

VITA

Jayadev Misra

Personal Data

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Education

- Johns Hopkins University, Baltimore, Maryland; Ph.D. in Computer Science, 1972.

Work Experience

- (Current Position, as of September 2015)
Professor and Schlumberger Centennial Chair Emeritus
in Computer Science and University Distinguished Teaching Professor
Emeritus, at the University of Texas, Austin.
- Professor and Schlumberger Centennial Chair in Computer Science, the
University of Texas, Austin. From Sept. 2001 to Aug. 2015.
- Chair, Computer Science Dept., the University of Texas, Austin, from
Sept. 1994 to Aug. 1997.
- Assistant Professor, Associate Professor, Professor of Computer Science,
the University of Texas, Austin. From Sept. 1974.
- Visiting Professor, Stanford University, Stanford, California, Sept. 1983-
Aug. 1984.

Awards, Honors

- Member of the National Academy of Engineering (US), 2018.
- Harry H. Goode Memorial Award, IEEE, 2017.
- Distinguished Alumnus, I.I.T., Kanpur, 2014.
- Doctor Honoris Causa from the École Normale Supérieure de Cachan,
France, 2010.

- Identified as a “highly cited researcher” by Thomson Reuters ISI, 2004.
- John Simon Guggenheim Fellow, 1989.
- Fellow of the ACM, 1995.
- Fellow of the IEEE, 1992.
- Fellow of the IFIP, 2023.
- Regents’ Outstanding Teaching Award, University of Texas, 2010.
- University Distinguished Teaching Professor, 2009.
- Teaching Excellence Award, College of Natural Sciences, University of Texas, Austin, 2005.

Publications

Books and Book Chapters

1. *Effective Theories in Programming Practice*, ACM Books, 2023.
2. (Co-edited with Cliff B. Jones) *Theories of programming, the life and works of Tony Hoare*, ACM, 2021.
3. *A Discipline of Multiprogramming*, Jayadev Misra, Springer-Verlag, 2001. Some of the chapters are available at <http://www.cs.utexas.edu/users/misra/discipline.pdf>
4. *Parallel Program Design: A Foundation*, K. Mani Chandy and Jayadev Misra, Addison-Wesley, 1988.
5. (Chapter) “Powerlist: A Structure for Parallel Recursion,” in *A Classical Mind: Essays in Honor of C. A.R. Hoare*, Prentice Hall, January 1994.
6. (Chapter) (with K. Mani Chandy) “Proofs of Distributed Algorithms: An Exercise,” *Developments in Concurrency and Communication*, U.T. Year of Programming Series, Addison-Wesley, 1990.
7. (Co-edited with W. H. J. Feijen, A. J. M. van Gasteren and D. Gries) *Beauty is our Business* (in the Series, *Texts and Monographs in Computer Science*, D. Gries, Editor), Springer-Verlag, 1990.
8. (Co-edited with Tobias Nipkow and Emil Sekerinski) *FM 2006: Formal Methods*, LNCS 4085, Springer-Verlag, 2006.

Selected Publications

1. “Bilateral Proofs of Safety and Progress Properties of Concurrent Programs”, Oct. 2016. Unpublished manuscript available at <http://www.cs.utexas.edu/users/misra/BilateralProof.pdf>.
2. “A Denotational Semantic Theory of Concurrent Systems”, Logic, Rewriting, and Concurrency: Essays Dedicated to José Meseguer on the occasion of his 65th Birthday, ed. Narciso Martí-Oliet, Peter Csaba Ölveczky and Carolyn Talcott, Springer LNCS 9200, Aug, 2015, PP 493-518.
3. “Mapping among the nodes of infinite trees: A variation of König’s infinity lemma”, Information Processing Letters, Vol. 15, Issue 5, May 2015, PP 548-549, DOI information: 10.1016/j.ipl.2015.01.005.
4. “Orchestration”, Proc. of FACS (Formal Aspects of Component Software), Springer Verlag, (ed.) Jose Luiz Fiadeiro, LNCS 8348, 2013.
5. “A Secure Voting Scheme based on Rational Self-Interest”, Formal Aspects of Computing: Volume 24, Issue 4 (2012), Page 793-805, Available online at: <http://dx.doi.org/10.1007/s00165-012-0248-1>
6. (with Xiaozhou Li, C. Greg Plaxton) “Maintaining the Ranch Topology”, Journal of Parallel and Distributed Computing, Vol. 70(11), Nov. 2010, pp 1142–1158. Available online at: <http://dx.doi.org/10.1016/j.jpdc.2010.06.004>
7. (with David Kitchin, Adrian Quark) “Quicksort: Combining Concurrency, Recursion, and Mutable Data Structures”, *Reflections on the Work of C.A.R. Hoare*, a Festschrift in honor of his 75th birthday, Springer-Verlag, 2010.
8. (with C.A.R. Hoare) “Preface to special issue on software verification”, ACM Computing Surveys, Vol. 41, No. 4, 18:1-18:3, Oct. 2009.
9. (with C.A.R. Hoare, Gary T. Leavens, Natarajan Shankar) “The verified software initiative: A manifesto”, ACM Computing Surveys, Vol. 41, No. 4, 22:1-22:8, Oct. 2009. <https://doi.org/10.1145/1592434.1592439>
10. (with David Kitchin, Adrian Quark, William Cook) “The Orc Programming Language”, Proceedings of FMOODS/FORTE, Springer Verlag, (ed.) David Lee and Antónia Lopes and Arnd Poetzsch-Heffter, LNCS 5522, pp 1–25, 2009.
11. (with William Cook) “Structured Interacting Computations”, Proceedings of “Software-Intensive Systems and New Computing Paradigms”, Springer Verlag, (ed.) Wirsing et. al., LNCS 5380, pp 139 – 145, 2008.

12. (with C.A.R. Hoare) "Vision of a Grand Challenge Project", *Verified Software: Theories, Tools, Experiments*, LNCS 4171, pp 1–18, Springer Verlag, Berlin, Heidelberg; Accessible at http://dx.doi.org/10.1007/978-3-540-69149-5_1, 2008.
13. (with Ian Wehrman, David Kitchin, William R. Cook) "A Timed Semantics of Orc", *Theoretical Computer Science*, Elsevier, Volume 402, pp 234-248, 2008.
14. (with David Kitchin, Evan Powell) "Simulation using Orchestration", Proceedings of the 12th International Conf., AMAST 2008, Urbana, Illinois, LNCS Vol. 5140, pp 2–15, Springer Verlag, Berlin, Heidelberg; Accessible at <http://www.cs.utexas.edu/~wcook/Drafts/2008/OrcSimulation.pdf>
15. (with William Cook and David Kitchin) "A Language for Task Orchestration and Its Semantic Properties", *Proceedings of the 17th International Conference, Concur 2006 – Concurrency Theory*, Bonn, Germany, August 2006. LNCS 4137, Springer Verlag, Berlin, Heidelberg; Accessible at http://dx.doi.org/10.1007/11817949_32.
16. (with William Cook) "Computation Orchestration: A Basis for Wide-Area Computing", *Journal of Software and Systems Modeling*, May 2006. Accessible at <http://dx.doi.org/10.1007/s10270-006-0012-1>. (A preliminary version appeared in *Engineering Theories of Software Intensive Systems*, pp 285-330, M. Broy et. al. (ed.), Springer-Verlag, 2005).
17. (with X.Li and C. Greg Plaxton) "Concurrent Maintenance of Rings", *Distributed Computing*, June 2006.
18. (with William Cook and Sourabh Patwardhan) "Workflow Patterns in ORC", *Coordination Models and Languages: 8th International Conference, COORDINATION 2006*, Bologna, June 14–16, 2006; proceedings appear as LNCS 4038, ed. Paolo Ciancarini and Herbert Wiklicky (pp 82–96), Springer Berlin / Heidelberg.
19. (with Tony Hoare) "Verified software: theories, tools, experiments". EASST Newsletters, pp 5–17, ISSN 1861-0668, December 2005.
20. (with Tony Hoare) "Verified software: Frequently Asked Questions". EASST Newsletters, pp 18–30, ISSN 1861-0668, December 2005.
21. (with Tony Hoare and Galen Menzel) "A Tree Semantics of an Orchestration Language". *Engineering Theories of Software Intensive Systems*, pp 331–350, M. Broy et. al. (ed.), Springer-Verlag, 2005.
22. "A Programming Model for the Orchestration of Web Services", *Proceedings of the Second International Conference on Software Engineering and Formal Methods (SEFM 2004)*, Beijing, Sept. 2004.

23. (with X.Li and C. Greg Plaxton) “Active and Concurrent Topology Maintenance”, *Proceedings of the 18th International Conference on Distributed Computing*, Lecture Notes in Computer Science, Volume 3274, pp 320–334, 2004.
24. (with Ankur Gupta) “Synthesizing Programs over Recursive Data structures”, Technical Report, TR03-38, Univ. of Texas at Austin, 2003.
25. (with Markus Kaltenbach) “A Theory of Hints in Model Checking,” in *Formal Methods at the Crossroads: from Panacea to Foundational Support*, ed. Bernhard K. Aichernig and Tom Maibaum, LNCS 2757, pp 423-438, Springer-Verlag, 2003.
26. “Derivation of a Parallel String Matching Algorithm”, *Information Processing Letters*, 85(5): 255-260, January 2003.
27. “A Reduction Theorem for Concurrent Object-Oriented Programs,” in *Programming Methodology*, ed. Annabelle McIver and Carroll Morgan, Springer-Verlag, pp 69–92, 2002.
28. (with Young-ri Choi, Amit Garg, Siddhartha Rai, Harrick Vin) “Orchestrating Computations on the World-wide Web,” *Proceedings of the EuroPar 2002*, Paderborn, Germany, August 2002.
29. “A Simple, Object-based View of Multiprogramming,” *Formal Methods in System Design*, Vol. 20, No. 1, pp. 23–45, January 2002.
30. (with Edsger W. Dijkstra) “Designing a Calculational Proof of Cantor’s Theorem,” *American Mathematical Monthly*, May 2001.
31. “A Walk over the Shortest Path: Dijkstra’s Algorithm Viewed as Fixed-Point Computation,” *Information Processing Letters*, 77(2–4), pp 197–200, February 2001.
32. (with Rajeev Joshi) “Maximally Concurrent Programs,” *Formal Aspects of Computing*, 2000, 12: 100–119.
33. (with Rajeev Joshi) “Toward a Theory of Maximally Concurrent Programs,” *Proceedings of the 19th ACM Symposium on Principles of Distributed Computing (PODC 2000)*, July 16-19, 2000, Portland, Oregon.
34. “Generating-Functions of Interconnection Networks,” *Millennial Perspectives in Computer Science: the proceedings of the 1999 Oxford–Microsoft Symposium in honour of Sir Tony Hoare*, St. Catherine’s College, Oxford, September 1999.
35. “Modular Multiprogramming,” *Proc. of the NATO Advanced Study Institute on Calculational System Design*, Marktobendorf, Germany, July 28-August 9, 1998, in *NATO Science Series, Vol. 173*, ed. Manfred Broy and Ralf Steinbrüggen, IOS press, pp. 131–165, 1999.

36. "A Logic for the Design of Multiprogramming Systems," *South African Computer Journal*, Number 22, March 1999, pp 32-46.
37. "An Object Model for Multiprogramming," *Proc. 10 IPPS/SPDP 98 Workshops*, José Rolim (ed.), Lecture Notes in Computer Sciences, Springer-Verlag, Vol. 1388, pp. 881–889, 1998.
38. "A Discipline of Multiprogramming," *ACM Comput. Surv.*, 28 4es (article 49) (Dec. 1996).
39. (with Al Carruth) "Proof of a Real-Time Mutual-Exclusion Algorithm," *Parallel Processing Letters*, Vol 6, No. 2, pp 251-257, 1996.
40. "Powerlist: A Structure for Parallel Recursion," *TOPLAS*, Vol. 16, No. 6, pp. 1737-1767, November 1994.
41. "A logic for Concurrent Programming (in two parts): Safety and Progress" *Journal of Computer and Software Engineering*, Vol.3, No.2, pp 239–300, 1995.
42. "A Discipline of Multiprogramming," Guy E. Blelloch and K. Mani Chandy and Suresh Jagannathan (editors), *Specification of Parallel Algorithms Proceedings of the DIMACS workshop*, 18, 357–381, 1994.
43. (with David Gries) "A Constructive Proof of Vizing's Theorem," *Information Processing Letters*, Vol. 41, No. 3, pp. 131-133, Mar. 1992.
44. "Loosely Coupled Processes," *Future Generations Computer Systems* 8, 269–286, North-Holland, 1992. A preliminary version appeared in *Proc. PARLE '91 Parallel Architectures and Languages Europe, Eindhoven, The Netherlands, June 1991, LNCS 506*, 1–26, 1991.
45. "Phase Synchronization," *Information Processing Letters*, Vol. 38, pp. 81-85, 1991 (Corrigenda, *IPL* 41, p. 59, 1992).
46. "A Perspective on Parallel Program Design," *Research Directions in High-level Parallel Programming Languages*, Mont Saint-Michel, France, June 1991. Published as Springer-Verlag Lecture Notes in Computer Science, J. P. Banâtre and D. Le Métayer (eds.), Vol. 574, pp 2–5.
47. "Equational Reasoning About Nondeterministic Processes," *Formal Aspects of Computing*, 2:2, 167–195, 1990.
48. (with K. M. Chandy) "Proofs of Distributed Algorithms: An Exercise," in *Developments in Concurrency and Communication*, ed. C. A. R. Hoare, Addison-Wesley, pp 305–332, 1990.
49. "Specification Structuring," *Proc. Belgian FNRS, International Chair of Computer Science*, Louvain-la-Neuve, March 18-23, 1990.

50. "Specifying Concurrent Objects as Communicating Processes," *Science of Computer Programming* 14, 159–184, 1990. A preliminary version, "Specifications of Concurrently Accessed Data," appears in *Proc. International Conference on Mathematics of Program Construction, Groningen University, The Netherlands, June 26–30, 1989, LNCS 375*, Springer-Verlag, 1989.
51. "A Simple Proof of a Simple Consensus Algorithm," *Information Processing Letters*, **33**:1, pp. 21–24, 1989.
52. (with K. M. Chandy) "Architecture Independent Programming," *Proc. 3rd International Conference on Supercomputing*, Vol. 3, pp. 345–351, May 1988.
53. (with K. M. Chandy) "Parallelism and Programming: A Perspective," *Proc. of Foundations of Software Technology and Theoretical Computer Science, Pune, India, December 1987*, published as *Lecture Notes in Computer Science*, LNCS 287, Springer-Verlag, 1988.
54. "A Foundation of Parallel Programming," *Proc. 9th International Summer School on Constructive Methods in Computer Science*, Marktobendorf, Germany, July 24–August 5, 1988, in *NATO ASI Series, Vol. F 55*, ed. Manfred Broy, Springer-Verlag, pp. 397–433, 1989.
55. "A Visionary Decision," *Proc. 9th International Summer School on Constructive Methods in Computer Science*, Marktobendorf, Germany, July 24–August 5, 1988, in *NATO ASI Series, Vol. F 55*, ed. Manfred Broy, Springer-Verlag, pp. 1–3, 1989.
56. (with K. M. Chandy) "Another view on Fairness," *Software Engineering Notes* 13, 3 (July 1988), 21, <https://doi.org/10.1145/51696.51698>.
57. (with K. M. Chandy and R. Bagrodia) "A Message Based Approach to Discrete Event Simulation," *IEEE Transactions on Software Engineering*, SE-13:6, 1987.
58. (with K. M. Chandy) "An Example of Stepwise Refinement of Distributed Programs: Quiescence Detection," *ACM Transactions on Programming Languages and Systems*, Vol. 8, No. 3, pp 326–343, July 1986.
59. (with K. M. Chandy) "How Processes Learn," *Journal of Distributed Computing*, 1:40–52, 1986.
60. "Distributed Discrete Event Simulation," *Computing Surveys*, vol.18, No.1, pp 39–65, March 1986
61. (with K. Mani Chandy) "Systolic Algorithms as Programs," *Distributed Computing*, 1:177–183, 1986.

62. (with K. M. Chandy) "A Paradigm for Detecting Quiescent Properties in Distributed Computations," NATO ASI Series, F13, Springer-Verlag Lecture Notes in Computer Sciences, 1985.
63. "Axioms for Memory Access in Asynchronous Hardware," *ACM Transactions on Programming Languages and Systems*, Vol. 8, 1:142-153, 1986.
64. (with K. M. Chandy) "The Drinking Philosophers Problem," *ACM Transactions on Programming Languages and Systems*, Vol. 6, No. 4, pp. 632-646, October 1984.
65. "Detecting Termination of Distributed Computations Using Markers," *PODC*, Montreal, Canada, August 17-19, 1983.
66. (with K. M. Chandy and L. Haas) "Distributed Deadlock Detection," *ACM Transactions on Computer Systems*, Vol. 1, No. 2, pp. 144-156, May 1983.
67. (with David Gries) "Finding Repeated Elements," *Science of Computer Programming*, Vol. 2, pp. 143-152, North-Holland Publishing Company, 1982.
68. (with K. M. Chandy) "Distributed Computation on Graphs: Shortest Path Algorithms," *Communications of the ACM*, Vol. 25, No. 11, pp. 833-837, November 1982.
69. (with K. M. Chandy) "A Distributed Graph Algorithm: Knot Detection," *ACM Transactions on Programming Languages and Systems*, Vol. 4, No. 4, pp. 678-686, October 1982.
70. (with K. M. Chandy and Todd Smith) "Proving Safety and Liveness of Communicating Processes with Examples," *PODC*, Ottawa, Canada, August 1982.
71. (with K. M. Chandy) "A Distributed Algorithm for Detecting Resource Deadlocks in Distributed Systems," *PODC*, Ottawa, Canada, August 1982.
72. (with K. M. Chandy, R. Berry and D. Neuse) "The Use of Performance Models in Systematic Design," *Proceedings of 1982 National Computer Conference*, pp. 251-256, Houston, Texas, June 7-10, 1982.
73. (with K. M. Chandy) "Termination Detection of Diffusing Computations in Communicating Sequential Processes," *ACM Transactions on Programming Languages and Systems*, Vol. 4, No. 1, pp. 37-43, January 1982.
74. (with K. M. Chandy) "Proofs of Networks of Processes," *IEEE* Vol. SE-7, No. 4, pp. 417-426, July 1981.
75. (with K. M. Chandy) "Asynchronous Distributed Simulation Via a Sequence of Parallel Computations," *Communications of the ACM*, Vol. 24, No. 11, pp. 198-206, April 1981.

76. "An Exercise in Program Explanation," *ACM Transactions on Programming Languages and Systems*, Vol. 3, No. 1, pp. 104-109, January 1981.
77. (with K. M. Chandy) "Deadlock Absence Proofs for Networks of Communicating Processes," *Information Processing Letters*, Vol. 9, No. 4, pp. 185-189, November 1979.
78. (with K. M. Chandy) "Distributed Simulation: A Case Study in Design and Verification of Distributed Programs," *IEEE* Vol. SE-5, No. 5, pp. 440-452, September 1979.
79. (with L. Flon) "A Unified Approach to the Specification and Verification of Abstract Data Types," Proceedings of the IEEE Conference on Specifications of Reliable Software, Cambridge, Massachusetts, April 1979.
80. "Space-Time Trade off in Implementing Certain Set Operations," *Information Processing Letters*, Vol. 8, No. 2, pp. 81-85, February 1979.
81. (with K. M. Chandy and V. Holmes) "Distributed Simulation of Networks," *Computer Networks*, Vol. 3, pp. 105-113, January 1979.
82. (with D. Gries) "A Linear Sieve Algorithm for Finding Prime Numbers," *Communications of the ACM*, Vol.21, No. 12, pp. 999-1003, December 1978.
83. "Some Aspects of the Verification of Loop Computations," *IEEE* Vol. SE-4, No. 6, pp. 478-486, November 1978.
84. (with K. M. Chandy) "A Nontrivial Example of Concurrent Processing: Distributed Simulation," *Proceedings of COMPSAC*, 1978, available from IEEE.
85. "An Approach to Formal Definitions and Proofs of Programming Principles," *IEEE* Vol. SE-4, No. 5, pp. 410-413, September 1978.
86. "A Technique of Algorithm Construction on Sequences," *IEEE-TSE*, January 1978.
87. "Prospects and Limitations of Automatic Assertion Generation for Loop Programs," *SIAM Journal on Computing*, Vol. 6, No. 4, December 1977.
88. (with S. Kundu) "A Linear Tree Partitioning Algorithm," *SIAM Journal on Computing*, Vol. 6, No. 1, pp. 151-154, March 1977.
89. (with S. K. Basu) "Some Classes of Naturally Provable Programs," *Proceedings of the 2nd International Conference on Software Engineering*, San Francisco, California, October 1976.
90. "A Principle of Algorithm Design on Limited Problem Domain," *Proceedings of the 13th Annual Design Automation Conference*, San Francisco, California, June 1976.

91. “Remark on Algorithm 246[Z],” *ACM Transactions on Mathematical Software*, Vol. 1, No. 3, September 1975.
92. (with R. E. Tarjan) “Optimal Chain Partitions of Trees,” *Information Processing Letters*, Vol. 4, No. 1, pp. 24-26, September 1975.
93. “Relations Uniformly Conserved by a Loop,” *9th International Symposium on Proving and Improving Programs*, Are-et-Senans, France, July 1975.
94. (with S. K. Basu) “Deterministic Generation of Inductive Assertions,” IEEE Workshop on Automated Theorem Proving, Argonne National Laboratory, Argonne, Illinois, June 3-5, 1975.
95. (with S. K. Basu) “Proving Loop Programs,” *IEEE* Vol. SE-1, No. 1, pp. 76-86, March 1975.

Keynotes and Invited Lectures

- “A Denotational Semantic Theory of Concurrent Systems”, Invited talk at the Festschrift of Jose Meseguer, Urbana, Illinois, Sept. 2015.
- “Orchestration”, Keynote talk at FACS 2013, Nanchang, China, Oct. 2013.
- “Structured Orchestration of Data and Computation”, Keynote talk at WRiPE, The 2nd International Workshop on Rigorous Protocol Engineering, Austin, Tx., Oct. 2012.
- “The Challenge of Exascale”, Keynote talk at ASCR Exascale Programming Challenges Workshop, Marina del Rey, CA., July 2011.
- “Describing Simulations in the Orc Programming Language”, Keynote talk at Principles of Advanced and Distributed Simulation (PADS 2009), June 2009.
- “The Orc Programming Language”, Keynote talk at Forte/FMOODS, Lisbon, Portugal, June 2009.
- “Wide-area Computing”, Distinguished talk at Research Triangle Park Lecture Series (N. Carolina State Univ., Univ. of N. Carolina, Duke Univ.), Sept. 2008.
- “Is Network a Computer? Writing Programs that run over the Internet.”, Invited talk at MetroCon. 2007, Oct. 2007, Dallas.
- “Structured Concurrent Programming”, Distinguished talk at Univ. of Toronto, Sept. 2007.
- “Structured Concurrent Programming”, Invited talk at Univ. of Waterloo, Sept. 2007.

- “Structured Concurrent Programming”, Invited talk at Cal Tech., Feb. 2007.
- “Structured Concurrent Programming”, Distinguished talk at UCLA, Feb. 2007.
- “Structured Concurrent Programming”, Distinguished talk at Univ. of Calif. at San Diego, Jan. 2007.
- “Structuring Web-based Computations”, Invited talk at FMCO 2006, Amsterdam, The Netherlands, Nov. 2006.
- “Structuring Web-based Computations”, Keynote talk at TGC 2006 (Trusted Global Computing), Lucca, Italy, Nov. 2006.
- “Structured Concurrent Programming”, Invited talk at Stanford Univ., Oct. 2006.
- “Structured Concurrent Programming”, Invited talk at Cornell Univ., Sept. 2006.
- “Structured Concurrent Programming”, Invited talk at MIT, Sept. 2006.
- “A Theory of Orchestration”, Invited talk at Carnegie Mellon University, April 2006.
- “Verified Software: The Next Step”, Keynote talk at HCSS conference organized by NSA, Washington D.C., April 2006.
- “Web-based Computing”, Distinguished talk at Rice Univ., Nov. 2005.
- “Computation Orchestration”, Keynote talk at Coordination 2005, Namur, Belgium, April 2005.
- “A Theory of Orchestration”, Keynote talk at Software Engineering and Formal Methods (SEFM) 2004, Beijing, Sept. 2004.
- “Computation Orchestration”, NATO Summer School at Marktoberdorf, Germany, August 2004.
- “Computing with Distributed Resources,” Keynote talk at Joint Modular Languages Conference (JMLC), Klagenfurt, Austria, August 2003.
- “Computations over Wide area networks”, Univ. of Illinois, Urbana, May 2003.
- “Computing on the World-Wide-Web,” Keynote talk at Euro-Par 2002, Paderborn, August 2002.
- “Formal Methods in Practice”, UNU School on Formal Methods, Pune, India, Jan 2002.

- “Orchestrating Computations on the World-Wide-Web,” Keynote talk at the 8th Asia-Pacific Software Engineering Conference, Macau, Dec. 2001.
- “Object-Oriented Programming for Wide-Area Computing,” Keynote talk at Formal Methods Europe, 2001, Berlin, March 2001.
- “Object-Oriented Programming for Wide-Area Computing,” Keynote talk at the 6th Annual Conference on Formal Methods for Open Object-Based Distributed Systems, FMOODS’2000, Stanford University, September 2000.
- “A Notation for Hypercubic Computations,” Keynote address at the 6th International Conference on High Performance Computing, Calcutta, India, December 99.
- “A Simple, Object-based View of Multiprogramming,” Keynote address at the High Performance Computing Workshop at the IEEE IPDS/SPDP conference, San Juan, Puerto Rico, April 1999.
- “A Simple View of Multiprogramming,” APL, Johns Hopkins University; CyberTech Seminar, February 1999.
- “A Discipline of Multiprogramming,” 9th International Summer School on Constructive Methods in Computer Science, Marktoberdorf, Germany, July 29, 1998 – August 8, 1998.
- “A Discipline of Multiprogramming,” University of Cape Town, S. Africa, Winter School in Formal Methods, July 1998.
- “Powerlist,” Strachey Memorial Lecture, Oxford University, October 1996.
- “Modular Multiprogramming,” United Nations University, Macau (a series of lectures for a school in Programming Methodology), Jan. 1994.
- “A Discipline of Multiprogramming,” Supercomputing Research Center, Maryland, March 1994.
- “Powerlist,” Distinguished Speaker, Cornell University, September 1993.
- “Loosely Coupled Processes,”
 - Keynote Speaker, WDAG, Haifa, Israel, October 1992.
 - Italian Chapter of the ACM, University of Siena, Italy, September 1991.
 - Keynote Address, Conference on Parallel Architectures and Languages Europe, (PARLE ‘91), The Netherlands, June 1991.
 - Workshop on Research Directions in High-Level Parallel Programming Languages, France, June 1991.
 - Louisiana Distinguished Speakers Series, University of Southwestern Louisiana and Nichols State University, December 1990.

- Distinguished Speakers Series, the Graduate School of the City University of New York, November 1990.
- Invited Speaker, 28th Annual Allerton Conference on Communication, Control and Computing, October 1990.
- “Parallel Program Design,” The Universities of Pisa and Bologna, Italy, May 1991.
- “Toward Systematic Design of Reactive Systems: A Theory and Its Applications,” Belgian FNRS International Chair of Computer Science (a series of lectures under the auspices of the Belgian NSF and IBM Belgium), Belgium March 1990.
- “Specifying Concurrent Data Objects,” DEC, Palo Alto, CA and SRI, Menlo Park, CA, January 1990.
- “Parallel Program Design: A Foundation,” Parallel Programming Workshop, arranged by the Italian Chapter of the ACM, Bologna, Italy, October 1989.
- “Specifications of Concurrently Accessed Data,” RuG International Conference on Mathematics of Program Construction, Groningen University, The Netherlands, June 1989.
- “Concurrent Data Specification,” Royal Institute of Technology, Stockholm, Sweden, May 1989.
- “Specifications of Reactive Systems,” Swedish Institute for Computing Science, Spanga, Sweden, May 1989.
- “How to Specify Reactive Programs,” UCLA Distinguished Speakers Series, The University of California at Los Angeles, California, October 1988.
- “UNITY and Parallel Program Design,” The Workshop on Techniques of Rigorous Software Design, Bull HN Information Systems, Inc., Phoenix, Arizona, September and November, 1988.
- “Parallelism and Programming,” Pennsylvania State University, State College, Pennsylvania, September 1988.
- “A Foundation of Parallel Programming,” Rice University, Houston, Texas, September 1988.
- Key Lecturer, “A Foundation of Parallel Programming,” 9th International Summer School on Constructive Methods in Computer Science, Marktoberdorf, Germany, July 24-August 5, 1988.
- “On Parallel Program Design,” ICALP Summer School on Formal Methods in Programming, Orivesi, Finland, July 18-22, 1988.

- “Proofs of Distributed Termination Algorithms,” Workshop on Concurrency in Hardware and Software, La Jolla, California, February 22-26, 1988.
- “Parallelism and Programming: A Perspective,” 7th Conference on Foundations of Software Technology and Theoretical Computer Science, Pune India, December 1987.
- “Parallel Program Design,” Institute on Encapsulation, Modularization, and Reusability, U.T. Year of Programming, Austin, Texas, April 1987.
- “A Foundation of Parallel Program Design,” Institute of Concurrent Programming, U.T. Year of Programming, Austin, Texas, March 1987.
- “Search for a Unified Framework of Programming,” November 1986,
 - Carnegie Mellon University, PA.
 - Yale University, CT.
 - University of Groningen, The Netherlands.
- “A Foundation of Programming Based on Nondeterminism,” three-lecture series presented at the Microelectronics and Computer Technology Corporation (MCC), Austin, Texas, Spring 1986.
- “A Model for Nondeterministic Computations,” California Institute of Technology, Pasadena, California, December 1985.
- “Reasoning About Networks of Communicating Processes,” Advanced Nato Study Institute on Logics and Models for Verification and Specification of Concurrent Systems, La Colle-Sur-Loup, France, October 10-19, 1984.
- “Multilevel Synchronization,” Workshop on Reasoning About Cooperating Agents and Concurrent Processes, sponsored by the Center for the Study of Languages and Information of the Stanford Research Institute, Monterey Dunes, California, August 22-24, 1984.
- “The Drinking Philosophers Problem,” IFIP Working Group 2.3 on Programming Methodology, University of Victoria, Victoria, Canada, July 22-27, 1984.
- “Concurrency in the Small,” United States-United Kingdom Joint Conference on the Semantics of Concurrency, Carnegie-Mellon University, July 9-11, 1984.
- “Distributed Simulation,” Tutorial given at IEEE Fourth International Conference on Distributed Computing Systems, San Francisco, California, May 14-18, 1984.

- “Nondeterminism,” “Conflict Resolution” and “Multilevel Synchronization,”
 - Carnegie-Mellon University, April 1985.
 - Cornell University, April 1985.
 - IFIP Working Group 2.3, Manchester, England, April 1985.
 - Yale University, September 1984.
 - IBM T. J. Watson Research Center, July 1984.
 - University of Washington, May 1984.
 - California Institute of Technology, March 1984.
 - Xerox Palo Alto Research Center, March 1984.
 - IBM San Jose Research Center, March 1984.
 - IBM T. J. Watson Research Center, February 1984.
 - University of California at Los Angeles, January 1984.
 - Stanford University, December 1983.
 - University of Manchester, England, November 1983.
 - University of California at Berkeley, October 1983.
- “Distributed Systems,” University of Southern California, Los Angeles, California, December 1982.
- “Distributed Deadlock Detection,” IBM T. J. Watson Research Center, Yorktown Heights, NY, August 1982.
- “A Case Study in Distributed Algorithm Development: Deadlock Detection,”
 - Cornell University, May 1982.
 - University of Waterloo, Canada, May 1982.
 - Georgia Institute of Technology, May 1982.
- “Reasoning About Communicating Processes,” University of Maryland, College Park, Maryland, November 1981.
- (with K. Mani Chandy) “A Performance Modeling System,” National Computer Conference '81, Chicago, Illinois, June 1981.
- “Performance Models of Computing Systems,” MITRE Corporation, Houston, Texas, April 1981.
- “Diffusing Simulation” and “Correctness Issues in Simulation” (with K. M. Chandy), presented at the SICSIM: Special Interest Committee for Simulation Conference sponsored by the ACM. Held at Columbia University, New York, New York, April 20-22, 1980.

- “Distributed Simulation,” IBM Research, Zurich, Switzerland, March 1980.
- “Design, Analysis and Efficient Implementation of Combinatorial Algorithms,” a one-week course given at Weggis, Switzerland, June 25-28, 1979 and Neuchatel, Switzerland, March 3-6, 1980, sponsored by the Swiss chapter of the ACM.

Current Research

I have been developing a theoretically sound and practical approach to structured concurrent programming by orchestration of asynchronous activities, in a project called *Orc*. Complete information about *Orc*, including instructions for freely downloading the system to a host computer, is available at <http://orc.csres.utexas.edu/>

Students

Ph.D. Dissertations Supervised

- David Kitchin, “Orchestration and Atomicity,” co-supervised with William Cook, August 2013.
- Xiaozhou Li, “Ranch: A Dynamic Network Topology,” co-supervised with Greg Plaxton, August 2004.
- William Adams, “Untangling the Threads: Reduction for a Concurrent Object-based Programming Model,” August 2000.
- Rajeev Joshi, “Immediacy: A Technique for Reasoning about Asynchrony,” December, 1999.
- Jacob Kornerup, “Data Structures for parallel recursion,” August 1997.
- Markus Kaltenbach, “Interactive Verification Exploiting Program design Knowledge: A Model Checker for UNITY,” December 1996.
- Ernest S. Cohen (Co-Supervisor), “Modular Progress Proofs of Asynchronous Programs,” December 1992.
- J. R. Rao, “Building on the UNITY Experience: Compositionality, Fairness and Probability in Parallelism” August 1992.
- Edgar Knapp, “Refinement as a Basis for Concurrent Program Design”, May 1992.
- Mark G. Staskauskas, “Specification and Verification of Large-Scale Reactive Programs,” May 1992.
- Ambuj Singh (Co-Supervisor), “Ranking in Distributed Systems,” December 1989.

- Devendra Kumar (Co-Supervisor), “Efficient Algorithms for Distributed Simulation and Related Problems,” May 1987.
- Rajive Bagrodia (Co-Supervisor), “An Environment for the Design and Performance Analysis of Distributed Systems,” May 1987.
- M. Seethalakshmi (Co-Supervisor), “Performance Analysis of Loosely Coupled Computer Systems,” May 1983.
- Martin J. Ossefort, “A Unified Approach to Formal Verification of Network Safety Properties,” August 1982.
- Laura Myers Haas (Co-Supervisor), “Two Approaches to Deadlock in Distributed Systems,” May 1981.
- Paul Reynolds, “Parallel Processing Structures: Languages, Schedules and Performance Results,” December 1979.
- Mike Conner (Co-Supervisor), “Process Synchronization by Behavior Controllers,” December 1978.
- Victor Holmes, “Parallel Algorithms on Multiple Processor Architectures,” October 1978.
- David Matuszek, “Disjunctive Complexity of Assertions as a Model of Perceived Complexity of Programs,” August 1978.

Masters Theses Supervised

- Shirish Rai, May 2005
- Ingolf Krueger, August 1996
- James Robert Palmer, August 1983.
- Rajive Bagrodia (Co-Supervisor), May 1983.
- Patricia R. Tittizer, May 1982.
- William F. Quinlivan, III, May 1981.
- William David Young, December 1980.

Undergraduate Theses Supervised

- Chand T. John, 2003

Past Editorships

- Associate Editor, *Computing Surveys*, 1992–1994.
- Associate Editor, *Information Processing Letters*, 1989–1994.
- Associate Editor, *Formal Aspects of Computing*, 1989–1991.
- Associate Editor, *Journal of the Association of Computing Machinery*, 1984–1991.

Major External Service

- I jointly spearheaded, with Sir Tony Hoare, an international Grand Challenge Project on Automated Verification.
- Member of the Scientific Advisory Board, ERC Advanced Investigator Grant project “Concurrency Made Easy”, ETH, Zurich.
- Program co-Chair, FM 06, Hamilton, Canada, Aug. 2006.
- Chair, IEEE Emanuel R. Piore Award committee for the years 2004 and 2005.
- Member of the scientific evaluation committee to evaluate the John von Neumann Minerva Center for Formal Verification of Reactive Systems at the Weizmann Institute of Science in Israel in August 2004. The center is funded by The Minerva Foundation, a subsidiary of the Max Planck Society, Germany.