Stanford



Clark Barrett

Corbel Professor

Computer Science

Curriculum Vitae available Online

CONTACT INFORMATION

- **Administrative Contact**

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Bio

BIO

Clark Barrett is the Corbel Professor (Research) of Computer Science in the School of Engineering at Stanford University. Before coming to Stanford in 2016, he was an Associate Professor of Computer Science at the Courant Institute of Mathematical Sciences at New York University. His expertise is in automated reasoning and its applications. He was an early pioneer in satisfiability modulo theories, formal hardware verification, and neural network verification. More recently, he has also pioneered efforts on AI-assisted formal verification. He is the director of the Stanford Center for Automated Reasoning (Centaur), co-director of the Stanford Center for AI Safety, and a member of the CSLib steering committee. He is an ACM Fellow and a two-time winner of the Computer Aided Verification (CAV) award (2021, 2024).

ACADEMIC APPOINTMENTS

- Professor-Research, Computer Science

ADMINISTRATIVE APPOINTMENTS

- Director, Center for Automated Reasoning (Centaur), (2021- present)
- Co-director, Center for AI Safety, (2018- present)
- Amazon Scholar, Amazon Web Services, (2023-2026)
- Visiting Scientist, Google, (2015-2017)

HONORS AND AWARDS

- Distinguished Paper Award for "Satisfiability Modulo Extensional Constant Arrays", Computer Aided Verification conference (CAV) (2026)
- Rance Cleaveland Test-of-Time Tool Award for CVC4/cvc5, ETAPS (2026)
- ACM Fellow, ACM (2025)
- CAV Award for pioneering the application of formal methods to neural networks., Computer Aided Verification conference (CAV) (2024)
- Distinguished Tutorial Paper Award for "Satisfiability Modulo Theories: A Beginner's Tutorial", International Symposium on Formal Methods (2024)
- Best SCP Tool Paper for "cvc5: A Versatile and Industrial-Strength SMT Solver", Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) (2022)

- CAV Award for pioneering contributions to ... theory and practice of satisfiability modulo theories, Computer Aided Verification conference (CAV) (2021)
- Test of Time award for "A Decision Procedure for an Extensional Theory of Arrays", Logic in Computer Science (LICS) (2021)
- Best Paper for "Politeness for the Theory of Algebraic Datatypes", International Joint Conference on Automated Reasoning (IJCAR) (2020)
- First place (CoSA2 model checker), Hardware Model Checking Competition (HWCC) (2019)
- Best Short Paper for "p4pktgen: Automated Test-Case Generation for P4 Programs", Symposium on Software Defined Networking Research (SOSR) (2018)
- Distinguished Artifact Award for "EMME: A Formal Tool for ECMAScript Memory Model Evaluation", Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) (2018)
- Best Paper for "Lazy Proofs for DPLL(T)-Based SMT Solvers", International Conference on Formal Methods in Computer-Aided Design (FMCAD) (2016)
- Best Paper for "A Structured Approach to Post-Silicon Validation and Debug using Symbolic QED", IEEE International Test Conference (ITC) (2015)
- Distinguished Scientist, ACM (2014)
- HVC Award, Haifa Verification Conference (2010)
- Software Quality Innovation Award, IBM (2008)
- CAREER award, National Science Foundation (2007)
- Best Paper for "A Decision Procedure for Bit-vector Arithmetic", Design Automation Conference (DAC) (1998)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Board member, RadixArk (2025 - present)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Computer Science (2003)

PATENTS

- Subhasish Mitra, Clark Barrett, David Lin, Eshan Singh. "United States Patent 10528448 Post-silicon Validation and Debug using Symbolic Quick Error Detection", The Board of Trustees of the Leland Stanford Junior University (Palo Alto, CA, US); New York University (New York, NY, US), Jan 7, 2020

LINKS

- Center for Automated Reasoning: http://centaur.stanford.edu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

In an increasingly automated and networked world, one of the most pressing challenges we face is ensuring the security and dependability of hardware, software, and AI systems. Formal techniques (based on mathematical logic and automated reasoning) are among the most powerful tools available for finding difficult bugs and ensuring correctness. Unfortunately, formal methods today either require extensive manual effort or are severely limited in their scope or scalability. My research vision is to develop general-purpose, automated, and scalable formal techniques, with the aim of providing a sound and practical foundation for reliable computer systems.

PROJECTS

- cvc5 - Stanford University (5/6/2021 - present)
- Marabou - Stanford University

- Pono - Stanford University

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Saranyu Chattopadhyay, Daniel Mendoza

Postdoctoral Faculty Sponsor

Pei Huang

Doctoral Dissertation Advisor (AC)

Samuel Akinwande

Master's Program Advisor

Anushree Aggarwal, Charles Ding, Jiaxin Fang, Teddy Ganea, Tanmay Garg, Yuina Iseki, Andrew Lee, Priyank Shethia, Sudharsan Sundar, Tony Wang

Doctoral Dissertation Co-Advisor (AC)

Milan Ganai

Doctoral (Program)

Daneshvar Amrollahi, Leni Aniva, Rachel Cleaveland, Harun Khan, Hanna Lachnitt, Abdal Mohamed, Áron Ricardo Perez-Lopez, Liza Pertseva, Yicheng Qian, Scott Viteri

Publications

PUBLICATIONS

- **The nonexistence of unicorns and many-sorted Löwenheim-Skolem theorems** *LOGIC JOURNAL OF THE IGPL*
  Przybocki, B., Toledo, G., Zohar, Y., Barrett, C.
  2026; 34 (5)
- **PEak: A Single Source of Truth for Hardware Design and Verification** *ACM TRANSACTIONS ON EMBEDDED COMPUTING SYSTEMS*
  Donovick, C., Melchert, J., Daly, R., Truong, L., Raina, P., Hanrahan, P., Barrett, C.
  2026; 25 (2)
- **Formalization of a Proof Calculus for Incremental Linearization for Satisfiability Modulo Nonlinear Arithmetic and Transcendental Functions**
  Mascarenhas, T., Khan, H., Mohamed, A., Reynolds, A., Barbosa, H., Barrett, C., Tinelli, C.
  edited by Stark, K., Zakowski, Y., Swamy, N., Tabareau, N.
  ASSOC COMPUTING MACHINERY.2026: 216-230
- **Efficiently Computing Compact Formal Explanations**
  Wu, M., Li, X., Wu, H., Barrett, C.
  edited by Koenig, S., Jenkins, C., Taylor, M. E.
  ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2026: 35857-35866
- **Parameterized Abstract Interpretation for Transformer Verification**
  Huang, P., Wei, D., Isac, O., Wu, H., Wu, M., Barrett, C.
  edited by Koenig, S., Jenkins, C., Taylor, M. E.
  ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2026: 35500-35508
- **Cubing for Tuning**
  Wu, H., Barrett, C., Narodytska, N.
  edited by Koenig, S., Jenkins, C., Taylor, M. E.

ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2026: 14361-14370

- **Verifying Nonlinear Neural Feedback Systems using Polyhedral Enclosures**
  Akinwande, I., Sidrane, C., Kochenderfer, M. J., Barrett, C.
  edited by Lindemann, L., Tu, S., Wierman, A., Atanasov, N., Sukhatme, G.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2026: 737-760

- **Ethos: A Fast Proof Checker for the Eunoia Logical Framework**
  Reynolds, A., Schurr, H., Soldevila, M., Barbosa, H., Barrett, C., Tinelli, C.
  edited by Biere, A., Lutz, C., Negri, S.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 305-314

- **The Termination of Nielsen Transformations Applied to Word Equations with Length Constraints**
  Przybocki, B., Barrett, C.
  edited by Biere, A., Lutz, C., Negri, S.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 234-250

- **Checking Regular Expressions in Cvc5 Proofs**
  Israel, O., Zohar, Y., Reynolds, A., Hitarth, S., Dutertre, B., Barrett, C., Tinelli, C.
  edited by Biere, A., Lutz, C., Negri, S.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 267-275

- **Pono 2.0: A Versatile SMT-Based Model Checker for Safety and Liveness (Long Tool Paper)**
  Perez-Lopez, A., Chien, P., Lonsing, F., Archer, S., Irfan, A., Barrett, C.
  edited by Sampaio, A., Stoelinga, M.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 3-26

- **Certificates in AI: Learn but Verify** *COMMUNICATIONS OF THE ACM*
  Barrett, C., Henzinger, T. A., Seshia, S. A.
  2026; 69 (1): 66-75

- **ClassInvGen: Class Invariant Synthesis Using Large Language Models**
  Sun, C., Agashe, V., Chakraborty, S., Taneja, J., Barrett, C., Dill, D., Qiu, X., Lahiri, S. K.
  edited by Giacobbe, M., Lukina, A.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 64-96

- **Automating Bitvector and Finite Field Equivalence Proofs in Lean**
  Pertseva, E., Robert, V., Barrett, C., Parker, J.
  edited by Darulova, E., Lin, A. W., Rummer, P.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 165-187

- **Satisfiability Modulo Extensional Constant Arrays**
  Preiner, M., Niemetz, A., Barrett, C.
  edited by Darulova, E., Lin, A. W., Rummer, P.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 27-49

- **The Cooperating Proof Calculus: Comprehensive Proofs for an SMT Solver**
  Reynolds, A., Schurr, H., Barbosa, H., Israel, O., Jakpor, J., Lachnitt, H., Mohamed, A., Niemetz, A., Preiner, M., Zohar, Y., Jones, R., Barrett, C., Tinelli, et al
  edited by Darulova, E., Lin, A. W., Rummer, P.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 188-212

- **Proof Minimization in Neural Network Verification**
  Isac, O., Refaeli, I., Wu, H., Barrett, C., Katz, G.
  edited by Chen, Y. F., Jensen, T., Lengal, O.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 99-124

- **Combining Combination Properties, Part I: Nelson-Oppen and Politeness** *JOURNAL OF AUTOMATED REASONING*
  Toledo, G. V., Zohar, Y., Barrett, C.

2025; 70 (1)

- **Interactive Bitvector Reasoning using Verified Bit-Blasting** *PROCEEDINGS OF THE ACM ON PROGRAMMING LANGUAGES-PACMPL*
  Boving, H., Bhat, S., Cicolini, L., Keizer, A., Frenot, L., Mohamed, A., Stefanesco, L., Khan, H., Clune, J., Barrett, C., Grosser, T.
  2025; 9 (OOPSLA2)
- **Bounded verification for finite-field-blasting in a compiler for zero knowledge proofs** *FORMAL METHODS IN SYSTEM DESIGN*
  Ozdemir, A., Wahby, R. S., Brown, F., Barrett, C.
  2025
- **The Nonexistence of Unicorns and Many-Sorted Lowenheim-Skolem Theorems**
  Przybocki, B., Toledo, G., Zohar, Y., Barrett, C.
  edited by Platzer, A., Rozier, K. Y., Pradella, M., Rossi, M.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 658-675
- **Improving the SMT Proof Reconstruction Pipeline in Isabelle/HOL**
  Lachnitt, H., Fleury, M., Barbosa, H., Jakpor, J., Andreotti, B., Reynolds, A., Schurr, H., Barrett, C., Tinelli, C.
  edited by Forster, Y., Keller, C.
  SCHLOSS DAGSTUHL, LEIBNIZ CENTER INFORMATICS.2025
- **Integer Reasoning Modulo Different Constants in SMT**
  Pertseva, E., Ozdemir, A., Pailoor, S., Bassa, A., Porncharoenwase, S., Dillig, I., Barrett, C.
  edited by Piskac, R., Rakamaric, Z.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 339-362
- **Lean-Auto: An Interface Between Lean 4 and Automated Theorem Provers**
  Qian, Y., Clune, J., Barrett, C., Avigad, J.
  edited by Rakamaric, Z., Piskac, R.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 175-196
- **Relational Hoare Logic for Realistically Modelled Machine Code**
  Mazzucato, D., Mohamed, A., Lee, J., Barrett, C., Grundy, J., Harrison, J., Pasareanu, C. S.
  edited by Piskac, R., Rakamaric, Z.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 389-413
- **LEAN-SMT: An SMT Tactic for Discharging Proof Goals in Lean**
  Mohamed, A., Mascarenhas, T., Khan, H., Barbosa, H., Reynolds, A., Qian, Y., Tinelli, C., Barrett, C.
  edited by Rakamaric, Z., Piskac, R.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 197-212
- **Bit-Precise Reasoning with Parametric Bit-Vectors**
  Berger, Z., Zohar, Y., Niemetz, A., Preiner, M., Reynolds, A., Barrett, C., Tinelli, C.
  edited by Berg, J., Nordstrom, J.
  SCHLOSS DAGSTUHL, LEIBNIZ CENTER INFORMATICS.2025
- **Efficient SAT-based Bounded Model Checking of Evolving Systems**
  Andrews, S., Sotoudeh, M., Barrett, C., IEEE
  IEEE.2025
- **Application of Formal Methods (SAT/SMT) to the Design of Constrained Codes**
  Sudhakaran, S., Barrett, C., Horowitz, M., IEEE
  IEEE.2025
- **Satisfiability Modulo Theories: A Beginner's Tutorial**
  Barrett, C., Tinelli, C., Barbosa, H., Niemetz, A., Preiner, M., Reynolds, A., Zohar, Y.
  edited by Platzer, A., Rozier, K. Y., Pradella, M., Rossi, M.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 571-596
- **Generalized Optimization Modulo Theories**
  Tsiskaridze, N., Barrett, C., Tinelli, C.

edited by Benzmuller, C., Heule, M. J., Schmidt, R. A.
SPRINGER INTERNATIONAL PUBLISHING AG.2024: 458-479

- **Safe and Reliable Training of Learning-Based Aerospace Controllers**
  Mandal, U., Amir, G., Wu, H., Daukantas, I., Newell, F., Ravaioli, U., Meng, B., Durling, M., Hobbs, K., Ganai, M., Shim, T., Katz, G., Barrett, et al
  IEEE.2024

- **Robust Mean Estimation by All Means**
  Affeldt, R., Barrett, C., Bruni, A., Daukantas, I., Khan, H., Saikawa, T., Schurmann, C.
  edited by Bertot, Y., Kutsia, T., Norrish, M.
  SCHLOSS DAGSTUHL, LEIBNIZ CENTER INFORMATICS.2024

- **Marabou 2.0: A Versatile Formal Analyzer of Neural Networks**
  Wu, H., Isac, O., Zeljic, A., Tagomori, T., Daggitt, M., Kokke, W., Refaeli, I., Amir, G., Julian, K., Bassan, S., Huang, P., Lahav, O., Wu, et al
  edited by Ganesh, Gurfinkel, A.
  SPRINGER INTERNATIONAL PUBLISHING AG.2024: 249-264

- **Clover: Closed-Loop Verifiable Code Generation**
  Sun, C., Sheng, Y., Padon, O., Barrett, C.
  edited by Avni, G., Giacobbe, M., Johnson, T. T., Katz, G., Lukina, A., Narodytska, N., Schilling, C.
  SPRINGER INTERNATIONAL PUBLISHING AG.2024: 134-155

- **Parallel Verification for δ-Equivalence of Neural Network Quantization**
  Huang, P., Yang, Y., Wu, H., Daukantas, I., Wu, M., Jia, F., Barrett, C.
  edited by Avni, G., Giacobbe, M., Johnson, T. T., Katz, G., Lukina, A., Narodytska, N., Schilling, C.
  SPRINGER INTERNATIONAL PUBLISHING AG.2024: 78-99

- **Split Grobner Bases for Satisfiability Modulo Finite Fields**
  Ozdemir, A., Pailoor, S., Bassa, A., Ferles, K., Barrett, C., Dillig, I.
  edited by Gurfinkel, A., Ganesh
  SPRINGER INTERNATIONAL PUBLISHING AG.2024: 3-25

- **IsaRARE: Automatic Verification of SMT Rewrites in Isabelle/HOL**
  Lachnitt, H., Fleury, M., Aniva, L., Reynolds, A., Barbosa, H., Notzli, A., Barrett, C., Tinelli, C.
  edited by Finkbeiner, B., Kovacs, L.
  SPRINGER INTERNATIONAL PUBLISHING AG.2024: 311-330

- **Towards Efficient Verification of Quantized Neural Networks**
  Huang, P., Wu, H., Yang, Y., Daukantas, I., Wu, M., Zhang, Y., Barrett, C.
  edited by Wooldridge, M., Dy, J., Natarajan, S.
  ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2024: 21152-21160

- **Combining Stable Infiniteness and (Strong) Politeness** *JOURNAL OF AUTOMATED REASONING*
  Sheng, Y., Zohar, Y., Ringeissen, C., Reynolds, A., Barrett, C., Tinelli, C.
  2023; 67 (4)

- **Generating and Exploiting Automated Reasoning Proof Certificates** *COMMUNICATIONS OF THE ACM*
  Barbosa, H., Barrett, C., Cook, B., Dutertre, B., Kremer, G., Lachnitt, H., Niemetz, A., Notzli, A., Ozdemir, A., Preiner, M., Reynolds, A., Tinelli, C., Zohar, et al
  2023; 66 (10): 86-95

- **Reasoning About Vectors: Satisfiability Modulo a Theory of Sequences** *JOURNAL OF AUTOMATED REASONING*
  Sheng, Y., Notzli, A., Reynolds, A., Zohar, Y., Dill, D., Grieskamp, W., Park, J., Qadeer, S., Barrett, C., Tinelli, C.
  2023; 67 (3)

- **Synthesising Programs with Non-trivial Constants.** *Journal of automated reasoning*
  Abate, A., Barbosa, H., Barrett, C., David, C., Kesseli, P., Kroening, D., Polgreen, E., Reynolds, A., Tinelli, C.
  2023; 67 (2): 19

- **Formal Verification of Bit-Vector Invertibility Conditions in Coq**
  Ekici, B., Viswanathan, A., Zohar, Y., Tinelli, C., Barrett, C.
  edited by Sattler, U., Suda, M.
  SPRINGER INTERNATIONAL PUBLISHING AG.2023: 41-59

- **VERIX: Towards Verified Explainability of Deep Neural Networks**
  Wu, M., Wu, H., Barrett, C.
  edited by Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023

- **Toward Certified Robustness Against Real-World Distribution Shifts**
  Wu, H., Tagomori, T., Robey, A., Yang, F., Matni, N., Pappas, G., Hassani, H., Pasareanu, C., Barrett, C., IEEE
  IEEE COMPUTER SOC.2023: 537-553

- **AHA: An Agile Approach to the Design of Coarse-Grained Reconfigurable Accelerators and Compilers** *ACM Transactions on Embedded Computing Systems*
  Koul, K., Melchert, J., Sreedhar, K., Truong, L., Nyengele, G., Zhang, K., Liu, Q., Setter, J., Chen, P., Mei, Y., Strange, M., Daly, R., Donovick, et al
  2023; 22 (2)

- **G-QED: Generalized QED Pre-silicon Verification beyond Non-Interfering Hardware Accelerators**
  Chattopadhyay, S., Devarajegowda, K., Zhao, B., Lonsing, F., D'Agostino, B. A., Vavelidou, I., Bhatt, V. D., Prebeck, S., Ecker, W., Trippel, C., Barrett, C., Mitra, S., IEEE
  IEEE.2023

- **Combining Combination Properties: An Analysis of Stable Infiniteness, Convexity, and Politeness**
  Toledo, G. V., Zohar, Y., Barrett, C.
  edited by Pientka, B., Tinelli, C.
  SPRINGER INTERNATIONAL PUBLISHING AG.2023: 522-541

- **Combining Finite Combination Properties: Finite Models and Busy Beavers**
  Toledo, G. V., Zohar, Y., Barrett, C.
  edited by Sattler, U., Suda, M.
  SPRINGER INTERNATIONAL PUBLISHING AG.2023: 159-175

- **VERIX: Towards Verified Explainability of Deep Neural Networks**
  Wu, M., Wu, H., Barrett, C.
  edited by Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023

- **Toward Certified Robustness Against Real-World Distribution Shifts**
  Wu, H., Tagomori, T., Robey, A., Yang, F., Matni, N., Pappas, G., Hassani, H., Pasareanu, C., Barrett, C., IEEE
  IEEE COMPUTER SOC.2023: 537-553

- **AHA: An Agile Approach to the Design of Coarse-Grained Reconfigurable Accelerators and Compilers** *ACM Transactions on Embedded Computing Systems*
  Koul, K., Melchert, J., Sreedhar, K., Truong, L., Nyengele, G., Zhang, K., Liu, Q., Setter, J., Chen, P., Mei, Y., Strange, M., Daly, R., Donovick, et al
  2023; 22 (2)

- **G-QED: Generalized QED Pre-silicon Verification beyond Non-Interfering Hardware Accelerators**
  Chattopadhyay, S., Devarajegowda, K., Zhao, B., Lonsing, F., D'Agostino, B. A., Vavelidou, I., Bhatt, V. D., Prebeck, S., Ecker, W., Trippel, C., Barrett, C., Mitra, S., IEEE
  IEEE.2023

- **Combining Combination Properties: An Analysis of Stable Infiniteness, Convexity, and Politeness**
  Toledo, G. V., Zohar, Y., Barrett, C.
  edited by Pientka, B., Tinelli, C.
  SPRINGER INTERNATIONAL PUBLISHING AG.2023: 522-541

- **Combining Finite Combination Properties: Finite Models and Busy Beavers**
  Toledo, G. V., Zohar, Y., Barrett, C.

edited by Sattler, U., Suda, M.
SPRINGER INTERNATIONAL PUBLISHING AG.2023: 159-175

- **Scalable Verification of GNN-Based Job Schedulers** *PROCEEDINGS OF THE ACM ON PROGRAMMING LANGUAGES-PACMPL*
  Wu, H., Barrett, C., Sharif, M., Narodytska, N., Singh, G.
  2022; 6 (OOPSLA)
- **Polite Combination of Algebraic Datatypes** *JOURNAL OF AUTOMATED REASONING*
  Sheng, Y., Zohar, Y., Ringeissen, C., Lange, J., Fontaine, P., Barrett, C.
  2022
- **Even Faster Conflicts and Lazier Reductions for String Solvers**
  Notzli, A., Reynolds, A., Barbosa, H., Barrett, C., Tinelli, C.
  edited by Shoham, S., Vizel, Y.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 205-226
- **Neural Network Verification with Proof Production**
  Isac, O., Barrett, C., Zhang, M., Katz, G.
  edited by Griggio, A., Rungta, N.
  TU Wien Acad Press.2022: 38-48
- **Reconstructing Fine-Grained Proofs of Rewrites Using a Domain-Specific Language**
  Notzli, A., Barbosa, H., Niemetz, A., Preiner, M., Reynolds, A., Barrett, C., Tinelli, C.
  edited by Griggio, A., Rungta, N.
  TU Wien Acad Press.2022: 65-74
- **Bit-Precise Reasoning via Int-Blasting**
  Zohar, Y., Irfan, A., Mann, M., Niemetz, A., Notzli, A., Preiner, M., Reynolds, A., Barrett, C., Tinelli, C.
  edited by Finkbeiner, B., Wies, T.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 496-518
- **Proof-Stitch: Proof Combination for Divide-and-Conquer SAT Solvers**
  Nair, A., Chattopadhyay, S., Wu, H., Ozdemir, A., Barrett, C.
  edited by Griggio, A., Rungta, N.
  TU Wien Acad Press.2022: 84-88
- **On Optimizing Back-Substitution Methods for Neural Network Verification**
  Zelazny, T., Wu, H., Barrett, C., Katz, G.
  edited by Griggio, A., Rungta, N.
  TU Wien Acad Press.2022: 17-26
- **Synthesizing Instruction Selection Rewrite Rules from RTL using SMT**
  Daly, R., Donovick, C., Melchert, J., Setaluri, R., Bullock, N., Raina, P., Barrett, C., Hanrahan, P.
  edited by Griggio, A., Rungta, N.
  TU Wien Acad Press.2022: 139-150
- **Cooperating Techniques for Solving Nonlinear Real Arithmetic in the cvc5 SMT Solver (System Description)**
  Kremer, G., Reynolds, A., Barrett, C., Tinelli, C.
  edited by Blanchette, J., Kovacs, L., Pattinson, D.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 95-105
- **Flexible Proof Production in an Industrial-Strength SMT Solver**
  Barbosa, H., Reynolds, A., Kremer, G., Lachnitt, H., Niemetz, A., Notzli, A., Ozdemir, A., Preiner, M., Viswanathan, A., Viteri, S., Zohar, Y., Tinelli, C., Barrett, et al
  edited by Blanchette, J., Kovacs, L., Pattinson, D.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 15-35
- **Reasoning About Vectors Using an SMT Theory of Sequences**
  Sheng, Y., Notzli, A., Reynolds, A., Zohar, Y., Dill, D., Grieskamp, W., Park, J., Qadeer, S., Barrett, C., Tinelli, C.

edited by Blanchette, J., Kovacs, L., Pattinson, D.
SPRINGER INTERNATIONAL PUBLISHING AG.2022: 125-143

- **Efficient Neural Network Analysis with Sum-of-Infeasibilities**
  Wu, H., Zeljic, A., Katz, G., Barrett, C.
  edited by Fisman, D., Rosu, G.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 143-163

- **cvc5: A Versatile and Industrial-Strength SMT Solver**
  Barbosa, H., Barrett, C., Brain, M., Kremer, G., Lachnitt, H., Mann, M., Mohamed, A., Mohamed, M., Niemetz, A., Notzli, A., Ozdemir, A., Preiner, M., Reynolds, et al
  edited by Fisman, D., Rosu, G.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 415-442

- **Murxla: A Modular and Highly Extensible API Fuzzer for SMT Solvers**
  Niemetz, A., Preiner, M., Barrett, C.
  edited by Shoham, S., Vizel, Y.
  SPRINGER INTERNATIONAL PUBLISHING AG.2022: 92-106

- **Global optimization of objective functions represented by ReLU networks** *MACHINE LEARNING*
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