

Marienus Johannes Hendrikus Heule

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Education

- 2004-2008 Ph.D. in Applied Computer Science**
Delft University of Technology, The Netherlands
Advisor: Hans van Maaren
Topic: SmArT solving: Tools and techniques for satisfiability solvers
- 1997-2004 Master with Honors in Applied Computer Science (cum laude)**
Best graduate MSc Applied Computer Science 2004
Delft University of Technology, The Netherlands

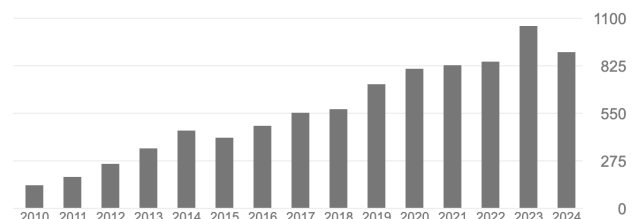
Employment

- 2019-pres. Associate Professor, tenured since July 2024**
Carnegie Mellon University
- 2017-2019 Research Assistant Professor**
The University of Texas at Austin
- 2012-2017 Research Scientist**
The University of Texas at Austin
- 2008-2012 Postdoc**
NICTA, Sydney, Australia with Toby Walsh (10/2009–12/2009)
Johannes Kepler University, Linz, Austria with Armin Biere (04/2011–10/2011)
Delft University of Technology with Hans van Maaren (otherwise)

Citations (Google Scholar*)

	Citations	h-index	i10-index
All	8806	41	107
Since 2019	5162	33	84

* accessed on October 2, 2024



Best Paper Awards

1. Bernardo Subercaseaux and Marijn J. H. Heule.
Toward Optimal Radio Colorings of Hypercubes via SAT-solving.
Logic for Programming, Artificial Intelligence and Reasoning - LPAR 2023.
2. Joshua Brakensiek, Marijn J. H. Heule, John Mackey, and David Narvaez.
The Resolution of Keller's Conjecture.
International Joint Conference on Automated Reasoning - IJCAR 2020.
3. Marijn J. H. Heule, Matti Järvisalo, Florian Lonsing, Martina Seidl, and Armin Biere.
Clause Elimination for SAT and QSAT.
Journal of Artificial Intelligence Research 53, 2015 (awarded in 2019).
4. Benjamin Kiesl, Adrian Rebola-Pardo, and Marijn J. H. Heule.
Extended Resolution Simulates DRAT.
International Joint Conference on Automated Reasoning - IJCAR 2018.
5. Marijn J. H. Heule, Benjamin Kiesl, Martina Seidl, and Armin Biere.
PRuning Through Satisfaction.
Haifa Verification Conference - HVC 2017.
6. Marijn J. H. Heule, Benjamin Kiesl, and Armin Biere.
Short Proofs without New Variables.
Conference on Automated Deduction - CADE-26 (2017).
7. Valentin Wüstholtz, Oswaldo Olivo, Marijn J. H. Heule, and Isil Dillig.
Static Detection of DoS Vulnerabilities in Programs that use Regular Expressions.
Tools and Algorithms for the Construction and Analysis of Systems - TACAS 2017.
8. Marijn J. H. Heule, Oliver Kullmann, and Victor W. Marek.
Solving and Verifying the boolean Pythagorean Triples problem via Cube-and-Conquer.
Theory and Practice of Satisfiability Testing - SAT 2016.
9. Marijn J. H. Heule, Oliver Kullmann, Siert Wieringa, and Armin Biere.
Cube and Conquer: Guiding CDCL SAT Solvers by Lookaheads.
Haifa Verification Conference - HVC 2011.

Best Paper Nominations

1. Randal E. Bryant, Wojciech Nawrocki, Jeremy Avigad, and Marijn J. H. Heule.
Certified Knowledge Compilation with Application to Verified Model Counting.
Theory and Practice of Satisfiability Testing - SAT 2023.
2. Bernardo Subercaseaux and Marijn J. H. Heule.
The Packing Chromatic Number of the Infinite Square Grid is 15.
Tools and Algorithms for the Construction and Analysis of Systems - TACAS 2023.
3. Dawn Michaelson, Dominik Schreiber, Marijn J. H. Heule, Benjamin Kiesl-Reiter, and Mike W. Whalen.
Unsatisfiability Proofs for Distributed SAT Solvers.
Tools and Algorithms for the Construction and Analysis of Systems - TACAS 2023

4. Armin Biere, Md Solimul Chowdhury, Marijn J. H. Heule, Benjamin Kiesl, and Michael W. Whalen.
Migrating Solver State.
Theory and Practice of Satisfiability Testing - SAT 2022.
5. Joseph E. Reeves, Randal E. Bryant, and Marijn J. H. Heule.
Preprocessing of Propagation Redundant Clauses.
International Joint Conference on Automated Reasoning - IJCAR 2022.
6. Randal E. Bryant and Marijn J. H. Heule.
Generating Extended Resolution Proofs with a BDD-Based SAT Solver.
Tools and Algorithms for the Construction and Analysis of Systems - TACAS 2021.
7. Marijn J. H. Heule, Benjamin Kiesl, and Armin Biere.
Encoding Redundancy for Satisfaction-Driven Clause Learning.
Tools and Algorithms for the Construction and Analysis of Systems - TACAS 2019.

Books (editor)

1. Armin Biere, Marijn J. H. Heule, Hans van Maaren, and Toby Walsh.
Second edition of Handbook of Satisfiability.
IOS Press, 2021.
2. Armin Biere, Marijn J. H. Heule, Hans van Maaren, and Toby Walsh.
Handbook of Satisfiability.
IOS Press, 2009.

Book chapters

1. Marijn J. H. Heule.
Proofs of Unsatisfiability.
Chapter 15, second edition of Handbook of Satisfiability, IOS Press, 2021.
2. Marijn J. H. Heule, Oliver Kullmann, and Armin Biere.
Cube and Conquer for Satisfiability.
Chapter 2, Handbook of Parallel Constraint Reasoning, Springer, 2018.
3. Marijn J. H. Heule and Armin Biere.
Proofs for Satisfiability Problems.
Chapter 1, All about Proofs, Proofs for All, College Publications, 2015.
4. Marijn J. H. Heule and Hans van Maaren.
Look-Ahead Based SAT Solvers.
Chapter 5, Handbook of Satisfiability, IOS Press, 2009.

Selected Journal Papers

1. Emre Yocu, Scott Aaronson, and Marijn J. H. Heule.
An Automated Approach to the Collatz Conjecture.
Journal of Automated Reasoning 67, 2023.
2. Yong Kiam Tan, Marijn J. H. Heule, and Magnus O. Myreen.
Verified Propagation Redundancy and Compositional UNSAT Checking in CakeML.
International Journal on Software Tools for Technology Transfer 25, 2023.
3. Joshua Brakensiek, Marijn J. H. Heule, John Mackey, and David E. Narvaez.
The Resolution of Keller’s Conjecture.
Journal of Automated Reasoning 66, 2022.
4. David Neiman, John Mackey, and Marijn J. H. Heule.
Tighter Bounds on Directed Ramsey Number $R(7)$.
Graphs and Combinatorics 38, 2022.
5. Nils Froleys, Marijn J. H. Heule, Markus Iser, Matti Järvisalo, and Martin Suda.
SAT Competition 2020.
Artificial Intelligence Journal 301, 2021.
6. Marijn J. H. Heule, Manuel Kauers, and Martina Seidl.
New ways to multiply 3×3 -matrices.
Journal of Symbolic Computation 104, 2021.
7. Marijn J. H. Heule, Benjamin Kiesl, and Armin Biere.
Strong Extension-Free Proof Systems.
Journal of Automated Reasoning 64, 2020.
8. Keenan Breik, Chris Thachuk, Marijn J. H. Heule, and David Soloveichik.
Computing properties of stable configurations of thermodynamic binding networks.
Theoretical Computer Science 785, 2019.
9. Marijn J. H. Heule.
Avoiding Triples in Arithmetic Progression.
Journal of Combinatorics 8(3), 2017.
10. Marijn J. H. Heule and Oliver Kullmann.
The Science of Brute Force.
Communications of the ACM 60(8), 2017.
11. Marijn J. H. Heule and Stefan Szeider.
A SAT Approach to Clique-Width.
ACM Transactions on Computational Logic 16, 2015.
12. Marijn J. H. Heule and Sicco Verwer.
Software model synthesis using satisfiability solvers.
Empirical Software Engineering 18(4), 2012.
13. Matti Järvisalo, Armin Biere, and Marijn J. H. Heule.
Simulating Circuit-Level Simplifications on CNF.
Journal of Automated Reasoning 49(4), 2012.

SAT Competition Awards, see <http://www.satcompetition.org>

1. Gold medal on seq. UNSAT random problems by march_rw at SAT '11
2. Gold medal on parallel UNSAT random problems by march_rw at SAT '11
3. Gold medal on UNSAT random problems by march_hi at SAT '09
4. Silver medal on ALL random problems by march_hi at SAT '09
5. Gold medal on SAT crafted problems by march_ks at SAT '07
6. Gold medal on UNSAT random problems by march_ks at SAT '07
7. Silver medal on ALL random problems by march_ks at SAT '07
8. Bronze medal on UNSAT crafted problems by march_dl at SAT '05
9. Silver medal on SAT crafted problems by march_dl at SAT '05
10. Bronze medal on ALL crafted problems by march_dl at SAT '05
11. Silver medal on UNSAT random problems by march_dl at SAT '05
12. Silver medal on ALL random problems by march_dl at SAT '05
13. Best SAT solver on SAT crafted problems by march_eq at SAT '04
14. Best SAT solver on ALL crafted problems by march_eq at SAT '04

Selected Media Appearances

July 2, 2023	<i>New York Times</i> A.I. Is Coming for Mathematics, Too
April 20, 2023	<i>Quanta Magazine</i> The Number 15 Describes the Secret Limit of an Infinite Grid
July 2, 2021	<i>MIT Tech Review</i> Are computers ready to solve this notoriously unwieldy math problem?
August 19, 2020	<i>Quanta Magazine</i> Computer Search Settles 90-Year-Old Math Problem
May 17, 2018	<i>Numberphile</i> The Problem with 7825 1,363,892 views on YouTube (accessed on July 10, 2023)
May 26, 2016	<i>Nature</i> Two-hundred-terabyte maths proof is largest ever