CP), 2018.
- CP-18 20. [Not All FPRASs are Equal: Demystifying FPRASs for DNF-Counting](#)  
**Invited to IJCAI-19 Sister Conference Best Paper Track**  
 (Alphabetical) Kuldeep S. Meel, Aditya A. Shrotri, and Moshe Y. Vardi  
 Proc. of International Conference on Constraint Programming (CP), 2018.
- VMCAI-18 19. [Scalable Approximation of Quantitative Information Flow in Programs](#)  
 (Alphabetical) Fabrizio Biondi, Mike Enescu, Annelie Heuser, Axel Legay, Kuldeep S. Meel, Jean Quilbeuf  
 Proc. of Verification, Model Checking, and Abstract Interpretation (VMCAI), 2018  
 2017

- FSTTCS-17 18. [On Hashing-Based Approaches to Approximate DNF-Counting](#)  
 (Alphabetical) Kuldeep S. Meel, Aditya A. Shrotri, and Moshe Y. Vardi  
 Proc. of IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2017
- IJCAI-17 17. [The Hard Problems Are Almost Everywhere For Random CNF-XOR Formulas](#)  
 (Alphabetical) Jeffrey Dudek, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2017
- IJCAI-17 16. [Counting-based Reliability Estimation for Power-Transmission Grids](#)  
 (Alphabetical) Leonardo Duenas-Osorio, Kuldeep S. Meel, Roger Paredes, and Moshe Y. Vardi  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2017  
 2016
- IJCAI-16 15. [Algorithmic Improvements in Approximate Counting for Probabilistic Inference: From Linear to Logarithmic SAT Calls](#)  
 (Alphabetical) Supratik Chakraborty, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2016
- IJCAI-16 14. [Combining the k-CNF and XOR Phase-Transitions](#)  
 (Alphabetical) Jeffrey Dudek, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2016
- Constraints 13. [On computing Minimal Independent Support and its Applications to Sampling and Counting](#)  
 (Alphabetical) Alexander Ivrii, Sharad Malik, Kuldeep S. Meel and Moshe Y. Vardi  
 Constraints 21(1), 2016
- Euro-Par-16 12. [Design and Verification of Distributed Phasers](#)  
 Karthik Murthy, Sri Raj Paul, Kuldeep S. Meel, Tiago Cogumbreiro, and John Mellor-Crummey  
 Proc. of International European Conference on Parallel and Distributed Computing (Euro-Par) 2016
- CC-16 11. [Automatic Data Layout Generation and Kernel Mapping for CPU+GPU Architectures](#)  
 Deepak Majeti, Kuldeep S. Meel, Raj Barik, and Vivek Sarkar  
 Proc. of International Conference on Compiler Construction (CC) 2016.
- AAAI-16 10. [Approximate Probabilistic Inference via Word-Level Counting](#)  
 (Alphabetical) Supratik Chakraborty, Kuldeep S. Meel, Rakesh Mistry and Moshe Y. Vardi  
 Proc. of AAAI Conf. on Artificial Intelligence (AAAI) 2016  
 2015
- CP-15 9. [On computing Minimal Independent Support and its applications to sampling and counting](#)  
**Best Student Paper Award**  
 (Alphabetical) Alexander Ivrii, Sharad Malik, Kuldeep S. Meel and Moshe Y. Vardi  
 In Proc of Principles and Practice of Constraint Programming (CP) 2015
- IJCAI-15 8. [From Weighted to Unweighted Model Counting](#)  
 (Alphabetical) Supratik Chakraborty, Dror Fried, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of International Joint Conference on Artificial Intelligence (IJCAI) 2015
- TACAS-15 7. [On Parallel Scalable Uniform SAT Witness Generation](#)  
 (Alphabetical) Supratik Chakraborty, Daniel J. Fremont, Kuldeep S. Meel, Sanjit A. Seshia, and Moshe Y. Vardi  
 Proc. of Tools and Algorithms for the Construction and Analysis of Systems, 2015  
 2014
- AAAI-14 6. [Distribution-Aware Sampling and Weighted Model Counting for SAT](#)  
 (Alphabetical) Supratik Chakraborty, Daniel J. Fremont, Kuldeep S. Meel, Sanjit A. Seshia, and Moshe Y. Vardi  
 Proc. of AAAI Conf. on Artificial Intelligence (AAAI) 2014

- PACT-14 5. [ADHA: Automatic Datalayout Framework for Heterogenous Architectures](#)  
 Deepak Majeti, Kuldeep S. Meel, Raj Barik, and Vivek Sarkar  
 Proc. of International Conf. on Parallel Architectures and Compiler Technologies (PACT) 2014
- DAC-14 4. [Balancing Scalability and Uniformity in SAT Witness Generator](#)  
 (Alphabetical) Supratik Chakraborty, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of Design Automation Conference (DAC) 2014, pages 60:1-60:6  
 2013
- CP-13 3. [A Scalable Approximate Model Counter](#)  
**Chosen as one of the 25 papers across 25 years for CP anniversary volume**  
 (Alphabetical) Supratik Chakraborty, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of International Conf. on Principles and Practice of Constraint Programming (CP), 2013
- CAV-13 2. [A Scalable and Nearly Uniform Generator of SAT-Witnesses](#)  
 (Alphabetical) Supratik Chakraborty, Kuldeep S. Meel, and Moshe Y. Vardi  
 Proc. of International Conf. on Computer-Aided Verification (CAV) 2013, pages 608-623

## Workshop Publications

- BNP-16 1. [Constrained Sampling and Counting: Universal Hashing Meets SAT Solving](#)  
 Kuldeep S. Meel, Moshe Vardi, Supratik Chakraborty, Daniel J. Fremont, Sanjit A. Seshia, Dror Fried,  
 Alexander Ivrii and Sharad Malik  
 Proc. of AAAI-16 Workshop on Beyond NP (BNP) 2016

## Tutorials

- SETSS-24 *Distribution Testing: The New Frontier for Formal Methods*, Four lectures spanning six hours at the 6th Spring School on Trustworthy Software Systems, held in Chongqing (China)
- IJCAI-22 *Automated Synthesis: Towards the Holy Grail of AI*, Co-presented with Supratik Chakraborty, S. Akshay, Priyanka Golia, and Subhajit Roy
- AAAI-22 *Automated Synthesis: Towards the Holy Grail of AI*, Co-presented with Supratik Chakraborty, S. Akshay, Priyanka Golia, and Subhajit Roy
- IJCAI-20 *Logic-Enabled Verification and Explanation of ML Models*, Co-presented with Alexey Ignatiev, Joao Marques-Silva, and Nina Narodytska
- AAAI-20 *Rigorous Verification and Explanation of ML Models*, Co-presented with Alexey Ignatiev, Joao Marques-Silva, and Nina Narodytska
- IJCAI-18 *Scaling Discrete Integration and Sampling: Foundations and Challenges*, Co-presented with Supratik Chakraborty
- AAAI-17 *Discrete Sampling and Integration for the AI Practitioner*, Co-presented with Supratik Chakraborty and Moshe Y. Vardi
- UAI-16 *Discrete Sampling and Integration in High Dimensional Spaces*, Co-presented with Supratik Chakraborty and Moshe Y. Vardi

## Teaching

University of Toronto

- CSC 384 *Introduction to Artificial Intelligence*  
 Winter 2024
- CSC 2512 *Advanced Propositional Reasoning*  
 Fall 2023

## National University of Singapore

- CS 4244 *Knowledge Representation and Reasoning*  
Spring 2023, Spring 2021, Spring 2020, Spring 2019, Spring 2018
- CS 3243 *Introduction to Artificial Intelligence*  
Fall 2020, Fall 2021
- CS 4269 *Fundamentals of Logic in Computer Science*  
Fall 2019
- CS 6283 *Logic in AI*  
Fall 2018

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## Advising

### Research Scientist

1. Dr. Mate Soos  
(Senior) Research Fellow/Scientist  
March 18- June 18; July 2019 - Sep 2019; March 2023- June 2023; April 2024–June 2024

### Postdocs

2. Dr. Paulius Dilkas (since 12.22)
3. Dr. Yacine Izza (since 11.22)

### PhD Students

1. Yang Jiong (since August 2021)  
Presidential Graduate Fellowship
2. Mohimenul Kabir (since August 2020)
3. Yash Pote (since Jan 2021)
4. Arijit Shaw (since August 2021)
5. Yang Suwei (since August 2019)
6. Uddalok Sarkar (since January 2023) (co-advised with Sourav Chakraborty)
7. Yifan Ruan (since September 2023)
8. Jack Sun (since September 2023)

### Alumni

#### PhD Graduates

1. Dr. Teodora Baluta  
Graduated with PhD in 06.24; co-advised with Prof. Prateek Saxena  
**Next Position:** Assistant Professor at Georgia Tech
2. Dr. Priyanka Golia  
Graduated with PhD in 08.23; co-advised with Prof. Subhajit Roy  
**ACM India Doctoral Dissertation Award Winner**  
**Next Position:** Assistant Professor at IIT Delhi
3. Dr. Bishwamittra Ghosh  
Graduated with PhD in 07.23;  
**Next Position:** Post-doc at MPI-SWS

#### Post-doc “Graduates”

4. Dr. Timothy Van Bremen  
Post-doc: 06.22-06.24  
**Next Position:** Assistant Professor at Nanyang Technical University

5. Dr. Gunjan Kumar  
Post-doc: 03.21-07.24 (co-advised with Diptarka Chakraborty)  
**Next Position:** Assistant Professor at IIT Kanpur

6. Dr. Anna Latour  
Post-doc: 02.22-04.24  
**Next Position:** Assistant Professor at TU Delft

7. Dr. Lawqueen Kanesh  
Post-doc: Jan 2021- Dec 2021  
**Next Position:** Assistant Professor at IIT Jodhpur

8. Dr. Yong Lai  
Post-doc: 07.19-08.20  
**Next Position:** Associate Professor at Jilin University

9. Dr. Vignesh Sivaraman  
Post-doc: 09.20-04.21  
**Next Position:** Assistant Professor at IIIT-Hyderabad

#### **Masters Graduates**

10. Delannoy Remi Christian (graduated with MComp in 12.19)

11. Alexis de Colnet (graduated with MComp in 12.18)

12. Lorenzo Ciampiconi (graduated with Masters in Computing in 12.19)

13. Rahul Gupta (graduated with MTech in 05.19; co-advised with Subhajit Roy)

14. Shubham Sharma (graduated with MTech in 05.19; co-advised with Subhajit Roy)

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#### **Professional Experience**

05.16-07.16 *Summer Intern*, IBM Research, T J Watson Research Center

05.15-08.15 *Summer Intern*, Microsoft Research, Bangalore, India

05.11-01.12 *Mobile Developer* Pocket Gems Inc., San Francisco, USA

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#### **Extended Research Visit**

05.19 Telecom ParisTech

06.18 INRIA Rennes

01.16 Microsoft Research

10.15-12.15 Institute for Advanced Studies, Hebrew University of Jerusalem

12.13 Synopsys Inc

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#### **Service**

External

Co-Chair

2022 **Program Co-Chair**, 25th Theory and Practice of Satisfiability (SAT) 2022

2020 CP Doctoral Program (Co-chair) 2020

**Advisory Chair**

2024 27th Theory and Practice of Satisfiability (SAT) 2024

**Co-Organiser**

2024 Dagstuhl Seminar on Automated Synthesis: Functional, Reactive and Beyond

2023 Theory and Practice of Satisfiability, Simons Institute Reunion Program on Satisfiability

2021 Beyond Satisfiability at Simons's Institute Program on Satisfiability

2020-22 International Workshop on Model Counting (co-located with SAT)

○ 1st Edition, co-organized with F. J. Fichte, M. Hecher, S. Mengal

○ 2nd Edition, co-organized with F. J. Fichte, M. Hecher, M. Soos

○ 3rd Edition, co-organized with F. J. Fichte and M. Hecher

2019-23 The Indian SAT+SMT Winter School

2017 Workshop on Probabilistic Reasoning and Formal Methods at FSTTCS 2017. Co-organized with S. Akshay (IIT Bombay)

**Sponsorship Co-chair**

2021 Principles of Knowledge Representation and Reasoning (KR 2021)

**Editorial Board**

2022- *Action Editor*, Transaction of Machine Learning Research (TMLR)

2023- *Associate Editor*, Journal of AI Research (JAIR)

**Program Committee**

2025 ICDT-25, CADE-25, TACAS-25, ICML-25 (AC), ICLR

2024 PODS-24, CAV-24, IJCAR-24, SAT-24, ICML-24 (AC), CP-24

2023 ACM Doctoral Dissertation Award (India), CAV-23, SAT-23, IJCAI-23 (SPC), ICML-23 (AC), AISTATS-23 (AC), AAAI-23, FMCAD-23

2022 SAT-22 (Program Co-Chair), CAV-22, IJCAI-22(AC), AAAI-22, FMCAD-22, KR-22

2021 NeurIPS-21 (AC), AAAI-21 (SPC), IJCAI-21 (SPC), CP-21, FMCAD-21, ICML-21

2020 SAT-20, CP-20, CAV-20, CONCUR-20, IJCAI-20, AAAI-20, ECAI-20

2019 IJCAI-19, AAAI-19, SAT-19, AIES-19, ISAAC-19

2018 IJCAI-18 (**Awarded Distinguished PC Member**), AAAI-18, CP-18

2017 CP 2017

2015 AAAI 2015 Futures Focus Group tasked with creation of vision for AAAI

**Reviewer (Conferences)**

○ HPCA 2018, IJCAR 2018, NFM 2018, SAT 2017, TACAS 2017, SAT 2016, CAV 2015, FoSSaCS 2015, DAC 2014

**Reviewer (Journals)**

○ JAIR (2018–), Artificial Intelligence (2018–), CACM (2018, 2014), Algorithms (2018), TOPLAS (2017), NSF (2015)

Thesis Examiner/Committee

○ Ruiwei Wang (PhD), Mahamarakkalage Dileepa Yasas Fernando(PhD), Nguyen Ta Duy (MComp), Guillaume Henri J. Freisz (MComp)

11.19 Thesis Opponent, Topi Talvitie at University of Helsinki

**University Service**

07.23 – 06.24 Graduate Admissions Committee (Co-chair), Graduate Awards Committee (Member), University of Toronto

08.18-06.23 Graduate Admissions Committee, School of Computing, National University of Singapore

08.18-05.21 Assistant Professor Representative at School of Computing Executive committee (NUS)

05.18 Program Committee, AI Singapore Workshop (NUS)

Outreach

05.18 Judge, NUS High School International Mathematics Challenge

2013-2014 Judge, Rice Undergraduate Research Symposium (RURS)

2013, 2016 Judge, Science & Engineering Fair of Houston

**Talks**

Distribution Testing: The New Frontier for Formal Methods

March 2025 148. *IMDEA Software Institute*

Feb 2025 147. *Leiden University*

April 2024 146. *Tutorial, The Spring School on Engineering Trustworthy Software Systems (SETSS 2024)*

Nov 23 145. *SAT-SMT Winter School 2023*

Oct 23 144. *Keynote, Formal Methods for Computer-Aided Design (FMCAD) 2023*

Constrained Optimization over Semirings

Nov 23 143. *Simons Institute for Theory of Computing*

A Theory for Computing with SAT Solvers: What's the Power of a Satisfying Assignment?

April 25 142. *Chennai Mathematical Institute (CMI)*

April 25 141. *Indian Institute of Science, Bangalore*

April 25 140. *The Institute of Mathematical Sciences, Chennai*

Feb 24 139. *University of Toronto*

Dec 23 138. *IIT Bombay*

Dec 23 137. *IIT Delhi*

Distinct Elements in Streams: An Algorithm for the (Text) Book

Feb 24 136. *ARC Seminar, Georgia Institute of Technology*

Feb 24 135. *University of British Columbia, Vancouver*

Nov 23 134. *Tata Institute for Fundamental Research, Mumbai*



- Feb 24 133. *University of British Columbia, Vancouver*
- Feb 24 132. *Georgia Institute of Technology*
- Nov 23 131. *Simons Institute for Theory of Computing, Berkeley*
- Oct 23 130. *University of Toronto, Theory Seminar*
- July 23 129. *CRIL Lens*
- Jun 23 128. *Microsoft Research, Redmond*
- May 23 127. *Stanford Software Research Lunch*
- May 23 126. *Arizona State University*
- May 23 125. *University of Massachusetts, Amherst*
- May 23 124. *Northeastern University*
- Apr 23 123. *CS Conversations, Simons Institute*
- March 23 122. *IIT Bombay*
- Nov 22 121. *National University of Singapore, Theory Seminar*

Model Counting meets  $F_0$  Estimation

- Oct 23 120. *Simons Institute for Theory of Computing*
- May 23 119. *University of California, Berkeley EECS Seminar*
- April 22 118. *University of Birmingham*
- Feb 22 117. *IIT Bombay*
- Nov 21 116. *IIT Kharagpur*
- Oct 21 115. *TU Wien*

Estimating the size of unions of sets in streaming model

- Sep 21 114. *MIAO Seminar, University of Copenhagen*

Automated Synthesis: An Ideal Meeting Ground for Formal Methods and Machine Learning

- July 24 113. *Simons Institute for Theory of Computing, Workshop on Synthesis of Models and Systems*
- May 24 112. *Keynote, 25th International Conference on Logic for Programming, Artificial Intelligence and Reasoning (LPAR)*
- Nov 23 111. *Vector Institute for Artificial Intelligence*
- Nov 23 110. *University of California, Santa Cruz*
- Sep 23 109. *UTSA Matrix AI Seminar*
- June 22 108. *Dagstuhl Seminar: Logical Reasoning and Machine Learning: The Next Frontier*
- June 22 107. *Simons Institute*
- Apr 21 106. *USC CCI-MHI Cyber-Physical Systems Seminar*
- Mar 21 105. *University of Wisconsin*
- Mar 21 104. *MPI-SWS, Germany*
- Mar 21 103. *Waterloo ML+Logic Seminar*

- Mar 21 102. *CITRIS People and Robots Seminar*
- Sep 19 101. *University of Copenhagen*
- Feb 22 100. *TU Graz*
- Democratizing SAT Solving
- August 22 99. *The Workshop on Democratizing Software Verification*
- Distribution Testing and Probabilistic Programming: A Match made in Heaven
- August 22 98. *The Workshop on Verification of Probabilistic Programs*
- Counting, Sampling, and Synthesis: The Quest for Scalability
- Feb 23 97. *Georgia Institute of Technology*
- Feb 23 96. *George Mason University*
- Feb 23 95. *Indian Institute of Technology, Bombay*
- Feb 23 94. *Open University, Israel*
- Feb 23 93. *National University of Singapore*
- August 22 92. *ACP Early Career Research Award Talk*
- July 22 91. *IJCAI Early Career Spotlight*
- April 22 90. *University of Toronto*
- April 22 89. *University of Southern California*
- April 22 88. *Pennsylvania State University*
- Mar 22 87. *University of California, Berkeley*
- Mar 22 86. *University of Waterloo*
- Mar 22 85. *Columbia University*
- Mar 22 84. *Washington State University in St. Louis*
- Mar 22 83. *Rice University*
- Mar 22 82. *Purdue University*
- Next Gen Automated Reasoning: Beyond “SAT Revolution” to “Beyond SAT” Revolution
- Feb 22 81. *Iowa State University*
- Feb 22 80. *University of Nebraska, Lincoln*
- Feb 22 79. *CISPA Helmholtz Center for Information Security*
- The Rise of Model Counting: A Child of SAT Revolution
- Apr 21 78. *MPI Software and Privacy*
- Apr 21 77. *Data and Knowledge Seminar, University of Oxford*
- Nov 19 76. *Keynote, Symposium on Dependable Software Engineering Theories, Tools and Applications*
- Sparse Hashing for Scalable Approximate Model Counting: When Theory and Practice Finally Meet
- Dec 20 75. *UnRAVeL, RWTH Aachen*
- Model counting with probabilistic component caching

Oct 20 74. *University of Copenhagen*

Constrained Counting and Sampling: From Theory to Practice and Back

Jul 19 73. *Keynote, 26th International SPIN Symposium on Model Checking of Software*

Dec 16 72. *Tata Research Development and Design Centre*

Towards Verifying AI Systems: Testing of Uniform Samplers

Feb 20 71. *Rutgers University*

Nov 19 70. *Institute of Theoretical Computer Science, Shanghai*

Nov 19 69. *East China Normal University*

Aug 19 68. *University of Toronto*

Jun 19 67. *Tata Institute of Fundamental Research*

May 19 66. *MPS-SWS*

May 19 65. *IST Austria*

May 19 64. *The second Workshop of Formal Methods and AI (FMAI)*

Feb 19 63. *Rice University*

Jan 19 62. *Indian Institute of Technology, Bombay*

Aug 19 61. *Formal Methods and AI: Yet Another Entanglement Waterloo ML + Security + Verification Workshop*

CrystalBall: Gazing in the Black Box of SAT Solving

Sep 19 60. *Rice University*

Mar 19 59. *Defense Service Organization*

Dec 18 58. *The Third Indian SAT+SMT School, IIT Hyderabad*

Sep 18 57. *Indian Institute of Technology, Delhi*

Aug 18 56. *Theory and Practice of Satisfiability Solving at Casa Mathematica Oaxaca*

Beyond NP Revolution

Nov 19 55. *ShanghaiTech University*

Nov 19 54. *University of Helsinki*

Oct 19 53. *Yale University*

Jul 19 52. *Chinese Academy of Sciences*

May 19 51. *TCS, KTH Royal Institute of Technology*

May 19 50. *CRIL-CNRS, Lens*

May 19 49. *Telekom-ParisTech*

Apr 19 48. *TU Dresden*

Mar 19 47. *Singapore Management University*

Mar 19 46. *IIT Kharagpur*

Feb 19 45. *Indian Statistical Institute, Kolkata*

Jan 19 44. *Complexity, Algorithms, Automata and Logic Meet (CAALM), Chennai*

- Dec 18 43. *IIT Hyderabad*
- Oct 18 42. *Singapore University of Technology and Design*
- Jul 18 41. *DSO National Laboratories, Singapore*
- Jul 18 40. *Leiden University, Netherlands*
- Jun 18 39. *INRIA Rennes, France*
- May 18 38. *And The Formal Methods Strike Back Lightning Talk, AI Singapore Workshop*
- Mar 18 37. *The Second Coming of Logic in AI, Yogyakarta, Indonesia*
- Sep 17 36. *On Demystifying CNF-XOR Formulas, Indian Institute of Technology, Delhi*
- Constrained Counting and Sampling: Bridging the gap between Theory and Practice
- Dec 17 35. *Indian Institute of Science, Bangalore*
- Apr 17 34. *Iowa State University*
- Apr 17 33. *Rutgers University*
- Apr 17 32. *New York University*
- Mar 17 31. *University of Utah*
- Mar 17 30. *Virginia Tech*
- Mar 17 29. *Purdue*
- Mar 17 28. *Arizona State University*
- Mar 17 27. *IST Austria*
- Mar 17 26. *MPI-SWS, Germany*
- Mar 17 25. *University of Waterloo*
- Feb 17 24. *National University of Singapore*
- Feb 17 23. *Institute of Theoretical Computer Science, Shanghai*
- Jan 17 22. *IIT Delhi*
- Jan 17 21. *IIT Kanpur*
- Jan 17 20. *IIT Bombay*
- Jan 17 19. *Tata Institute of Fundamental Research*
- Jan 17 18. *Chennai Mathematical Institute*
- Jan 17 17. *IIT Madras*
- Dec 16 16. *The First Indian SAT+SMT School*
- Improving Approximate Counting for Probabilistic Inference: From Linear to Logarithmic SAT Solver Calls
- Dec 16 15. *Fields Institute, Workshop on Theoretical Foundations of SAT Solving*
- Constrained Sampling and Counting: When Practice Drives Theory
- Jan 16 14. *Chennai Mathematical Institute*
- Dec 15 13. *Theory Seminar, Hebrew University of Jerusalem*
- Scalable Techniques for Constrained Sampling and Counting.

- Dec 15 12. *IBM Haifa*  
Designing Scalable Techniques for Dynamic Verification and Probabilistic Inference
- Aug 15 11. *IBM Research, Haifa*  
SAT Sampling and Counting: From Theory to Practice
- May 15 10. *Vienna Center of Logic and Algorithms Outstanding Masters' Thesis Award Ceremony*  
Word-Level Hashing Approach to Approximate Probabilistic Inference
- Feb 16 9. *University of California, Berkeley*  
Sampling from combinatorial spaces: Achieving the fine balancing act between independence and scalability
- May 15 8. *IIT Bombay*  
Approximating probabilistic inference without losing guarantees: Combining hashing with feasibility
- Aug 14 7. *IIT, Bombay*  
Sampling techniques for constraint satisfaction and beyond
- Jun 14 6. *Princeton University*
- Jun 14 5. *University of California, Berkeley*
- Jun 14 4. *Microsoft Research India, Bangalore*
- May 14 3. *Mentor Graphics Inc.*  
Distribution-aware sampling for SAT and beyond
- Jan 14 2. *IIT Bombay*
- Dec 13 1. Distribution-aware sampling for SAT and beyond. *Synopsys Inc.*

## ■ Misc.

- 2015 3rd Heidelberg Laureate forum Invitee
- 2014-2015 Overall Coordinator: Rice Computer Science Graduate Association (CSGSA)
- 2013 Co-founded Rice Computer Science Graduate Association (CSGSA)