Carl Tropper
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Personal
American born
Married, 3 children

Education
McGill University, Montreal, Canada - B.Sc. (Mathematics) 1968
Polytechnic Institute of New York - Ph.D. (Mathematics) 1973.

Academic, Research and Industrial Experience
McGill University 1984-present, Associate Professor of Computer Science,
School of Computer Science, Montreal, Canada
My current major research interest centers about the distributed discrete-event simulation of VLSI circuitry. I am at present collaborating with Nortel Telecommunications on a project for the distributed simulation of large circuits which are being supplied by Nortel. The circuits are described in Verilog.
My other major interest is the distributed simulation of wireless networks. In that field I have developed channel access algorithms and assessed their performance in a large network via distributed simulation.
I have worked in the area of distributed simulation since its inception and have developed algorithms belonging to both of the major classes of synchronization algorithms for distributed simulation, known as the conservative and optimistic classes of algorithms. In addition, I have also developed load-balancing algorithms for both of these classes.
My broader interests lie in the areas of distributed systems. At McGill and at BBN (Cambridge, Mass.) I did research in computer networks, focusing on algorithms for routing and flow control and on their performance. BBN is well known for having developed the ARPANET, the research predecessor of the INTERNET and for having implemented TCP/IP, the communications layer for the INTERNET.

California Institute of Technology, Pasadena, California
Sabbatical year 1991-92
My sabbatical was spent at the Jet Propulsion Laboratories of the California Institute of Technology, working on a project whose goal it was to verify the sequence of commands sent to a spacecraft. I developed a synchronization mechanism to execute the verification model on a distributed memory machine. They can easily be modified to take advantage of a shared memory environment. The algorithms are based on a conservative synchronization strategy, and were implemented on an Intel i860 machine.

Bolt, Beranek and Newman, 1982-84, Cambridge, Mass, Senior Scientist
As part of a network design and performance group, I worked on a number of projects whose principle orientation was to develop new routing algorithms and flow control strategies for the

ARPANET. The ARPANET was the research predecessor of the INTERNET and was both designed and implemented by BBN. After doing this pioneering research, BBN for some time built networks for both government and private sector clients based on this technology.
I also participated in the Packet Radio project. Again, my orientation on this project was towards the development of routing and flow control algorithms.

MITRE Corporation, Bedford, Mass.,1978-82, Member, Technical Staff
As a member of the local area networking group at MITRE, I participated in design studies for the Air Force and other DOD clients. The local area networking group at MITRE was one the first developers of Ethernet technology, pioneering a broadband approach.
While at MITRE, I wrote a book on the performance of local area networks. It contained a description of the (current) LAN access protocols, and compared their performance via both queuing and simulation models.

Boeing Computer Services, McLean, Virginia, 1976-78 Senior Analyst
I participated in the development of a combined arms simulation model for the Air Force.

Rutgers University, 1973-76, Department of Mathematics
I taught undergraduate mathematics courses. During my tenure at Rutgers, I also worked for *Data Systems Analysts*, a company which developed real-time software for airplane flight controllers.

Journal Publications

1. "Scalable Clustered Time Warp and Logic Simulation", with H. Avril, the *VLSI Design,Special Issue on Current Advances in Parallel Logic Simulation*, Gordon-Breach, vol9,no3,pp291-313, 1999.

2. "Clustered Time Warp", with H. Avril, under review at *IEEE Transactions of Parallel and Distributed Systems*

3. "On Learning Algorithms and Balancing Loads in Time Warp", with M. Choe, *IEEE Transactions on Parallel and Distributed Processing*, under review

4. "Conservative Parallel Simulation, a Case Study", with A. Boukerche, accepted for publication by *Journal of Parallel and Distributed Computing*

5. "On the Parallel Simulation of Fixed Channel Allocation Algorithms", with P. Alleyne, accepted for publication in *Wireless Networks*, Baltzer Science Publishers, the Netherlands

6. "A Distributed Algorithm for the Detection of Local Cycles and Knots", with A. Boukerche, *IEEE Transactions on Parallel and Distributed Systems*, August, 1998, pp. 748-758

7. "Parallel Simulation on the Hypercube Multiprocessor", with A. Boukerche, *Distributed Computing*, Springer Verlag, vol.8, no.4, pp.181-191, 1995

8. "On Load Balancing and Process Migration in Time Warp", with D. Glazer, *IEEE Transactions on Parallel and Distributed Computing*, March 1993,pp 318-328

9. "Optimal Packet Size in packet-Switching Networks", with C. Evequoz, *Computer Networks and ISDN Systems*, vol. 25, 1992, pp.387-404

10. "Approximate Analysis of Bulk Closed Queuing Networks", with C. Evequoz, *INFOR*, Feb.1992

11. "The Distributed Simulation of Clustered Processes", with B. Groselj, *Distributed Computing* Springer-Verlag, 1991, pp. 111-121

12. "A New Metric for Dynamic Routing", with D. Glazer,*IEEE Transactions on Communications*, March 1990

13. "On Buffer Allocation in Transport Protocols", with A. Zissopoulos, *Computer Networks and ISDN Systems*, vol. 16, no.5, May 1989, pp. 383-393

14. "On Reassembly Delay in Packet-Switching Networks", C.Evequoz,*Computer Networks and ISDN Systems*,vol.15, no.1 1988, pp.1-25

15. "On Priorities and Performance in Packet-Switching Networks", *Computer Networks and ISDN Systems*, vol 12, no.2, 1987, pp.89-99

16. "Pseudosimulation: An Algorithm for Distributed Simulation with Limited Memory", with B. Groselj,*International Journal of Parallel Programming*, vol15, no5, October 1987, pp.42-82

Papers in conference proceedings

1. "The Dependence List in Time Warp", with J. Zhou, accepted for publication at PADS2001, Los Angeles, California

2. "Stochastic Learning Automata and Flow Control in Time Warp", with M. Choe, SCS, April, 2000.

3. "On Learning Algorithms and Balancing Loads in Time Warp", with M. Choe, PADS99, May2-5, Atlanta, Georgia

4. "The Parallel Simulation of Distributed Channel Allocation Algorithms", with Peter Alleyne, Wireless Communications Workshop, MASCOTS98, Montreal, Canada, June 19-27,1998

5. "On the Dynamic Load Balancing of Clustered Time Warp", with K.el Khatib, HICSS, Hawaii, January, 1999

6. "An Efficient GVT Algorithm using Snapshots", with M. Choe, CSMA98, Orlando, Florida, November, 1998

7. "Parallel Simulation of Billiard Balls using Shared Variables", with P MacKenzie,PADS'96(Proc. 10th Workshop on Parallel and Distributed Simulation), Philadelphia, Penn., May 22-24, 1996

8. "The Dynamic Load Balancing of Clustered Time Warp for Logic Simulation",with H. Avril, PADS'96, Philadelphia, Penn., May 22-24, 1996

9. "SGTNE: Semi-Global Time of the Next Event Algorithm", with A. Boukerche, PADS'95,Lake Placid, New York State, June, 1995, pp.68-77

10. "Clustered Time Warp and Logic Simulation", with H Avril, PADS'95, Lake Placid, New York State, June, 1995, pp.112-119

11. "A Distributed Algorithm for the Detection of Local Knots and Cycles", with A. Boukerche, Ninth International Parallel Processing Symposium, April 1995, Santa Barbara, California

12. "Hierarchical Schedulings of the Time of Next Event Heuristic on Distributed Memory Machines", with A. Boukerche, 28th Annual Simulation Symposium, Phoenix, Arizona

13. "A Static Partitioning and Mapping Algorithm for Conservative Parallel Simulations", with A. Boukerche, PADS94, Edinburgh, Scotland, pp.164-173

14. "Parallel Simulation of Communicating Finite State Machines", with A. Boukerche, PADS93, San Diego, California, May 1993, vol. 23, no.1, pp. 143-151

15. "On the Performance of Time Warp", with N. Krivossidis, International Conference on Parallel Processing, Chicago, Illinois, August, 1992

16. "On Distributed and Pseudosimulation",with C. Cote, PADS92, SCS Simulation Series, vol.24, no.3, pp. 97-107

17. "A Performance Analysis of Distributed Simulation with Clustered Processes", with A. Boukerche, 1991 IEEE Workshop on Parallel and Distributed Computing, SCS vol.23, no.1, pp.112-125

18. "End-to-End Delay of Multiple Packet Messages in Window Flow Controlled Packet-Switched Networks", with C. Evequoz, IEEE INFOCOM, June, 1990

19. "Local Deadlock Detection for Distributed Simulation", with L. Liu, 1990 PADS, SCS vol. 22, no. 1, pp. 64-70

20. "A Deadlock Resolution Scheme for Distributed Simulation", with B. Groselj, 1989 PADS, Tampa, Florida, SCS vol. 21, no. 2, pp.108-113

21. "The Time-of-Next-Event Algorithm", with B. Groselj, PADS88, San Diego, SCS vol. 19,no.3, pp. 25-30

22. "On Re-Assembly Delay in Packet-Switching Networks", with C. Evequoz, INFOCOM'87

23. "A Congestion Based Dynamic Routing Algorithm", with D. W. Glazer ICC'87

24. "On Congestion Based Dynamic Routing ", with D. Glazer, Telecom '87, Geneva, Switzerland, vol. III.3, pp.377-381

25. "On Priorities in a Packet-Switching Network", 19th Annual Hawaiian Conference on System Science, Honolulu, Hawaii, 1986.

26. "Distributed Simulation Using a Look-Ahead Algorithm," with B. Groselj, ACM Workshop on Distributed Computing, Amsterdam, Holland, 1986

27. "Priorities and Performance in Packet-Switching Networks", IEEE INFOCOM '86, Miami, Fla.

28. "Re-Transmission Protocols for Ethernet", ICC83, Boston, Mass. IEEE.

Book
Local Computer Network Technologies, Academic Press, 1981.
The book provided a comprehensive overview of access techniques for local area networks swhich were in existence as of the time of its publication. In addition to this description, it also discussed their performance. as determined by both analytical(queuing) and simulation models.

Technical Reports

1. "Window - A Queuing Model of the ARPANET", BBN Internal Report, July 1984.
2. "On Multipath Routing", BBN Internal Report.
3. "Packet size in the ARPANET", BBN Internal Report.
4. "Computerized Models for the Design and Analysis of Computer-Communications Networks", ESD-TR-79-128, MITRE Corp., Bedford, Mass., May, 1979.
5. "Models of Local Networks", ESD-TR-80-111, MITRE Corp., April 1980.
6. "Software Timing Studies for the Hughes Class 1 JTIDS Terminals", Working Papers 23253, MITRE Corp., March 1981.
7. "Applications of Distributed Database Technology to Tactical C3". Working Paper 23323 (joint with D. Lambert and W. Tracton, MITRE Corp. March 1983.

Professional Activities
Editorial board, Parallel and Distributed Computing Practices, Nova Science Publishers, New York
Guest Editor, Journal of Parallel and Distributed Computing (Academic Press), Special Issue on Distributed and Parallel Simulation, scheduled to appear in the spring of 2002.
Guest Editor, Parallel and Distributed Computing Practices, Nova Science Publishers, Special Issue on Distributed and Parallel Simulation, scheduled to appear in the fall of 2001.
Program Co-Chair, ACM MSWIM, Conference on the Modelling and Simulation of Mobile Networks, Boston, August, 2000.
Program Co-Chair, 11th Workshop on Parallel and Distributed Simulation (PADS97), held in Lockenhaus, Austria, June 1997
Program Committee for MASCOTS97 (Sixth International Symposium on Modeling, Analysis, and Telecommunications)
Local and Finance Chair, 9th Workshop on Parallel and Distributed Simulation (PADS95), Lake Placid, New York State, June, 1995
Program Committee for PADS (Parallel and Distributed Simulation Workshop), 1992-01

Research Grants
National Science and Engineering Research Council(NSERC) The Canadian counterpart of the NSF. I have had continuous good support from NSERC at McGill in the form of both research and equipment grants.

Quebec Research Grants(FCAR) Quebec's research grant organization, I have participated in several team grants.
Nortel Corporation(1999) Grant for parallel simulation of VLSI
NSERC Collaborative Research and Development Grant for VLSI simulation, Further support for VLSI simulation with Nortel.

Courses
Operating Systems (undergraduate)
Computer Networks (upper-level undergraduate/graduate)
Distributed Algorithms (upper-level undergraduate/graduate)
Parallel Simulation (seminar; graduate/upper-level undergraduate)

Graduate Students
Doctoral Students. Six Ph.D. students have completed their degree. One will start this spring. One *post-doctoral* fellow spent a year at McGill.
Master's Students. Fifteen M.Sc. students have completed their degree. Three M.Sc.students are under my supervision at present.

References

1. Professor John Cleary
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   University of Waikato, New Zealand
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2. Professor S.J. Turner
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   Department of Computer Science
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   Troy, New York State, 12180, U.S.A.
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