Curriculum Vitæ

Kedar S. Namjoshi

Address

Nokia Bell Labs
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Personal Information

U.S. Citizen.

Research Interests

Methods for creating reliable software. Interests include program verification, model checking, temporal logics, static program analysis, program security, program synthesis, and programming methodology.

Education

Ph.D. in Computer Sciences (1998)
   The University of Texas at Austin
   Dissertation: "Ameliorating the State Explosion Problem"
   Advisor: Prof. E. Allen Emerson

Bachelor of Technology in Computer Science and Engineering (1990)
   The Indian Institute of Technology, Madras
   Thesis: "DICE: A Distributed C Environment"
   Advisor: Prof. C. R. Muthukrishnan

Employment

- 1998-present: Member of Technical Staff, Computing Sciences Research Center, Bell Labs

- 1994-1998: Research Assistant, Department of Computer Sciences, The University of Texas at Austin

- 1991-1994: Teaching Assistant, Department of Computer Sciences, The University of Texas at Austin

Honors and Awards

Invitation to special issue, CAV 2007, SAS 2016
Best Paper Award, FORTE 2002, QRS 2016
MCD Fellowship, University of Texas at Austin, 1990-1992
National Talent Scholarship, India, 1984-1990

Professional Activities

Research Grants

- NSF CCF award, #1563393: "Self-Certifying Compilation and its Applications", 2016-2020, (with Prasad Sistla, V.N. Venkatakrishnan, and Lenore Zuck)

- DARPA grant, #FA8750-12-C-0166: "DOC: A Defensive Optimizing Compiler", 2012-2015, (with Jens Palsberg, V.N. Venkatakrishnan, and Lenore Zuck)

- NSF CCR award, #0341658: "Analysis Techniques and Tools for Building Robust Software", 2003-2008, (with Dennis Dams and Patrice Godefroid)

Editorships

Associate Editor, *Formal Methods in Systems Design*, 2005-Present

Guest Editor, *International Journal of Foundations of Computer Science (IJFCS)*, vol. 21, no. 2; Special Issue for ATVA 2007 (co-editor Tomohiro Yoneda)

Conference and Seminar Organization

- *HVC 2009, Haifa Verification Conference 2009*, Haifa, Israel, October 19-22, 2009 (PC co-chair, with Andreas Zeller and Avi Ziv)

- *ATVA 2007, The 5th International Symposium on Automated Technology for Verification and Analysis*, Tokyo, Japan, October 2007 (PC co-chair, with Tomohiro Yoneda)

- *NEVER: The Northeast Verification Seminar* (initiator and co-organizer of the first seminar at Bell Labs with Dennis Dams)

- *VMCAI 2006, The 7th International Conference on Verification, Model Checking, and Abstract Interpretation*, Charleston, SC, January 2006 (PC co-chair, and co-organizer, with E. Allen Emerson)

Program Committees

- *The 48th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2021)*, Copenhagen, Denmark, 2021

- *The IEEE Secure Development Conference (SecDev 2020)*, Atlanta, USA, 2020

- *The 27th Static Analysis Symposium (SAS 2020)*, Chicago, USA, 2020

- *The 33rd IEEE Computer Security Foundations Symposium (CSF 2020)*, Boston, USA, 2020

- *The 21st International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2020)*, New Orleans, USA, 2020

- *The 26th Static Analysis Symposium (SAS 2019)*, Porto, Portugal, 2019

- *The 20th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2019)*, Cascais, Portugal

- *The 30th International Conference on Computer Aided Verification (CAV 2018)*, Oxford, UK, 2018

- *The 24th Static Analysis Symposium (SAS 2017)*, New York, USA, 2017

- *The 28th International Conference on Computer Aided Verification (CAV 2016)*, Toronto, Canada, 2016

- *The 27th International Conference on Computer Aided Verification (CAV 2015)*, San Francisco, USA, 2015

- *The 26th International Conference on Computer Aided Verification (CAV 2014)*, Vienna, Austria, 2014

- *The 15th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2014)*, San Diego, USA, 2014

- *The 25th International Conference on Computer Aided Verification (CAV 2013)*, St. Petersburg, Russia, 2013

- *The 24th International Conference on Computer Aided Verification (CAV 2012)*, Berkeley, USA, 2012

- *The 12th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2011)*, Austin, Texas, USA, 2011

- *The 9th International Symposium on Automated Technology for Verification and Analysis (ATVA 2011)*, Taipei, 2011

- *The 22nd International Conference on Computer Aided Verification (CAV 2010)*, Edinburgh, UK, 2010

- *The 8th International Symposium on Automated Technology for Verification and Analysis (ATVA 2010)*, Singapore, 2010

- *The 12th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS 2010)*, New York, USA, 2010

- *The 7th International Symposium on Automated Technology for Verification and Analysis (ATVA 2009)*, Macau, 2009

- *The 21st International Conference on Computer Aided Verification (CAV 2009)*, Grenoble, France, 2009

- *The 6th International Symposium on Automated Technology for Verification and Analysis (ATVA 2008)*, Seoul, South Korea, 2008

- *The 20th International Conference on Computer Aided Verification (CAV 2008)*, Princeton, USA, 2008

- *The 14th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2008)*, Budapest, Hungary, 2008

- *The 5th International Symposium on Automated Technology for Verification and Analysis (ATVA 2007)*, Tokyo, Japan, 2007 (co-chair)

- *The 14th Workshop on Model Checking Software (SPIN 2007)*, Berlin, Germany, 2007

- *The 8th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI 2007)*, Nice, France, 2007

- *The 13th International Static Analysis Symposium (SAS 2006)*, Seoul, Korea, 2006

- *The 7th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI 2006)*, Charleston, SC, 2006 (co-chair)

- *The 8th International Workshop on Verification of Infinite-State Systems (INFINITY)*, Bonn, Germany, 2006

- *The 17th International Conference on Computer Aided Verification (CAV 2005)*, Edinburgh, Scotland, 2005

- *The 15th International Conference on Computer Aided Verification (CAV 2003)*, Boulder, USA, 2003

- *The 14th International Conference on Computer Aided Verification (CAV 2002)*, Copenhagen, Denmark, 2002

- *The 13th International Conference on Computer Aided Verification (CAV 2001)*, Paris, France, 2001

- *Special Session on Model Checking (in MFCS)*, Hoboken, USA, 2000 (co-chair)

Dissertation Committees

- Zvonimir Pavlinovic (Advisor: Thomas Wies, NYU, 2019)

- Timothy King (Advisor: Clark Barrett, NYU, 2014)

- Uri Klein (Advisor: Amir Pnueli and Lenore Zuck, NYU, 2011)

- Ariel Cohen (Advisor: Amir Pnueli, NYU, 2008)

- Mihaela Bobaru (Advisor: Marsha Chechik, U. Toronto, 2008)

- Leena Unnikrishnan (Advisor: Scott Stoller, SUNY Stony Brook, 2008)

- Ahmed Rezine (opponent) (Advisor: Parosh Abdulla, Uppsala University, 2008)

- Marc Eaddy (Advisor: Alfred Aho, Columbia University, 2008)

- Ittai Balaban (Advisors: Amir Pnueli and Lenore D. Zuck, NYU, 2007)

- Diptikalyan Saha (Advisor: Scott Smolka and C. R. Ramakrishnan, SUNY Stony Brook, 2006)

- Yifei Dong (Advisors: Scott Smolka and C. R. Ramakrishnan, SUNY Stony Brook, 2003)

- Li Tan (Advisor: Rance Cleaveland, SUNY Stony Brook, 2002)

- Abhik Roychowdhury (Advisor: C. R. Ramakrishnan, SUNY Stony Brook, 2000)

Invited Talks

1. "Designing a Self-Certifying Compiler", PERR/CAV 2020, July 2020

2. "Synthesis from Temporal Specifications", SYNT/CAV 2019, July 2019

3. "Designing Self-Certifying Compilers", DSV/CAV 2019, July 2019

4. "Designing Self-Certifying Software Systems", VMCAI 2019, January 2019

5. "Plugging Leaks Introduced by Compiler Transformations", Dagstuhl Seminar on Secure Compilation, May 2018

6. "Witnessing Program Transformations", Dagstuhl Seminar on Program Equivalence, April 2018

7. "Self-Certifying and Secure Compilation", HVC 2017 Keynote, October 2017

8. "Witnessing Program Transformations", Rutgers University, October 2013

9. "Model Checking in Bits and Pieces", Festschrift for David Schmidt, September 2013

10. "Local Proofs for Global Properties", U. Toronto, October 2008

11. "Local Proofs for Global Properties", Uppsala University, April 2008

12. "The Speed vs. Precision Trade-off in Static Program Analysis", Columbia University, December 2007

13. "Local Proofs for Global Properties", IBM Research, Hawthorne, February 2007

14. "From Model Checking to Proof Checking ... and Back", SUNY Stony Brook, August 2006

15. "Incremental Model Checking", Logic and Algorithms, Cambridge, UK, May 2006

16. "From Model Checking to Proof Checking ... and Back", Tata Institute for Fundamental Research (TIFR), Bombay, September 2005

17. "From Model Checking to Proof Checking ... and Back", Carnegie Mellon University, April 2005

18. "Formal Methods at Bell Labs", TRDDC, Pune, July 2002.

19. "Certifying Model Checkers", Tata Institute for Fundamental Research (TIFR), Bombay, July 2002.

20. "Automatic Abstraction by Syntactic Program Transformation", NEC Research Institute, March 2001.

21. "Automatic Abstraction by Syntactic Program Transformation", Seminar, Logic and Computation Group, University of Pennsylvania, October 2000.

22. "Automatic Abstraction by Syntactic Program Transformation" Dagstuhl Workshop on Verification of Infinite-State Systems, organized by Ahmed Bouajjani and Javier Esparza, April 2000.

23. "A Simple Characterization of Stuttering Bisimulation", Stevens Institute of Technology, October 1998.

Journal Referee

Journal of the ACM, ACM Transactions on Computational Logic, ACM Transactions on Programming Languages, IEEE Transactions on Computers, Theoretical Computer Science, Software Tools for Technology Transfer, Formal Methods in Systems Design, Logical Methods in Computer Science, London Math. Society Journal of Computation and Mathematics

Conference Referee

IEEE Logic in Computer Science (LICS), Computer Aided Verification (CAV), ACM Symposium on Programming Languages (POPL), ACM Symposium on Programming Languages Design and Implementation (PLDI), Tools and Algorithms for Computer (TACAS), Static Analysis Symposium (SAS), Verification, Model Checking and Abstract Interpretation (VMCAI)

Proposal Reviewer

Reviewed proposals for the National Science Foundation and several other national and international funding agencies

Professional Societies

Member of the ACM and DIMACS

Patents

1. Preventing extreme coresidency hazards in cloud computing, with Eric J. Bauer, Randee S. Adams, Daniel W. Eustace, and Lyle D. Kipp, 2013; issued 2015 as U.S. Patent #8,949,655

2. Method and apparatus for synchronization in primary-backup replication schemes, with Pramod Koppol, Thanos Stathopoulos and Gordon Wilfong, 2011; issued 2014 as U.S. Patent #8,868,862

3. Time-preserved transmissions in asynchronous virtual machine replication, with Pramod Koppol, Thanos Stathopoulos and Gordon Wilfong, 2011; issued 2014 as U.S. Patent #8,798,086

4. Method And Apparatus For Incremental Analysis Of One Or More Properties Of A Program, with Christopher Conway and Dennis Dams, 2005; issued 2014 as U.S. Patent #8,762,949

5. Method and apparatus for pattern matching for intrusion detection/prevention systems, with Girija Narlikar, 2009; issued 2014 as U.S. Patent #8,683,590

6. A Method for Identifying Cyclicity in Circuit Designs, with Robert Kurshan, 1999; issued 2003 as U.S. Patent #6,591,231

Publications

Edited Volumes

1. (with Andreas Zeller, Avi Ziv) Hardware and Software: Verification and Testing - 5th International Haifa Verification Conference, HVC 2009, Haifa, Israel, 2009, LNCS 6405, Springer 2011

2. (with Tomohiro Yoneda, Teruo Higashino, Yoshio Okamura) ATVA 2007, The 5th International Symposium on Automated Technology for Verification and Analysis, Tokyo, Japan, 2007, LNCS 4762, Springer

3. (with E. Allen Emerson) VMCAI 2006, 7th International Conference on Verification, Model Checking, and Abstract Interpretation, Charleston, SC, January 2006, LNCS 3855, Springer

Book Chapters

1. (with Dimitra Giannakoupoulu, Corina Pasareanu) Compositional Reasoning. In the *Handbook of Model Checking*, Springer, 2018. Editors: E.M. Clarke, Th. A. Henzinger, H. Veith, R. Bloem.

Journal Publications

1. Securing a Compiler Transformation, *Formal Methods in System Design (FMSD) 53(2), 2018 [Special Issue for SAS 2016]* (with Chaoqiang Deng)

2. Model Checking in Bits and Pieces, *EPTCS 129: Festschrift for David Schmidt, 404-416, 2013*

3. On the Completeness of Compositional Reasoning, *ACM Trans. on Computational Logic (TOCL) 11(3), 2010* (with Richard J. Trefler)

4. Local proofs for global safety properties, *Formal Methods in System Design 34(2): 104-125, 2009* (with Ariel Cohen)

5. Telco meets the Web: Programming Shared Experience Services, *Bell Labs Technical Journal (BLTJ) 14(3): 167-185, 2009* (with Bob Arlein, Dennis Dams, Rick Hull, and John Letourneau)

6. Feature specification and automated conflict detection, *ACM Trans. Softw. Eng. Methodol. (TOSEM), vol. 12, num. 1, 2003* (with Amy P. Felty)

7. On Reasoning About Rings, *Int. J. Found. Comput. Sci., vol. 14, num. 4, 2003* (with E. Allen Emerson)

8. Environment modeling and language universality, *ACM Trans. Design Autom. Electr. Syst. (TODAES), vol. 5, num. 3, 2000* (with Richard Raimi and Ramin Hojati)

Conference Publications

1. Synthesis of coordination programs from linear temporal specifications, *POPL 2020* (with Suguman Bansal, Yaniv Sa'ar)

2. Witnessing Secure Compilation, *VMCAI 2020* (with Lucas M. Tabajara)

3. The Impact of Program Transformations on Static Program Analysis, *SAS 2018 (co-winner of the Radhia Cousot Award)* (with Zvonimir Pavlinovic)

4. Synthesis of Asynchronous Reactive Programs from Temporal Specifications, *CAV 2018* (with Suguman Bansal, Yaniv Sa'ar)

5. Symmetry Reduction for the Local Mu-Calculus, *TACAS 2018* (with Richard J. Trefler)

6. Witnessing Network Transformations, *RV 2017* (with Chaoqiang Deng)

7. Securing the SSA Transform, *SAS 2017* (with Chaoqiang Deng)

8. Leveraging Static Analysis Tools for Improving Usability of Memory Error Sanitization Compilers, *QRS 2016* (with Rigel Gjomemo, Phu H. Phung, Edmund Ballou, V. N. Venkatakrishnan, Lenore D. Zuck)

9. Securing a Compiler Transformation, *SAS 2016* (with Chaoqiang Deng)

10. Loopy: Programmable and Formally Verified Loop Transformations, *SAS 2016* (with Nimit Singhania)

11. Parameterized Compositional Model Checking, *TACAS 2016* (with Richard J. Trefler)

12. Loop Freedom in AODVv2, *FORTE 2015* (with Richard J. Trefler)

13. Analysis of Dynamic Process Networks, *TACAS 2015* (with Richard J. Trefler)

14. From Verification to Optimizations, *VMCAI 2015: 300-317* (with Rigel Gjomemo, Phu H. Phung, V. N. Venkatakrishnan, Lenore D. Zuck)

15. A Witnessing Compiler: A Proof of Concept, *RV 2013: 340-345* (with Giacomo Tagliabue, Lenore D. Zuck)

16. Witnessing Program Transformations, *SAS 2013: 304-323* (with Lenore D. Zuck)

17. Uncovering Symmetries in Irregular Process Networks, *VMCAI 2013: 496-514* (with Richard J. Trefler)

18. Formalization and Automated Verification of RESTful Behavior, *CAV 2011: 541-556* (with Uri Klein)

19. The inherent difficulty of timely primary-backup replication, *PODC 2011: 349-350* (with Pramod V. Koppol, Thanos Stathopoulos, Gordon T. Wilfong)

20. A Dash of Fairness for Compositional Reasoning, *CAV 2010: 543-557* (with Ariel Cohen, Yaniv Sa'ar)

21. SPLIT: A Compositional LTL Verifier, *CAV 2010: 558-561* (with Ariel Cohen, Yaniv Sa'ar)

22. Parallelizing a Symbolic Compositional Model-Checking Algorithm, *Haifa Verification Conference 2010: 46-59* (with Ariel Cohen, Yaniv Sa'ar, Lenore D. Zuck, Katya I. Kisyova)

23. Robust and Fast Pattern Matching for Intrusion Detection, *INFOCOM 2010: 740-748* (with Girija J. Narlikar)

24. Simple and fast biased locks, *ACM PACT 2010: 65-74* (with Nalini Vasudevan, Stephen A. Edwards)

25. Local Proofs for Linear-Time Properties of Concurrent Programs, *CAV 2008, LNCS 5123* (with Ariel Cohen)

26. Pointer Analysis, Conditional Soundness, and Proving the Absence of Errors, *SAS 2008, LNCS 5079* (with Christopher L. Conway, Dennis Dams, and Clark Barrett)

27. Local Proofs for Global Safety Properties, *CAV 2007, LNCS 4590 (Invited to Special Issue)* (with Ariel Cohen)

28. Symmetry and Completeness in the Analysis of Parameterized Systems, *VMCAI 2007, LNCS 4349*

29. Incremental Algorithms for Inter-procedural Analysis of Safety Properties, *CAV 2005, LNCS 3576* (with Christopher L. Conway, Dennis Dams, and Stephen A. Edwards)

30. Automata as Abstractions, *VMCAI 2005, LNCS 3385* (with Dennis Dams)

31. The Existence of Finite Abstractions for Branching Time Model Checking, *LICS 2004* (with Dennis Dams)

32. An Efficiently Checkable, Proof-Based Formulation of Vacuity in Model Checking, *CAV 2004, LNCS 3114*

33. Abstraction for Branching Time Properties, *CAV 2003, LNCS 2725*

34. Shape Analysis through Predicate Abstraction and Model Checking, *VMCAI 2003, LNCS 2575* (with Dennis Dams)

35. Abstract Patterns of Compositional Reasoning, *CONCUR 2003, LNCS 2761* (with Nina Amla, E. Allen Emerson, and Richard J. Trefler)

36. Visual Specifications for Modular Reasoning about Asynchronous Systems, *FORTE 2002, LNCS 2529* (with Nina Amla, E. Allen Emerson, and Richard J. Trefler)

37. Certifying Model Checkers, *CAV 2001, LNCS 2102*

38. RTDT: A Front-End for Efficient Model Checking of Synchronous Timing Diagrams, *CAV 2001, LNCS 2102* (with Nina Amla and E. Allen Emerson and Robert P. Kurshan)

39. Assume-Guarantee Based Compositional Reasoning for Synchronous Timing Diagrams, *TACAS 2001, LNCS 2031* (with Nina Amla, E. Allen Emerson, and Richard J. Trefler)

40. Feature Specification and Automatic Conflict Detection, *Feature Interactions Workshop, 2000* (with Amy P. Felty)

41. Model Checking Synchronous Timing Diagrams, *FMCAD 2000, LNCS 1954* (with Nina Amla, E. Allen Emerson, and Robert P. Kurshan)

42. Syntactic Program Transformations for Automatic Abstraction, *CAV 2000, LNCS 1855* (with Robert P. Kurshan)

43. On the Completeness of Compositional Reasoning, *CAV 2000, LNCS 1855* (with Richard J. Trefler)

44. Efficient Decompositional Model Checking for Regular Timing Diagrams, *CHARME 1999, LNCS 1703* (with Nina Amla and E. Allen Emerson)

45. Efficient Analysis of Cyclic Definitions, *CAV 1999, LNCS 1633* (with Robert P. Kurshan)

46. Linking Theorem Proving and Model-Checking with Well-Founded Bisimulation, *CAV 1999, LNCS 1633* (with Panagiotis Manolios and Robert Summers)

47. On Model Checking for Non-Deterministic Infinite-State Systems, *LICS 1998* (with E. Allen Emerson)

48. Verification of a Parameterized Bus Arbitration Protocol, *CAV 1998, LNCS 1427* (with E. Allen Emerson)

49. Automatic Verification of Parameterized Synchronous Systems (Extended Abstract), *CAV 1996, LNCS 1102* (with E. Allen Emerson)

50. Reasoning about Rings, *POPL 1995* (with E. Allen Emerson)