Gerard J. Holzmann

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Areas • Software reliability/safety, static source code analysis, code review, formal verification, concurrency, distributed systems, logic model checking, software engineering, software tools, formal methods.

TS/SCI (2015-2017)
U.S. National Academy of Engineering (2005)
Fellow of: JPL (2007), ACM (2012), AAIA (2022), Core Academy (2025)

Education

Ph.D. Technical Sciences, 14 June 1979, Delft University of Technology, The Netherlands
    Title: *Coordination Problems in Multiprocessing Systems*. Delft University, 1979.
    Thesis advisers: Prof. W.L. van der Poel (Math/CS) and Prof. J.L. de Kroes (EE).
M.Sc. (1976), and B.Sc (1973) EE. Delft University of Technology, The Netherlands.

Employment

Jan 2017	-	Nimble Research, CA, research contracts.
Jan 2017	-	Lecturer ComputerScience, Caltech CMS.
Jun 2012	- Jan 2017	Senior Faculty Associate in Computer Science, Caltech CMS.
May 2007	- Jun 2012	Faculty Associate, Caltech CS.
May 2007	- Jan 2017	Fellow, NASA/JPL.
Feb 2005	- Jan 2017	Senior Research Scientist, NASA/JPL.
May 2003	- Mar 2021	Lecturer (2003-06, 2008-10, 2013, 2015, 2017, 2019, 2022), Caltech CS.
May 2003	- Jan 2017	Principal Computer Scientist, NASA/JPL.
May 2003	- Jan 2017	Chief Scientist Laboratory for Reliable Software, NASA/JPL.
Jun 2001	- May 2003	Director Computing Principles Research, Bell Labs, CS Research.
Jun 1995	- Jun 2001	Distinguished Member of Technical Staff, Bell Labs, CS Research.
Nov 1983	- Jun 1995	Member Technical Staff, Bell Laboratories, Murray Hill, NJ, CS Research.
Jun 1981	- Oct 1983	Assistant Prof., Delft University of Technology, The Netherlands. EE.
Jun 1980	- Jun 1981	Member Technical Staff, Bell Laboratories, Murray Hill, NJ, CS Research.
Sep 1979	- Jun 1980	Fullbright scholarship, USC, host: Per Brinch Hansen, Los Angeles, CA.

Teaching

2003-25	CS118 Software Verification and Logic Model Checking, CalTech CMS (alternate years).
2009-20	Courses in Flight Software Certification, for developers at JPL.
2010-13	Courses on Safety-Critical Software Design, Northrop Grumman Corp.
2005-12	Courses in Software Risk, for senior management at JPL.
1991-96	Course in Formal Verification, Royal Institute of Techn., Stockholm, Sweden.
1991	Course in Formal Verification, Columbia University, New York, Visiting Prof., EE.
1989	Course in Formal Verification, Princeton University, Associate Prof., CS.
1982	Course in Data Communications, Delft University, The Netherlands.
1981	Course on concurrent systems design, for the Math. Center at Bell Labs.
1980	Graduate course, Operating Systems, USC CS, Los Angeles, CA.

Awards, Honors

2025   Elected Fellow of International Core Academy of Sciences and Humanities (Aug. 2025)

2022   Elected Fellow of the Asia-Pacific Artificial Intelligence Association (Aug. 2022)

2016   Named one of ten "Dutch Superheros in IT" by Intermediair (Nov. 2016)

2015   IEEE Harlan D. Mills Award
*"For fundamental contributions to improving software quality, in particular
through model checking tools and coding standards, and for successfully
transferring these contributions to practitioners developing mission-critical software."*

2013   NASA Software of the Year Award
Mars Science Laboratory (MSL), Flight Software Team (Nov. 2013)

2013   NASA Group Achievement Award, MSL Flight Software Team (Oct. 2013)
*"For outstanding achievement in the design and development of the Mars Science
Laboratory Flight Software."*

2013   JPL Research Poster Conference Award Winner (Jan. 2013)
"Verification methods and structuring principles for reliable software development"

2012   NASA Exceptional Engineering Achievement Medal (Oct. 2012)
*"for exceptional and sustained achievement in developing and infusing advanced
engineering practices for the verification of mission-critical software"*

2012   ACM Fellow (June 2012)
"for contributions to software verification by model checking"

2011   NASA Group Achievement Award
Toyota Unintended Acceleration Assessment Team (Oct. 2011)
*"for outstanding technical expertise and dedicated support to the NASA Engineering
and Safety Center's investigation of unintended acceleration in Toyota vehicles"*

2009   NASA Space Act Award (Aug. 2009)
*"for the development of a significant scientific or technical contribution, entitled
Support for systematic code reviews with the Scrub tool"*

2007   JPL Fellow (April 2007)
*"in recognition of his outstanding leadership and technical contributions in the
development of reliable software systems, in pioneering the application of logic model
checking techniques to software verification and in infusing these techniques in the
development of increasingly complex space missions"*

2006   Doctor Honoris Causa, Twente University, The Netherlands (Dec. 2006)

2006   ACM Kanellakis Theory and Practice Award (with Kurshan, Vardi, and Wolper, May 2006)
*"for the development of automata-theoretic techniques for reactive-systems verification,
and the practical realization of powerful formal-verification tools based on these"
techniques"*

2005   Elected member US National Academy of Engineering (Oct. 2005)
"For the creation of model checking systems for software verification"

2003   Thomas Alva Edison Patent Award, R&D Council of NJ (Nov. 2003)
"for Methods and Apparatus for testing event driven software, US Patent 6,353,896"

2002   ACM SIGSOFT Outstanding Research Award (Orlando, May 2002)

2001   ACM Software Systems Award for the *Spin* model checker (Toronto, April 2002)
"for the Spin verification system, a highly successful and widely used model-checking software system based on formal methods from Computer Science. Spin has made advanced theoretical verification methods applicable to large and highly complex software systems"

2000   Best paper award Bell Labs Technical Journal

1998   Best paper award ICRE Conference

1995   Distinguished Member of Technical Staff Award, Bell Labs

1981   Prof. Bähler Prize for best Dutch Ph.D. thesis 1975-1980 in Telecomm., 1st recipient

1979   Fulbright-Hayes Scholarship

General Service

2019 -   Research contracts in cybersecurity, logic model checking, and interactive static analysis.
2018   Review board for HRL Laboratories, June 6.
2015,2021   Panel Member for National Academy, review of NIST IT Lab.
2015   Peer reviewer, National Academy of Engineering, DOT report.
2015 -   Consultant, software reliability, Iridex, CA.
2015   Co-Chair 7th NASA Formal Methods Symposium, April 2015, Pasadena, CA.
2014 -   Editor *IEEE Software*, Reliable Software.
2011 - 2012 Scientific Advisory Board, NECSIS, Canada. (NECSIS=Network for Eng. of Software Intensive Systems for Automotive Applications)
2011   Invited expert, US Nuclear Regulatory Committee hearing, Washington DC, 2/1/2011.
2011 - 2013 Consultant, software reliability, Hospira Inc., Morgan Hill, CA.
2011   Co-Chair, 3rd NASA Formal Methods Symposium, Pasadena, CA.
2010 - 2011 Investigation of possible software causes for *Toyota sudden unintended acceleration* for NHTSA/DOT and NASA/NESC (see Significant Projects, below).
2010   Invited expert US Nuclear Regulatory Committee Panel on software safety.
2009 - 2011 Science and Technology Advisory Committee (STAC), JPL.
2009 -   Fellow Promotion Advisory Board, JPL.
2008 - 2011 Peer Committee Member, Computer Science and Engineering, NAE.
2008 -   Editor *Int. Journal of Critical Computer-Based Systems*, Interscience Publishers.
2007 - 2011 Annual *NASA Software of the Year Selection* Committee for JPL.
2006 -   *Software Reliability Leadership Council*, Division 31, JPL.
2006 - 2008 Co-chair nominating committee CS, (chair: Charles Simonyi), NAE.
2006   Evaluation team *Software Process*, NASA Kennedy Space Center.
2006 - 2010 NASA/SBIR technical mentor, for Grammatech static analysis development.
2005 - 2010 Small Business Innovation Research (SBIR), Selection Board, JPL.
2005 -   Editor *Innovations in Systems and Software Engineering*, Springer Verlag.
2003   Software Peer Review Board, Jupiter Icy Moons Orbiter Mission, JPL.
2003 -   Steering committee, Runtime Verification Workshop Series.
2003 -   Alternate JPL Representative for Software, NASA Engineering Safety Center (NESC).

2001 -   Chair advisory board, Spin Workshop Series (held annually since 1995).
2001 - 2003 Lead strategist *Software Quality Research* at Lucent / Bell Labs.
2000 - 2021   Editor *Software Tools for Technology Transfer*, Springer Verlag.
2000 - 2003 Team lead *Software Review* for *Bell Labs Technical Journal*.
1997   Reviewer NASA Guidebook on Verification of Software and Computer Systems Vol. II.
1996 - 2006 Editor *Formal Methods in Systems Design*, Kluwer Academic Publ. (journal).

Software Tools

A focus of my work is the design of tools that can bridge the gap between theory and practice in the area of software analysis, test, and verification. Most tools I designed and implemented are generally available. Some have a significant user base (e.g., spin, ispin, swarm, scrub, uno, and ncsl).

2016   *cobra*   a fast static source code analysis and query processing tool.
2015   *tau*   formal analysis of tiny automata, interfacing to spin.
2015   *buzz*   a modular framework for model checking algorithms.
2011   *ispin*   a graphical user-interface to Spin and Swarm.
2009   *scrub*   a code review and analysis tool, used in many JPL projects and missions.
2008   *swarm*   search diversification, randomization, and parallelism for Spin verifications.
2006   *ncsl*   a basic source code counter.
2006   *gh_cpp*   a pre-processor for C, with checks for a subset of the MISRA coding rules.
2001   *uno*   a property-based lightweight static souce code analyzer for ANSI-C.
1999   *catch*   a yacc-like parser for grammars describing event-driven systems.
1998   *modex*   automated *spin* model extraction system for C code (patent 2002),
                       making it possible to verify implementation level code.
1996   *sweep*   a model checking system for the μ-calculus, supporting ctl* and ctl.
1995   *ubet*   requirements capture tool, productized by Lucent (patent 1998).
1993   *hype*   previewing tool for displaying troff output, with support for hypertext links.
1992   *v1* and *v2* two simple Gentzen-style resolution theorem proving systems.
1991   *uapi*   an implementation of a Java-like system (patent issued 1998).
1989   *spin*   logic model checking system for the verification of concurrent systems.
1988   *sdlvalid*   first automated verification system for specifications written in SDL.
                       this tool preceded the commercial SDL verification tools by several years.
1987   *supertrace*   first implementation of a novel proof approximation technique;
                       this algorithm is today used in most logic verification systems.
1984   *pico*   early image editing system for digital photography (patent issued 1992).
1983   *trace*   a revised verification system based on automata and graph theory.
1980   *pan*   early automated verification system for communications protocols,
                       based on a process algebra for message passing systems.

Significant Projects

2008-2012   Participated as a member of the flight software team for the Mars Science
             Laboratory missions, delivering a one-ton rover (Curiosity) to the surface of
             Mars -- focusing on code review process, coding standards, and software robustness.
2010-2011   JPL team-lead selected by NASA, performing in-depth analysis to identify
             possible software causes for *sudden unintended acceleration* in Toyota vehicles,
             reporting to the U.S. Department of Transportation (DOT) and the NASA
             Engineering and Safety Center (NESC). Most of the results remain confidential.
2009-2014   Computational Modeling and Analysis of Complex Systems *NSF Expeditions*
             project, https://cmacs.cs.cmu.edu/
             Description: *"Gain fundamental new insights into the emergent behavior
             of complex biological and embedded systems through the use of revolutionary,*

highly scalable and fully automated modeling and analysis techniques."
Colleagues include: Ed Clarke, Patrick Cousot, and initially also Amir Pnueli.

2005-2006   Reliable Software Systems Development (JPL)
Project funded under the NASA Office of Exploration Systems (OExS).
Aimed to improve the reliability of mission and safety critical software for
space exploration.
The odds of winning this funding was less than 3%; the initial amount awarded
was the maximum possible at $15M, and $5 Million *more* than requested.

1998-2000   PathStar (Lucent)
Formal verification of the full call processing and class-5 feature code for
the PathStar Access Server, using the model extraction tool *feaver* and *spin*.
Verification system tracked evolving code from initial design through product
delivery with daily verification runs. A web-based system gave developers access
to all verification results. Built a 16-CPU server to perform all verifications.
Over 200 requirements checked. Uncovered 10 times more software defects in this
code than the regular testing team, with 10 times fewer people (2 instead of 20).

1990-1992   NewCoRe (AT&T)
Formal verification of a core piece of commercial call processing software:
the 5ESS ISUP protocol, coded in SDL as a central part of the implementation of SS7.
The verification team pursuing this approach consisted of 4-5 people.
Verification of 145 requirements, over 10,000 verification runs in a two year period,
using the verification tool that I built for this project (*sdlvalid*).
Uncovered a total of 112 serious defects in the initial design of the ISUP code.

Patents

2004   US Patent 6,804,634   automatic generation of a covering test case set from model
2002   US Patent 6,353,896   method and app. for testing event driven software, w. Ken Thompson
2000   US Patent 6,061,812   generating passive testers from LTL properties, w. Mihalis Yannakakis
1998   US Patent 5,826,017   general protocol for data communications (a java-like system)
1998   US Patent 5,812,145   message sequence chart analyzer, w. Doron Peled
1997   US Patent 5,615,137   on the fly model checking with partial order reduction, w. Doron Peled
1996   US patent 5,559,904   deriving width and height information from raw image files
1992   US patent 5,129,013   graphics image editing system, w. Rob Pike

Patent 6,353,896 received the 2003 Thomas Alva Edison Patent Award in the Information Technology Category from the Research and Development Council of New Jersey. Five other patent applications are pending.

Books

2025   *The Cobra Static Code Analyzer, User Guide,* June 2025, https://codescrub.com
Comprehensive guide to interactive code analysis with the Cobra tool.
2004   *The Spin Model Checker, Primer and Reference Manual,* Addison-Wesley.
Theoretical foundation and practical application of logic model checking techniques.
1995   *The Early History of Data Networks.* IEEE Computer Society Press. (w. Bjorn Pehrson)
A comprehensive history of pre-electric long distance communication methods.
1991   *Design and Validation of Computer Protocols.* Prentice Hall.
One of the first books on automated protocol verification.
A Japanese translation of the book was published in 1994.
1988   *Beyond Photography, The Digital Darkroom.* Prentice Hall.
One of the first books on digital photography; coining the term "digital darkroom."
The book was featured on CNN in 1989 in the Science & Technology report. In 1992 it led to
a permanent installation, demoing the software, at Liberty Science Museum, near New York.

Chapters in Books

2013   Explicit state model checking, In: Handbook of formal methods.
Eds. E. Clarke et al., Springer Verlag 2018.

2012   Conquering Complexity,
In: Conquering Complexity (book title), Eds. Mike Hinchey and Lorcan Coyle.
Publ. Springer Verlag, March 2012.

2005   Software Model Checking with Spin.
In: *Advances in Computers*, Vol 63, Ed. M. Zelkowitz,
Publ. Elsevier, Amsterdam, The Netherlands

Proceedings Edited

2015   *Proc. 7th NASA Formal Methods Symposium.*(Editor, w. K. Havelund, and
R. Joshi), Pasadena, April 2015, Springer Verlag, LNCS Vol. 9058.

2011   *Proc. 3rd NASA Formal Methods Symposium.*(Editor, w. M. Bobaru, K. Havelund, and
R. Joshi), Pasadena, April 2011, Springer Verlag, LNCS Vol. 6617.

1996   *The Spin Verification System.* (Editor, w. J-C. Gregoire and D. Peled),
Vol. 32, American Mathematical Society, DIMACS series, 1997, ISBN 0-8218-0680-7, 203 pgs.

1996   *Partial Order Methods in Verification.* (Editor, w. V.R. Pratt and D. Peled),
Vol. 29, American Mathematical Society, DIMACS series, 1997, ISBN 0-8218-0579-7, 403 pgs.

Invited Tutorials and Courses

2021   Two-day course on the Cobra analyzer, BlueOrigin, Sep 29 and Oct 6.

2019   Two-day courses on the Cobra analyzer, JPL, June 11, 13 and July 12,15.

2013   Proving Properties of Concurrent Programs,
First Spin Symposium / 20th Spin Workshop, Univ. of NY, Stony Brook, July 2013.

2005   Model Checking and Model Extraction with Spin,
(with Theo Ruys) 12th Spin Workshop, San Francisco, CA, August 2005.

2004   Advanced SPIN Tutorial,
(with They Ruys), SPIN 2004 Workshop, Barcelona, Spain, April 2004.

2002   Software Model Checking (2 lectures)
Concordia Summer School in Telecommunications Software Engineering.
August 26-29, 2002, Montreal, Canada.

2000   A two-week Course on Software Model Checking,
NATO Summer School, Marktoberdorf, Germany, Aug. 2000.
(Other lecturers: Amir Pnueli, C.A.R. Hoare, Joachim Parrow, Simon Peyton Jones.)

2000   Software Model Checking with Spin (half day tutorial),
FSE-8, ACM SigSoft 8th Int. Symp. on the Foundations of Software Engineering,
San Diego, Ca., Nov. 2000. (Other lecturer: E.A. Emerson.)

1998   Automata Based Model Checking (tutorial),
WIFT98, Workshop on Industrial Strength Formal Techniques,
Boca Raton Fl. USA, October 1998.

1998   Software and Hardware Model Checking (tutorial with A. Puri),
ASE98, Automated Software Engineering Conf., Honolulu Hawaii USA, October 1998.

1996   1-week Course on On-the-fly Model Checking,
BRICS Autumn school on Verification,
Inst. for Basic Research in Computer Science, Aarhus, Denmark, Oct. 1996.
(Other lecturers: Ed Clarke, David Basin, Tom Melham.)

1995   Proving Properties of Concurrent Systems with Spin (half-day tutorial)
CONCUR95, 6th Intern. Conf. on Concurrency Theory,
Philadelphia, Pa., USA, August 1995.

1993   Design and Validation of Communication Protocols (half day tutorial),

ICNP93, First IEEE Int. Conference on Network Protocols,
San Francisco, Oct. 1993.
1991   Design and Validation of Protocols (one day tutorial)
9th IFIP/INWG 6.1 Conf. on Protocol Specification, Testing and Verification,
Stockholm, Sweden, June 1991.

Invited Talks at Universities, etc.

2025   Invited speaker, Apex Space, Los Angeles, June 27
2021   Invited speaker Rahman Memorial Lecture, Indian Assoc. for the Cultivation of Science, March 29
2021   Invited speaker, BlueOrigin, Seattle, March 3 (remote, two talks).
2019   Invited speaker, Uber, San Francisco, June 19.
2019   Invited speaker, Cubesat Workshop, JPL, June 4.
2017   Guest speaker, TGS, Irvine, CA, Nov. 7.
2017   ACM Irvine Chapter, CA, September 13.
2017   Medtronic, Minneapolis, MN, August 16.
2016   Computer Science Colloquim, Oct. 13, Harvey Mudd College, Claremont, CA.
2015   Distinguished Lecture Series, Oct. 27, CMU West, Sunnyvale, CA.
2014   Howard and Jan Oringer Seminar, Caltech CMS, April 15.
2013   Princeton Univ., Aug. 27, Horizons in Theoretical Computer Science.
2012   Google, Venice, Dec. 13.
2012   Caltech IST Advisory Council Meeting.
2012   Distinguished Speaker Series, Academia Sinica, Inst. of Inf. Science, Taipei, Taiwan.
2011   Smith Distinguished lecture, Feb 18, UC Irvine, School of Inf and CS, Irvine, CA.
2011   Northrup Grumman Corp (NGC), May 11, invited presentation on Software Safety, El Segundo, CA.
2011   Software Certification Consortium, invited presentation, Nov. 9-10, Toronto, Canada.
2010   Jason Study Group, San Diego, CA, June 2010.
2009   IT Eminent Lecture Series, Louisiana State University, April 24, Baton Rouge, LA.
2009   Aerospace Corporation, July 23, El Segundo, CA.
2008   CWI, Amsterdam, The Netherlands, May 23, 2008.
2007   University of California at Riverside, CA, USA.
2006   Twente University, Netherlands, on the occasion of the doctorate honoris causa.
2004   Distinguished Lecture Series, Stanford University, CS/EE, Palo Alto, CA, USA.
2004   Distinguished Lecture Series, UCLA, CS, Los Angeles, CA, USA.
2004   Microsoft Summerschool, Univ. Washington, USA.
2002   Distinguished lecture series, University of Michigan, USA.
2002   Seminar for Joseph Sifakis, (speakers: Pnueli, Clarke, Cousot, Holzmann), Grenoble, France.
2002   Distinguished lecture series, University of Toronto, Canada.
2002   Distinguished Lecture Series, Telcordia Research, Morristown, NJ, USA.
2002   Distinguished Lecture Series, Columbia University, CS Department, NY, USA.
2002   Distinguished Lecture Series, IBM T.J. Watson Research Center, NY, USA.
2001   Microsoft Research, Seattle, Oregon, USA.
2001   Distinguished lecture series, University of Pennsylvania, USA.
2001   Stevens Institute of Technology, NJ, USA.
2000   Distinguished lecture series, Kansas State University, Kansas, USA.
1999   NASA/Ames Research Center, Moffett Field, Ca., USA.
1998   Distinguished lecture series, University of Virginia, USA.
1998   NASA/JPL, Jet Propulsion Laboratory, Pasadena, Ca., USA.
1997   NASA Verification and Validation Facility, West Virginia, USA.
1997   Telematics Research Center, Enschede, Netherlands.
1997   Formal Methods Day at Royal Holloway, Univ. of Surrey, U.K.
1996   UC Berkeley, Ca., USA.
1995   Software Process Improvement Network Meeting, New Jersey, USA.

1995   University of Utah, USA.
1995   State Univ. of New York, Stony Brook, New York.
1995   Distinguished lecture series, CS, North Carolina State University.
1993   Binghamton University, New York, USA.
1993   ESPRIT/CONCUR Project Review Meeting, Stockholm, Sweden
1992   Telia Research, Sweden
1992   FDTH University, Lausanne, Switzerland.
1992   Bellcore Research, Morristown, New Jersey, USA.
1992   Univ. of Montreal, Canada.
1991   ESPRIT/SPEC Project Review Meeting, Sigtuna, Sweden
1990   University of New Mexico, N.M., USA.

Invited Talks at Conferences

2024   Keynote at 30th Spin Symposium, Luxembourg, April 10 (remote).
2021   Invited speaker at KlausFest65, Rhodes, Greece Oct 24, (remote).
2021   Invited speaker at SAS 2021, Chicago, Oct. 17-22 (remote).
2021   Invited speaker ACM Joint European Sw Eng Conf on the Foundations of SE, Athens, August (remote).
2019   Keynote presentation, SMC-IT, Pasadena, CA, July 31.
2017   Invited presentation, ASE 2017, Urbana, IL, Oct 30 - Nov 3.
2017   Invited presentation, ACM OC Chapter, Irvine, CA, Sept 13.
2017   Keynote presentation 24th International Spin Symposium, UC Santa Barbara, CA, July 13-14.
2015   Invited presentation at ICSE2015, Florence, Italy, for the IEEE Harlan Mills award.
2014   Invited Lectures, 4th Summer School on Formal Techniques, May 19-24, Menlo College, CA.
2014   Keynote 26th IEEE Software Technology Conf., March 31 - April 3, 2014, Long Beach, CA.
2013   Keynote Flight Software Workshop, Dec 10-12, Pasadena.
2013   Keynote ISSRE, IEEE Int. Symp., on Softw. Reliability Eng., Nov. 4-7, Pasadena.
2012   Keynote USENIX Hot Topics in Dependable Systems Workshop, LA, Oct. 7, 2012.
2012   Keynote PDMC 2012 (Parallel and Distributed Model Checking),
        17 September, Imperial College, London, UK.
2012   Workshop on Validation of Autonomous Systems, Caltech, Pasadena, 8/21-8/23, 2012.
2012   Workshop on Engineering Resilient space Systems, Keck Institute, Caltech, Pasadena, 7/30-8/3.
2012   Formal Verification of multi-threaded code. 2nd Workshop on Automated Verification,
        Analysis and Synthesis. Keynote speaker, Taipei, Taiwan, April 10.
2011   Reliable Software Development: Analysis-Aware Design. Plenary/unifying speaker,
        ETAPS 2011 Conference, Saarbrucken, Germany, March 26 - April 4 2011.
2011   Keynote speaker, SSIRI (5th Int. Conf. on Secure Software Integr. and Reliability Impr.),
        Jeju Island, S. Korea, June 2011.
2011   Keynote speaker, SafeComp 2011, Naples, Italy.
2010   Keynote speaker, PSTV/FMOODS/FORTE, 30 year anniversary conference,
        Amsterdam, The Netherlands, June 2010.
2009   Problems worthy of attack. Plenary speaker,
        9th Annual Lee Center Workshop, Caltech, Pasadena, May 22.
2009   The performance of Swarm Search methods. Invited speaker,
        Symposium on Combinatorial Search, Lake Arrowhead, CA, July 2009.
2009   Tool support for code reviews. Invited speaker,
        NASA Software Working Group meeting, Sept. 3, 2009.
2009   The practice of formal methods. Invited speaker,
        Caltech Wkshp Formal Methods for Verification & Validation of Real-Time systems, Sept. 09.
2009   Scrub and Spin, stealth use of formal methods in software development. Invited speaker,
        OOPSLA '09 (Int. Conf. on Object Oriented Prog.), Orlando, Florida, Oct. 27.
2009   Reliable software systems. Keynote speaker,
        3rd Workshop on Spacecraft Flight Software, Cahill Center, Caltech, Nov. 2009.

2008	On Limits, invited speaker, 6th Langley Formal Methods Workshop, Virginia, 30 April 2008.
2008	Keynote, 23rd IEEE/ACM Int. Conf. on Automated Software Engineering (ASE08), L'Aquila, Italy, Sept. 15-19, 2008.
2007	Multi-Core Algorithms for Model Checking with Spin, 5th Int. Workshop on Parallel and Distributed Methids in Verification, PDMC 2007, Berlin, Germany, July 2007.
2006	Developing Safety Critical Software, ICT-Kenniscongress, Amsterdam, The Netherlands, April 2006.
2006	On coding rules for reliable software, NASA Workshop on Ultra-Reliability, Marshall Space Flight Center, Huntsville, AL., June 2006.
2006	Software architectures for reliable systems, Space Mission Challenges for Information Technology, Pasadena, CA, July 2006.
2006	The design of a multi-core extension of the Spin Model Checker, Formal Methods for Computer Aided Design Conference (FMCAD2006), San Jose, CA, November 2006.
2005	Verification Grand Challenge Workshop, SRI Int., CA, February 2005.
2005	Software Reliability, National Space Society, Washington, USA, May 2005.
2005	Theories, Methods, and Tools for Building Systems from Interacting Components, Caltech, CS, Workshop, October 31, 2005.
2004	Formal Methods and Software Reliability, Formal Methods and Models for CoDesign, IEEE, San Diego, CA, June 2004.
2004	Economics of Software Verification, 2004 U. of Washington and Microsoft Summer Institute on Trends in Testing: Theory, Techniques and Tools. Portland, Oregon, August 2004.
2003	Turing, Strachey and Spin, 10th Spin Workshop, Portland, Oregon, May 2003, keynote.
2003	Software Verification and Model Checking Space Mission Challenges in Information Technology (SMC-IT), Pasadena, CA, July 2003.
2003	Trends in Software Verification, Formal Methods Europe Conference, Italy, September 2003.
2002	Analysis of Software 6th World Conference on Integrated Design & Process Technology (IDPT 2002) Los Angeles, CA, USA, June 2002.
2002	Software Analysis and Model Checking, CAV02, 14th Conf. on Computer Aided Verification, Copenhagen, Denmark, July 2002.
2002	A Survey of Automata Based Testing Techniques World Computer Congress 2002, Montreal, Canada, August 2002.
2002	The Logic of Bugs, FSE-10, ACM SigSoft 10th Int. Symp. on the Foundations of Software Engineering, Charleston, SC, USA, November 2002, keynote.
2001	From Code to Models, Second Int. Conference on Application of Concurrency to System Design, Newcastle upon Tyne, UK, June 2001.
2001	Economics of software verification, PASTE01, Workshop on Program Analysis for Software Tools and Engineering, Snowbird, Utah, USA, June 2001.
2000	Testing Distributed Systems Software, AST2000, Automated Software Testing Symposium,

Lucent Technologies, Holmdel, New Jersey, Nov. 2000

2000   Formal Verification of Call Processing Software,
        MFPS2000, 16th Conf. on Mathematical Foundations of Programming Semantics,
        Hoboken, New Jersey, USA, April 2000.
        (The other invited speakers included Ed Clarke and Allen Emerson.)

2000   Proving Properties of C Programs,
        First Int. Workshop on Automated Program Analysis, Testing and Verification,
        ICSE Workshop, Limerick, Ireland, June 2000

2000   Proving Properties of C Programs,
        Workshop on Specification and Analysis of Protocols and Reactive Systems,
        Verimag, Grenoble, France, June 2000.
        (Other invited speakers were Pierre Wolper, Amir Pnueli and Joseph Sifakis.)

1999   A practical method for the verification of event-driven software, (with M.H. Smith),
        ICSE99, Int. Conf. on Software Engineering, Los Angeles CA USA, May 1999.

1999   Software model checking—Extracting verification models from source code, (with M.H. Smith),
        FORTE/PSTV99, Formal Methods for Protocol Engineering and Distributed Systems,
        Beijng, China, Oct. 1999.

1998   Designing executable abstractions,
        FMSP98, Formal Methods in Software Practice,
        Clearwater Beach, Florida USA, March 1998. (Keynote presentation.)

1998   On Checking Model Checkers,
        CAV98, Tenth Conf. on Computer Aided Verification,
        Vancouver Canada, June 1998.
        (The two other invited speakers were Carl Seger and Pierre Wolper.)

1998   The Spin Model Checker,
        IFIP Working Group 2.2, Formal Description of Programming Concepts,
        Shelter Island, New York, June 1998.

1997   On Finding Bugs in Concurrent Programs,
        USENIX Annual Technical Conference,
        Anaheim, California, USA, January 1997.

1997   Design Verification: Bridging the Gap,
        IFIP Working Group 2.2, Formal Description of Programming Concepts,
        Graz, Austria, Sep 20-24.

1996   Formal Methods for Early Fault Detection,
        FTRFT96, 3rd Conf. on Formal Techniques for Real-Time and Fault Tolerant Systems,
        Uppsala Sweden, Sept. 1996.
        (Other invited speakers included Amir Pnueli, and Pamela Zave.)

1996   Early Fault Detection Tools,
        TACAS96, 2nd Conf. Tools and Algorithms for the Construction and Analysis of Systems,
        Passau, Germany, March 1996.
        (The two other invited speakers were Leslie Lamport and Dexter Kozen.)

1994   Proving the Value of Formal Methods,
        IFIP FORTE94, 7th Int. Conf. on Formal Description Techniques,
        Berne, Switzerland, Oct. 1994.
        (The two other invited speaker were Leslie Lamport and Nancy Lynch.)

1994   Data Communications—The First 2500 Years,
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        Hamburg, Germany, August 1994.
        (Another invited speaker in the same session was Konrad Zuse.)

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45. Curve Balls, *IEEE Software*, column on Reliable Code, Mar/Apr 2018, pp. 2-5. IP 46. Software Components, *IEEE Software*, column on Reliable Code, May/Jun 2018, pp. 2-4.

47. Code Vault, *IEEE Software*, column on Reliable Code, Sep/Oct 2018, pp. 2-4.

48. Code Mining, *IEEE Software*, column on Reliable Code, Mar/Apr 2019, pp. 25-29.

49. Does not compute, *IEEE Software*, column on Reliable Code, May/Jun 2019, pp. 14-16.

50. Code Overload, *IEEE Software*, column on Reliable Code, Nov/Dec 2019, pp. 73-75.

51. Test Fatigue, *IEEE Software*, column on Reliable Code, Vol. 37, No. 4, (2020), pp. 11-16.

52. Predicting the past, *IEEE Software*, column on Reliable Code, Vol. 37, No. 2 (2020), pp. 10-12.

53. Right code, *IEEE Software*, column on Reliable Code, Vol. 38, No. 1 (2021), pp. 13-15.

54. Keeping it simple: agile analysis, *IEEE Software*, column on Reliable Code, Vol. 38, No. 3 (2021), pp. 13-16.

Hitting the News

1. *CNN*, May 1989, interview with Charles Crawford on digital photo editing and image manipulation for the *Science and Technology Report*.

2. *New Scientist*, 18 November 2000, *Abort, Retry, Fail*, article on software verification, with detailed references.

3. *Infoworld*, 29 October 2001, pg. S12, interview with Mark Leon on software verification.

4. *New Jersey Network News*, Science and Technology segment, March 6, 2002, interview with Patrick Regan on receiving the ACM System Software Award.

5. *Software Development Magazine*, Sept. 2002, p. 15, interview with A. Weber Morales titled 'Spinning Into Control.'

6. *MIT Technology Review*, Jan. 2003, mention of work in sidebar to "Ten emerging technologies that will change the world."

7. *FTP online*, interview on 'Spin and the future of testing tools,' Oct. 2003.

8. *Objectmonkey.com*, interview with Jason Gorman. Oct. 2003.

9. *IEEE Computer*, Jan. 2004, cover article on 'NASA's Mission Reliable,' interview with Scott Hamilton and Patrick Regan.

10. *Noord-Hollands Dagblad*, 10 Jan. 2004, 'Wie gaat er mee naar Mars?' (interview about the Mars missions — in Dutch).

11. *Computable*, 12 Jan. 2007, 'Veilig landen op Mars,' (in Dutch, interview on Honorary Doctorate in Twente).

12. *Computable*, 9 Nov. 2007, 'Software aan het stuur,' (in Dutch, fragment of interview on reliability of embedded software in cars).

13. *PT Embedded Systems*, 23 May 2008, interview with Hans van Thiel, in Amsterdam.

14. *Software Development Times*, 1 May 2009, interview with Jeff Feinman.

15. *NASA Tech Briefs*, Who's Who at NASA, Sept. 2009, interview with Bruce Bennett.

16. *Caltech ENGenious*, Interview, Issue 8, Oct. 2011, pp. 30-32.

17. *NWT Magazine*, Interview in article on SuperSoftware, Nov. 2012, pp. 59-63, (in Dutch).

18. *Communications of the ACM*, several quotes on the software process followed for the Curiosity Rover, in: *Revving the Rover*, article by Alex Wright, CACM Feb. 2013, pp. 14-16.

19. Interview for *The Setup* (https://gerard.holzmann.usesthis.com), June 19, 2013.

20. Named on of ten "Dutch Superheros in IT" by Intermediair Magazine (Dutch), Nov. 2016.

21. Interviewed for a story on formal verification in *Bitcoin Magazine*, by Amy Castor, Nov 22, 2017.

Program Committees

AAS97	ACM Workshop on Automated Analysis of Software	'97
ATVA	Automated Technology for Verification and Analysis	'05
AVoCS	Automated Verification of Critical Systems	'05
CAV	Int. Conf. on Computer Aided Verification	'90-05,'15,'17-18
CONCUR	Int. Conf. on Concurrency Theory	'97
COUFLESS	Int. Wkshp on Faults and Failures in Large Softw. Systems '14-15	
DCCA	IFIP Conf. on Dependable Computing for Critical Applications	'99
FATES	Formal Approaches to Testing of Software	'05
FORTE	IFIP Int. Conf. on Formal Description Techniques	'94-95,05-09,12,15
FM	Formal Methods Conference	'06,15
GC06	Grand Challenge in Verified Software	'05-06
GRAPHITE	Wkshp on Graph Inspection and Traversal Eng.	'12-13
HVC09	Haifa Verification Conference	'09
ICDCS	Int. Conference on Distributed Computing Systems	'95-96,98
ICSE	Int. Conference on Software Engineering	'12
ICST	IEEE Int Conf. on Sw Testing, Verification, and Validation	'10-11
IFIP	Working Conf. on Verified Software: Theories, Tools (Hoare/Misra/Shankar)	'05
IWPTS	IFIP Int. Workshop on Protocol Test Systems	'94
IWTCS	IFIP Int. Workshop on Testing of Communicating Systems	'97-98
MARS	Int. Workshop on Models for Analysis of Real-time Systems '15,'17	
MochART	Int. Workshop on Model Checking and Art. Intelligence	'05,08
NFM	NASA Formal Methods Symposium, PC and Organizing Cmt	'09-17;'22
PDMC	Parallel and Distributed Methods in verifiCation	'08-12
POMIV96	DIMACS Workshop on Partial Order Methods in Verification	'96
PSTV	IFIP Int. Conf. on Protocol Specification, Testing, and Verification	'93-95
PSTV/FORTE	IFIP Joint PSTV/FORTE Conference	'96,00-07
QMSSW	NASA Quality Mission Software & Systems Eng.	'08-10
RV	Int. Workshop on Runtime Verification	'01-15

SAVCBS	Spec. and Verification of Component Based Systems	'05
SDL-Forum	Int. Conf. on the SDL Formal Description Language	'99
SMC	Int. Workshop on Software Model Checking (post-CAV)	'01,03
SMC-IT	Int. Conf. on Space Mission Challenges for Info Techn	'23,'25
SPIN	Int. Workshop/Symposium on the SPIN Verification System	'95-25
SVW00	Int. Workshop on Software Verification (post-ICSE00)	'00
TACAS	Int. Conf. on Tools and Alg's for the Constr'n. and Analysis of Systems	'97,99-00,13-14
TestCom		'06-07
VMCAI	Int. Conf on Verification, Model Checking and Abstract Interpretation	'04
VSR	Verified Software Repository Initiative	'05-06
VVPS	Verification and Validation of Planning and Scheduling Systems	'05,'09,'11

(Last updated June 2025)