Sicun Gao

Assistant Professor
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Positions

- University of California, San Diego (July 2017 – Present)
  Assistant Professor, Computer Science and Engineering

- Massachusetts Institute of Technology (October 2014 – June 2017)
  Postdoctoral Researcher, Computer Science and Artificial Intelligence Laboratory

- Carnegie Mellon University (November 2012 – September 2014)
  Postdoctoral Researcher, Computer Science Department

Education

- Ph.D. in Logic, Carnegie Mellon University (October 2012)
  Advisors: Edmund Clarke and Jeremy Avigad

  Ph.D. Thesis: Computable Analysis, Hybrid Automata, and Decision Procedures
  Committee: Edmund Clarke, Jeremy Avigad, Lenore Blum, Randy Bryant, and Jeannette Wing

  M.S. Thesis: Counting Zeros in Finite Fields with Gröbner Bases

- B.S. in Logic and B.S. in Mathematics, Peking University (July 2006)

Awards

- Gödel Research Prize Fellowship Silver Medal, Kurt Gödel Society (2014)

- CMU School of Computer Science Distinguished Doctoral Dissertation Honorable Mention (2013)

Publications

- S. Kong, A. Solar-Lezama, and S. Gao, "Delta-Decision Procedures for Exists-Forall Problems over the Reals," *Proceedings of the 30th International Conference on Computer Aided Verification (CAV)*, 2018

- V. Akhlaghi, S. Gao, and R. Gupta, "LEMAX: Learning-based Energy Consumption Minimization in Approximate Computing with Quality Guarantee," *Proceedings of the 54th Annual Design Automation Conference (DAC)*, 2018

- K. Bae and S. Gao, "Modular SMT-Based Analysis of Nonlinear Hybrid Systems," *Proceedings of the 17th International Conference on Formal Methods in Computer-Aided Design (FMCAD)*, 2017

- S. Dathathri, N. Arechiga, S. Gao, and R. Murray, "Learning-Based Abstractions for Nonlinear Constraint Solving," *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*, 2017

– S. Gao and D. Zufferey, "Interpolants in Nonlinear Theories over the Reals," *Proceedings of the 22nd International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, 2016.

– M. O'Kelly, H. Abbas, S. Gao, S. Shiraishi, S. Kato, and R. Mangharam, "APEX: A Tool for Autonomous Vehicle Plan Verification and Execution," *Proceedings of the Society of Automotive Engineers (SAE) World Congress and Exhibition*, 2016.

– K. Bae, P. Olveczky, S. Kong, and S. Gao, "SMT-Based Analysis of Virtually Synchronous Distributed Hybrid Systems," *Proceedings of the 19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2016

– S. Gao, L. Xie, A. Solar-Lezama, D. Serpanos, and H. Shrobe, "Automated Vulnerability Analysis of AC State Estimation under Constrained False Data Injection in Electric Power Systems," *Proceedings of the 54th IEEE Conference on Decision and Control (CDC)*, 2015.

– D. Bryce, S. Gao, D. Musliner, and R. Goldman, "SMT-Based Nonlinear PDDL+ Planning," *Proceedings of the 29th AAAI Conference on Artificial Intelligence (AAAI)*, 2015.

– Q. Wang, P. Zuliani, S. Kong, S. Gao, E. M. Clarke, "SReach: A Probabilistic Bounded Delta-Reachability Analyzer for Stochastic Hybrid Systems," *Proceedings of the 13th Conference on Computational Methods in Systems Biology (CMSB)*, 2015.

– B. Liu, S. Kong, S. Gao, P. Zuliani, and E. M. Clarke, "Towards Personalized Prostate Cancer Therapy Using Delta-Reachability Analysis," *Proceedings of the 18th International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2015.

– S. Kong, S. Gao, W. Chen, and E. M. Clarke, "dReach: Delta-Reachability Analysis for Hybrid Systems," *Proceddings of the 21st International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, 2015.

– B. Liu, S. Kong, S. Gao, P. Zuliani, and E. M. Clarke, "Parameter Synthesis for Cardiac Cell Hybrid Models Using Delta-Decisions," *Proceedings of the 12th Conference on Computational Methods in Systems Biology (CMSB)*, 2014.

– S. Gao, S. Kong, and E. M. Clarke, "Proof Generation from Delta-Decisions," *Proceedings of the 16th International Conference on Symbolic and Numerical Algorithms for Scientific Computing (SYNASC)*, 2014.

– S. Gao, S. Kong, and E.M. Clarke, "Satisfiability Modulo ODEs," *Proceedings of the 13th International Conference on Formal Methods in Computer Aided Design (FMCAD)*, 2013.

– S. Gao, S. Kong, and E.M. Clarke, "dReal: An SMT Solver for Nonlinear Theories over the Reals," *Proceedings of the 24th International Conference on Automated Deduction (CADE)*, 2013.

– S. Gao, J. Avigad, and E.M. Clarke, "Delta-Complete Decision Procedures for Satisfiability over the Reals," *Proceedings of the 6th International Joint Conference on Automated Reasoning (IJCAR)*, 2012.

– S. Gao, J. Avigad, and E.M. Clarke, "Delta-Decidability over the Reals," *Proceedings of the 27th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*, 2012.

– S. Gao, A, Platzer, and E.M. Clarke, "Quantifier Elimination over Finite Fields with Gröbner Bases," *Proceedings of the 4th International Conference on Algebraic Informatics (CAI)*, 2011.

– S. Gao, M. Ganai, F. Ivančić, A. Gupta, and E.M. Clarke, "Integrating ICP with DPLL(T) for Nonlinear Real Arithmetic," *Proceedings of the 10th International Conference on Formal Methods in Computer Aided Design (FMCAD)*, 2010.

– W. Klieber, S. Sapra, S. Gao, and E.M. Clarke, "A Non-Prenex DPLL-Based QBF Solver with Game-State Learning," *Proceedings of the 13th International Conference on Theory and Applications of Satisfiability Testing (SAT)*, 2010.