BIOGRAPHICAL SKETCH AND PROFESSIONAL ACTIVITIES
RENSSELAER POLYTECHNIC INSTITUTE
January 19, 2012

I. Personal Data

Name: Christopher D. Carothers
Current Rank: Professor
Department: Computer Science
School: Science

June, 2010	Professor in Department of Computer Science
May, 2008	Associate Head of Computing for Computer Science
May, 2004	Associate Professor in Department of Computer Science
August, 1998	Assistant Professor in Department of Computer Science

Date of Birth: March, 19, 1968

Education Preparation

Ph.D., Computer Science	Georgia Institute of Technology, September 1997
M.S., Computer Science	Georgia Institute of Technology, December 1996.
B.S., Information and Computer Science	Georgia Institute of Technology, December 1991

II. Professional Experience

October, 2005 – December, 2007	**Consultant, Member of Research Staff** General Electric, Research Center
January, 1997 – August, 1998	**Research Scientist**, Georgia Institute of Technology
June, 1996 – September, 1996	**Member of Technical Staff**, MITRE Corporation
June, 1993–October, 1993	**Member of Technical Staff**, Bellcore
June, 1994–September, 1994	**Member of Technical Staff**, Bellcore
January, 1992–March, 1997	**Research Assistant**, Georgia Tech Research Institute

III. Teaching

A. Courses

Date		Number	Title	Enrollment
2011	Spring	CSCI-4320/6340	Parallel Comp. & Prog.	61
2010	Fall	CSCI-2500	Computer Organization	92
2010	Spring	CSCI-4320/6340	Parallel Comp. & Prog.	50
2009	Fall	CSCI-2500	Computer Organization	93
2009	Spring	CSCI-4320/6340	Parallel Comp. & Prog.	50
2008	Fall	CSCI-2500	Computer Organization	80
2008	Spring	CSCI-6964	High-Perf. Par. Dist. Comp.	20
2008	Fall	CSCI-2500	Computer Organization	77
2007	Spring	Special Leave		
2006	Fall	CSCI-2500	Computer Organization	60
2006	Spring	Sabbatical Leave		
2005	Fall	Sabbatical Leave		
2005	Spring	CSCI-4972/6962	Parallel Distributed Simulation Systems	8
2004	Fall	CSCI-4250	Computer Architecture	32
2004	Spring	CSCI-4250	Computer Architecture	40
2003	Fall	No Course	On Parental Leave	
2003	Spring	CSCI-2500	Computer Organization	66
2002	Fall	CSC-4966/6965	Parallel Distributed Simulation Systems	19
2002	Spring	CSCI-2500	Computer Organization	70
2001	Fall	CSCI-4966/6965	Parallel Distributed Simulation Systems	31
2001	Spring	CSCI-2500	Computer Organization	92
2000	Fall	CSCI-4964/6964	Parallel Distributed Simulation Systems	43
2000	Spring	CSCI-2500	Computer Organization	85
1999	Fall	CSCI-2500	Computer Organization	170
1999	Spring	CSCI-2500	Computer Organization	56
1998	Fall	CSCI-2500	Computer Organization	92

B. Student Thesis Supervision

a. **Bachelors**

Undergraduate Research Program (URP)

1. **Andrew Zonenberg**, *Massively Parallel Security Hash-Cracker Using GPUs*. Andrew is constructing what appears to be the one of the worlds fastest if not the fastest hash-cracker systems in the world. Using CUDA on a cluster of seven GPUs (GTX 280s), his system can do 2.1 billion MD5 hash-guesses per second. He is still atempting to improve the performance. *Completed Fall 2009*

2. **Richard Alimi**, *Real-time Detection and Termination of Buffer of Overflow Attacks*. Rich will be developing a new suit of algorithms to be inserted at the system call level of the operating system that will be able to efficiently detect and terminate "buffer overflow" security holes from being used to gain access or corrupt a computer system. *Completed Spring 2005.*
3. **Darling Garcia, and Ron Sze**, *Efficient, Parallel Simulation of the Border Gateway Protocol (BGP)*. Darling and Ron are implementing the BGP Internet routing protocol in our ROSS/ROSS.NET parallel simulation framework. This work is co-advised by Dr. S. Kalyanaraman. *Completed Spring 2004.*
4. **Benjamin Roghani**, *Efficient Parallel Virtual Environments*. Ben is designing a new virtual environment system that leverages state-of-the-art graphics hardware. In particular, he is attempting to develop a new method for doing soft shadowing that will improve the state-of-the-art. *Completed Spring 2004.*
5. **Fred Smith**, *Emulation of Network Protocols Using Existing Source Code Implementations*. Fred will be taking open source network protocols, such as TCP/IP and pulling them out of the OS and running them directly as part of a simulation/ emulation framework. *Completed Spring 2002.*
6. **Mike Peters**, *Perfectly Reversible Parallel Simulation*. Mike designed new algorithms that will enable models to be executed in a perfectly reversible mode of operation (i.e., no state saving). Mike transitioned to the CS M.S. program, completed his M.S. Thesis and is now working at Sandia National Labs. *Completed January 2004.*
7. **Shawn Pearce**, *High-Performance, Real-Time File System*. Shawn is developing a new file system architecture will that enable the reading and writing of data with hard real-time deadlines at a sustained rate of 100 MB/sec and will scale to 1 GB/sec using commodity based hardware. *Completed Fall 2002.*
8. **Shawn Pearce**, *ROSS Parallel Simulation Project*. Shawn developed the data structure and computing architecture for ROSS. This work resulted in two publications, one conference and one journal. Shawn is a co-author on those publications. *Completed Summer 1999.*
9. **Vinny Paceri**, *Mapping the World Wide Web*. Vinny is developing efficient techniques to explore the Internet to ascertain a measure of its size. *Completed Fall 1999.*
10. **Justin Lapre**, *Real-time Spatial Mapping and Referencing of Retinal Images*, Justin is developing a new technique for realizing an embedded real-time system from an existing code base as well as enabling a more efficient memory paging system. *Completed Spring 2003.*
11. **Justin Lapre**, *Linux / Segmented Virtual Memory Project*, Justin was developing a new virtual memory management scheme that will utilize segments on the Pentium-III architecture. *Completed Spring 2000.*

12. **Max Berman**, *Configurable Application View Storage.* Max was responsible for developing an initial simulation model of the view storage architecture. *Completed Spring 2000.*
13. **David Bauer**, *ROSS Parallel Simulation Project.* David developed the computing architecture and core scheduling algorithm for ROSS. This worked results in two publications, one conferences and one journal. David is a co-author on those publications and has since transitioned to the CS PhD program. *Completed Summer 1999.*

b. **Masters**

Graduated Students with Masters Thesis

1. **Thomas Reale**, "Data Routing with Wireless Sensor Networks". Major: Computer Science, December, 2011. Current Employer: Viasat.
2. **Timothy B. Wickberg**, "The RAMdisk Storage Accelerator – A Method of Accelerating I/O Performance on HPC Systems Using RAMdisks". Major: Computer Science, December, 2011. Current Employer: RPI/CCNI.
3. **Jing Fu**, "Parallel I/O Solutions for Large-Scale Partitioned Solver Systems". May, 2010. Current Employer: RPI/RA.
4. **Justin Lapre**, "Process-Level Parallelization of Spatial Referencing". May, 2005. Current Employer: RPI/RA.
5. **Mike Peters**, "An Algorithm for Fully-Reversible Optimistic Parallel Simulation". January, 2004. Current Employer: Sandia National Labs.

Students with Masters Thesis In Progress

1. **David Archibald**, "Distributed Applications Across Embedded Systems", Expected Graduation in December, 2011.
2. **Elsa Gonsiorowski**, "Massively Parallel Variable Order, Variable Gap HMMs", Expected Graduation in December, 2011.

Graduated Students with Masters Project

1. **Larry Bush, May 2003**, "Large-Scale Modeling and Simulation of Hot Potato Routing in Sensor Networks".
2. **Ying "Vicky" Guo, May 2002**, "Multicast Network Models Using Reverse Computation".
3. **Alexei V. Zheglov, May 1999**, "A Study of SNMP MIB Design and Implementation".

c. **Doctoral**

Research Associates / Postdocs

1. **David Bauer**, May 2005 – December 2005.

Graduated Students with Ph.D.

1. **Akintayo Holder, August 2011**, "The Impact of Irregularity on Efficient Large-Scale Integer-Intensive Computing", Major: Computer Science, Current Employer: Google, NYC.
2. **Ryan LaFortune, May 2008**, "Techniques and Data Structures for Efficient Information Access in Distributed Networks", Co-Advised by C.

Busch. Major: Computer Science, Current Employer: MITRE, Bedford MA.

3. **Bouchra Bouqata, September 2006**, "Using Data Mining to Improve HMM Estimation and Complexity", Co-Advised by B. K. Szymanski and M. J. Zaki. Major: Computer Science, Current Employer: General Electric, Corporate Research and Development Center, Niskayuna NY.
4. **David Bauer, December 2005**, "Meta-Simulation Design and Analysis for Large-Scale Networks", Major: Computer Science, Current Employer: Data Tatics, Mclean, VA.
5. **Garrett Yaun, May 2005**, "Efficient Large-Scale Computer Systems and Network Modeling Using Optimistic Parallel Simulation", Major: Computer Science, Current Employer: Google, San Jose CA.

Students with Ph.D. In Progress

1. **Jing Fu:** Thesis under development. Working in the area of modeling and simulation of large-scale networks, Petascale computations and massively parallel file systems. *Jing has completed the CS Ph.D. qualifier exam and will complete the CS Ph.D. research exam by Fall, 2010. His anticipated date of graduation is Spring, 2012.*
2. **Elsa Gonsiorowski:** Thesis under development. Working in the area of modeling large-scale gate-level logic circuits. *Elsa has completed the CS Ph.D qualifer example and will complete the CS Ph.D. research exam by Fall, 2012. Her anticipated data of graduation is Spring, 2013.*
3. **Justin LaPre:** Thesis under development. Working in the area of large-scale network models that leverage massively parallel discrete-event simulation techniques. *Justin is expected to complete the CS Ph.D. qualifier exam by Fall 2010. His anticipated date of graduation is Spring, 2013.*
4. **Ning Liu**, Thesis under development. Working in the area of modeling and simulation of Petascale computations and massively parallel file systems. *Ning has completed CS Ph.D. qualifier exam and will complete the CS Ph.D. research exam by Fall, 2010. His anticipated date of graduation is Spring, 2012 .*

Ph.D. Thesis Committee Membership – Completed

1. **Qi Wu, December 2011**, "Design Techniques to Facilitate the Adoption of Emergine Memory Technologies in Computing Systems", Rensselaer, Electrical and Computer Systems Engineering, Adviser: T. Zhang,
2. **Tuhin Neogi, August 2011**, "Design of a High-Speed and Compact Electro-optic Modulator using SiGe HBT", Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.
3. **Binh Nguyen, August 2011**, "Locally Nonconvex Contact Models and Solution Methods for Accurate Physical Simulation in Robotics", Rensselaer, Computer Science, Adviser: J. Trinkle.
4. **Eyuphan Bulut, May 2011**, "Opportunistic Routing Algorithms in Delay Tolerant Networks", Rensselaer, Computer Science, Adviser: B. K.

Szymanski.

5. **Philip Jacob, August 2010**, "Serial Code Accelerators for Heterogeneous Multi-core Processor with 3D memory", Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.
6. **Xiang Luo, December 2009**, "Dynamic Channel Assignment and Power Allocation Strategies in Multi-Channel Wireless Networks", Rensselaer, Electrical and Computer Systems Engineering, Adviser: K. Kar.
7. **Dawei Ni, December 2009**, "Arbitrary-Order Impulse-Response (IR) Moment Extraction in RLC Interconnect Networks: A Novel Stochastic Algorithm", Rensselaer, Electrical and Computer Systems Engineering, Adviser: Y. LeCoz.
8. **Tiffany Lam, December 2009**, "A Stochastic, Abritrary-Order Impluse-Response Moment-Extraction Algorithm for Uncoupled RC Interconnect Networks", Rensselaer, Electrical and Computer Systems Engineering, Adviser: Y. LeCoz.
9. **Min Zhou, August 2009**, "Petascale Adaptive Computational Flud Dynamics", Rensselaer, Mechanical, Aerospace and Nuclear Engineering, Adviser: K. Jansen.
10. **Aamir Zia, August 2009**, "High-Performance Memory Systems using 3-D IC Technology", Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.
11. **Jin-Woo Kim, August 2009**, "SiGe High Speed Crossbar Switch for Digital Signal Router and Phased Array Antenna Systems", Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.
12. **Yang Liu, December 2008**, "Low-Power Circuit and System Design in Nanoelectronics Regime", Rensselaer, Electrical and Computer Systems Engineering, Adviser: Y. LeCoz.
13. **Anil Kumar Karanam, August 2008**, "A P-Adaptive Stabilized Finite Element Method for Fluid Dynamics", Rensselaer, Computer Science, Adviser: K. Jansen.
14. **Paul Belemjian, August 2008**, "High Speed Adder Design Using BiCMOS SiGe Technology", Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.
15. **Vijay Subramanian, May 2008**, "Transport and Link-Level Protocols for Wireless Networks and Extreme Environments", Rensselaer, Electrical and Computer Systems Engineering, Adviser: S. Kalyanaraman.
16. **Juong-Sik Lee, May 2007**, "Recurrent Auctions in E-Commerce", Rensselaer, Computer Science (CS), Adviser: B. K. Szymanski.
17. **Young Uk Yim, December 2006**, "High Speed Serial Data Transmission Integrated Circuits with Half-Rate Clock and Quarter-Rate Clock in SiGe BiCMOS Technology" Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.

18. **Okan Erdogan, December 2006**, "A Three-Port Pipelined Register File Implemented Using a SIGe HBT BiCMOS Technology", Rensselaer, Electrical and Computer Systems Engineering, Adviser: J. McDonald.
19. **Yongqiang Zhang, August 2006**, "Structured Motifs in Biological Sequences: Localization and Extraction", Rensselaer, Computer Science (CS), Adviser: M. J. Zaki.
20. **Hua Yang, August 2005**, "Architectures for Application-Oriented Information Dissemination in Ad-Hoc Sensor Networks", Rensselaer, Electrical and Computer Systems Engineering , Adviser: B. Sikdar.
21. **David Levermore, August 2005**, "Global Database Query in Collaborative Environments", Rensselaer, Decision Sciences, Adviser: Cheng Hsu.
22. **Omesh Tickoo, May 2005**, "End-to-End Solutions for Real-Time Transmission Over Resource Deficient Networks", Rensselaer, Electrical and Computer Systems Engineering, Adviser: S. Kalyanaraman.
23. **Chi-nan Chiang, July 2005**, "An Information-Theoretic Approach to Storage Management for Middleware Caching", Rensselaer, Computer Science (CS), Adviser: S. Adali.
24. **Huaming Wu, June 2005**, "Supporting Multimedia Applications in Resource Constrained Multihop Wireless Networks", Rensselaer, Electrical and Computer Systems Engineering, Adviser: A. Abouzeid.
25. **Yu Juan (Annie) Zeng, Janurary 2005**, "Wafer-Level Three-Dimensional Cache Architecture Design For Memory-Intensive Applications", Rensselaer, Electrical and Computer Systems Engineering, Advisers: R. J. Gutmann and K. Rose.
26. **Xingzhe Fan, December 2005**, "Robust Nonlinear Control Designs for Communications Networks", Rensselaer, Electrical and Computer Systems Engineering, Adviser: M. Arcak.
27. **Jun Peng, August 2004**, "Multicast Congestion Control and Loss Recovery with Network Assistance", Rensselaer, Electrical and Computer Systems Engineering, Adviser: B. Sidkar.
28. **Yu Liu, July 2004**, "Loosely Coordinated, Distributed Network Simulation", Rensselaer, Computer Science, Adviser: B. K. Szymanski.
29. **Kartikeya Chandrayana, May 2004**, "Novel Placement of Congestion Control Functions in the Internet", Rensselaer, Electrical and Computer Systems Engineering, Adviser: S. Kalyanaraman.
30. **Stephen L. Fitzhugh, April 2004**, "Explicit Rate Congestion Management for Packet Switched Networks", Rensselaer, Electrical and Computer Systems Engineering, Adviser: S. Kalyanaraman.
31. **Li Jiang, July 2003**, "End-To-End Multicast Congestion Control and Avoidance", Rensselaer, Computer Science, Adviser: S. Kalyanaraman.
32. **Tao Ye, March 2003** , "Adaptive Optimization of Network Protocols Using On-line Simulation", Rensselaer, Electrical and Computer Systems

Engineering, Adviser: S. Kalyanaraman.

33. **Jason Liu, January 2003**, "Improvements in Conservative Parallel Simulation of Large-Scale Models", Dartmouth College, Computer Science, Adviser: D. Nicol.
34. **Gang Chen, January 2003**, "Component-Based Simulation", Rensselaer, Computer Science, Adviser: B. K. Szymanski.
35. **David Harrison, December 2001**, "Edge-to-Edge Traffic Control for the Internet", Rensselaer, Computer Science, Adviser: S. Kalyanaraman.
36. **Erman Coskun, July, 2001**, "The Impact of Complexity in Embedded Intelligent Real-Time System", Rensselaer, Engineering Science, Advisers: M. Grabowski and D. Berg.
37. **Hong Shin, December 1999**, "Progress Redundant Vision Algorithms for Real-time Spatial Referencing Application to Laser Retinal Surgery", Rensselaer, Electrical and Computer Systems Engineering, Advisers: B. Roysam, and C. Stewart.

Ph.D. Thesis Committee Membership – In Progress

1. **Ting Xie**, "Mesh Data Management Components for Petascale Adaptive Finite Element Simulations", Rensselaer, Mechanical, Aerospace and Nuclear Engineer, Adviser: M. Shephard, Thesis Candidacy Completed December, 2010.
2. **Sahin Cem Geyik**, "Network Data Modeling Via Grammatical Structures", Rensselaer, Computer Science, Adviser: B. K. Szymanski, Thesis Candidacy Completed March, 2011.
3. **Yiran Li**, "Memory Centric Low Power Digital System Design", Rensselaer, Electrical and Computer Systems Engineering, Adviser: T. Zhang, Thesis Candidacy Complete November, 2011.

C. **Course and Curriculum Development**

In 2000, introduced a senior undergraduate/graduate course in parallel and distributed simulation systems. Course has been offered during the Fall 2000, Fall 2001, Fall 2002 and Spring 2005. In Spring 2008, I offered a new introductory course in High-Performance Parallel and Distributed Computing. This course will re-used the existing course the Computer Science department offers called Parallel Computing at the undergraduate 4000 level and Parallel Programming at the graduate level.

IV. Publications

A. **Books, Monographs** None.

B. **Refereed Articles**

1. **In refereed JOURNAL (articles which are reviewed by peers in the field prior to publication).**
   (a) **Major articles**

1. A. Ovcharenko, O. Sahni, K. E. Jansen, **C. D. Carothers** and M. S. Shephard, "Neighborhood Communication Paradigm to Increase Scalability in Large-Scale Scientific Applications", to appear *Parallel Computing*, 2012.
2. N. Liu, J. Fu, **C. D. Carothers**, O. Sahni, K. E. Jansen and M. S. Shephard, "Massively Parallel I/O for Partitioned Solver Systems", *Parallel Processing Letters*, Volume 20, Number 4, pages 377–395, 2010.
3. M. Zhou, O. Sahni, M. S. Shephard, **C. D. Carothers**, and K. E. Jansen, "Data Reordering Algorithms for Accelaration of Finite Element Computations", *Scientific Programming*, Volume 18, Number 2, pages 107–123, 2010..
4. M. J. Zaki, **C. D. Carothers**, and B. K. Szymanski, "VOGUE: A Novel Variable Order-Gap State Machine for Modeling Sequences", *ACM Transactions on Knowledge Discovery from Data (TKDD)*, Volume 4, Number 1, January 2010, article 5 (31 pages).
5. O. Sahni, **C. D. Carothers**, M. S. Shephard, K. E. Jansen, "Strong Scaling Analysis of an Unstructured, Implicit Solver on Massively Parallel Systems", in *Scientific Programming* Volume 17, Number 3, pages 261–274, 2009.
6. T. J. Hacker, F. Romero and **C. D. Carothers**, "An Analysis of Clustered Failures on Large Supercomputing Systems", in *Journal of Parallel and Distributed Computing (JPDC)*, #69, pages 652–665, 2009.
7. D. Bauer, and **C. D. Carothers**, "Seven-O'clock: A New Distributed GVT Algorithm Using Network Atomic Operations", to appear in *Interational Journal of Simulation and Process Modeling* as part of special issue on Parallel and Distributed Simulation Volume 5, Number 2, pages 79–94, 2009.
8. C. Hsu, David Levermore, **C. D. Carothers**, and G. Babin, "Enterprises Collaboration: On-Demand Information Exchange Using Enterprise Databases, Wireless Sensor Networks, and RFID Systems", to appear in *IEEE Transactions on Systems, Man, and Cybernetics*, Volume 37, Issue 4, pages 519–532, July, 2007.
9. C. Hsu, **C. D. Carothers**, and David Levermore, "A Market Mechanism for Participatory Global Query: A First Step of Enterprise Resources Self-Allocation", *Journal of Information Technology and Management*, Volume 7, Number 2, pages 71–89, April, 2006. `http://www.inderscience.com/browse/index.php?journalID=18`
10. A. Tyrrell, J. LaPre, **C. D. Carothers**, B. Roysam and C. V. Stewart, "Transparent Migration of Off-Line Frame Rate Vision Systems to Real-Time", *IEEE Transactions on Information Technology in Biomedicine*, Volume 8, Number 2, pages 142–153, June, 2004.
11. G. Yaun, **C. D Carothers**, S. Adali and D. Spooner, "Optimistic Parallel Simulation of a Large-Scale View Storage System", *Future Generation*

on Computer Systems (FCGS), Volume 19, Number 4, pages 479–492, November, 2003.

12. G. Yaun, H. L. Bhutada, **C. D. Carothers**, M. Yuksel, and S. Kalyanaraman, "Large-Scale Network Simulation Techniques: Examples of TCP and OSPF Models", *ACM SIGCOMM Computer Communication Review Special Issue on Tools and Technologies for Networking Research and Education*, Volume 33, Issue 3, pages 27–41, July, 2003.
13. **C. D. Carothers**, D Bauer and S. Pearce, "ROSS: A High-Performance, Low Memory, Modular Time Warp System," *Journal of Parallel and Distributed Computing (JPDC)*, #62, pages 1648–1669, 2002.
14. **C. D. Carothers** and B. K. Szymanski, "Checkpointing Multithreaded Programs", *Dr. Dobbs Journal*, # 339, pages 46-51, August, 2002,
15. **C. D. Carothers** and R. M. Fujimoto, "Efficient Execution Time Warp Programs on Heterogeneous, NOW Platforms," *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, Volume 11, Number 3, pages 299–317, March 2000.
16. **C. D. Carothers**, K. S. Perumalla, and R. M. Fujimoto, "Efficient Optimistic Parallel Simulations using Reverse Computation," (journal version). *ACM Transactions on Computer Modeling and Simulation (TOMACS)*, Volume 9, Number 3, pages 224–253, July 1999.
17. **C. D. Carothers**, B. Topol, R. M. Fujimoto, J. T. Stasko, and V. S. Sunderam, "Visualizing Parallel Simulations Executing in Network Computing Environments" (journal version), *Future Generations of Computer Systems (FGCS)*, volume 15, pages 513-529, 1999.

(b) **Journal Articles Under Review or In Preparation**

1. N. Liu, **C. D. Carothers**, J. Cope, P. Carns and R. Ross, "Model and Simulation of Exascale Communication Networks", submitted to *Journal on Simulation*, 2011.
2. A. Holder, **C. D. Carothers** and K. Kalafala, "Prototype for a Large-Scale Static Timing Analyzer running on an IBM Blue Gene", submitted to *IEEE Transactions on Computer Aided Design (TCAD)*, 2011.

2. **In refereed CONFERENCES (articles which are reviewed by peers in the field prior to publication).**

(a) **Major articles**

1. M. Rasquin, P. Marion, V. Vishwanath, B. Matthews, M. Hereld, K. Jansen, R. Loy, A. Bauer, M. Zhou, O. Sahni, J. Fu, N. Liu, **C. D. Carothers**, M. Shephard, M. Papka, K. Kumaran, B. Geveci"Co-Visualization of Full Data and In Situ Data Extracts from Unstructured Grid CFD at 160k Cores", Extended Abstract and Electronic Poster. In *Processings of the 2011 International Conference for High Performance Computing, Networking, Storage and Analysis (SC11).*
2. N. Liu and **C. D. Carothers** and J. Cope, P. Carns, R. Ross, A. Crume and C. Maltzahn, "Modeling a Leadership-scale Storage System", In *Pro-*

ceedings of the 9th Conf. on Parallel Processing and Applied Mathematics as part of Lecture Notes in Computer Science, Oct 2011, proceedings to appear in 2012.

3. A. Holder and **C. D. Carothers**, "Investigating the Memory Characteristics of a Massively Parallel Time Warp Kernel", In *Proceedings 2011 SCS/ACM/IEEE Winter Simulation Conference (WSC 2011)*, December 2011.
4. J. Fu, M. Min, R. Latham and **C. D. Carothers**, "Parallel I/O Performance for Application-Level Checkpointing on the Blue Gene/P System", In *Proceedings of the 2011 Workshop on Interfaces and Abstractions for Scientific Data Storage* part of CLUSTER 2011, September 2011.
5. N. Liu and **C. D. Carothers**, "Modeling Billion-Node Torus Networks Using Massively Parallel Discrete-Event Simulation", In *Proceedings of the ACM/IEEE/SCS 25th Workshop on Principles of Advanced and Distributed Simulation (PADS '11)*, pages 1–8, June 14–17, Nice, France 2011.
6. **C. D. Carothers** and K. S. Perumalla, "On Deciding Between Conservative and Optimsitic Approaches on Massively Parallel Platforms", *Invited & Reviewed*, In *Proceedings of the 2010 SCS/ACM/IEEE Winter Simulation Conference (WSC '10)*, December 2010.
7. J. Fu, N. Liu, O. Sahni, **C. D. Carothers**, K. E. Jansen and M. S. Shephard, "Scalable Parallel I/O Library Alternatives for a Massively Parallel Partitioned Solver Systems", *Proceedings of the 2010 Workshop on Large-Scale Parallel Processing (LSPP)* April 23rd, 2010 as part of the *2010 IEEE International Parallel & Distributed Processing Symposium.*
8. A. Holder, **C. D. Carothers** and K. K. Kalafala, "Large-Scale Massively Parallel Static Timing Analysis", *Proceedings of the 11th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC)* April, 23rd 2010 as part of the *2010 IEEE International Parallel & Distributed Processing Symposium.*
9. A. Narayanaswamy, E. Ladi, Y. Al-Kofahi, Y. Chen, **C. D. Carothers**, E. Robey, and B. Roysam, "5-D Imaging and Parallel Automated Analysis of Cellular Events in Living Immune Tissue Microenvironments", *Proceedings of The 2010 International Symposium on Biomedical Imaging*, Rotterdam, Netherland, April 14-17th, 2010.
10. D. W. Bauer and **C. D. Carothers** "Scalable RF Propagation Modeling on the IBM Blue Gene/L and Cray XT5 Supercomputers", *Invited & Reviewed Paper*, In *Proceedings of the 2009 SCS/ACM/IEEE Winter Simulation Conference (WSC '09)*, December 2009.
11. A. Ovcharenko, O. Sahni, **C. D. Carothers**, K. E. Jansen and M. S. Shephard, "Subdomain Communication to Increase Scalability in Large-Scale Scientific Applications", in *Proceedings of the 23rd ACM International Conference on Supercomputing (ICS)*, pages 497–498, 2009 (short paper) .

12. D. Bauer, **C. D. Carothers** and A. O. Holder, "Scalable Time Warp on Blue Gene Supercomputers", In *Proceedings of the ACM/IEEE/SCS 23rd Workshop on Principles of Advanced and Distributed Simulation (PADS '09)*, pages 35–44, June 22-26, Lake Placid, NY, 2009. **BEST PAPER AWARD**.
13. R. LaFortune, **C. D. Carothers**, W. D. Simth, J. Czechowski and X. Wang, "Simulating Large-Scale P2P Assisted Video Streaming", In *Proceedings of the Hawaii International Conference on System Sciences (HICSS-42)*, Waikoloa, Big Island, Hawaii, January 2009.
14. A. O. Holder, **C. D. Carothers**, "Analysis of Time Warp on a 32,768 Processor IBM Blue Gene/L Supercomputer", In *Proceedings of the 2008 European Modeling and Simulation Symposium (EMSS '08)*, Campora San Giovanni, Amantea (CS), Italy, September 2008.
15. R. LaFortune, **C. D. Carothers**, W. D. Smith and M. Hartman, "An Abstract Internet Topology Model for Simulating Peer-to-Peer Content Distribution", In *Proceedings of the ACM/IEEE/SCS 21th Workshop on Principles of Advanced and Distributed Simulation (PADS '07)*, pages 152–162, June 2007.
16. D. Bauer, **C. D. Carothers**, "Elminating Remote Message Passing in Optimistic Simulation", In *Proceedings of the 2006 SCS/ACM/IEEE Winter Simulation Conference (WSC '06)*, page 995–1003 December 2006.
17. **C. D. Carothers**, R. LaFortune, W. D. Smith and M. Gilder. "A Case Study in Modeling Large-Scale Peer-to-Peer File-Sharing Networks Using Discrete-Event Simulation", *Invited and Reviewed Paper*, In *Proceedings of the 2nd European Modeling AND Simulation Symposium*, Barcelona, Spain, October 2006.
18. B. Bouqata, **C. D. Carothers**, B. K. Szymanski, and M. J. Zaki, "VOGUE: A New HMM based on Mining Periodic Patterns with Variable Gaps", In *Proceedings of 10th European Conference on Principles and Practice of Knowledge Discovery in Databases*, *Berlin, Germany*, September 2006.
19. D. Bauer, M. Yuksel, **C. D. Carothers**, and S. Kalyanaraman, "A Case Study in Understanding OSPF and BGP Interactions Using Efficient Experiment Design", In *Proceedings of the 20th ACM/IEEE/SCS Workshop on Principles of Advanced and Distributed Simulation (PADS '06)*, pages 158–165, *Singapore*, May 2006,
20. G. Yaun, D. Bauer, **C. D. Carothers**, "Sharing Event Data in Optimistically Scheduled Multicast Applications", In *Proceedings of the 2005 Winter Simulation Conference (WSC '05)*, pages 2649–2656, December 2005.
21. D. Bauer, G. Yaun, **C. D. Carothers**, S. Kalyanaraman, and M. Yuksel, "Seven-O'Clock: A New Distributed GVT Algorithm Using Network Atomic Operations", In *Proceedings of the 19th Workshop on Principles of Advanced and Distributed Simulation (PADS '05)*, pages 39–48, June 2005.

22. L. Bush, **C. D. Carothers**, and B. K. Szymanski, "Algorithm for Optimizing Energy Use and Path Resilience in Sensor Networks", In *Proceedings of the 2nd European Workshop on Wireless Sensor Networks*, Istanbul, Turkey, Jan/Feb, 2005.
23. D. Bauer, G. Yaun, **C. D. Carothers**, M. Yuksel and S. Kalyanaraman, "Large-Scale Network Protocol Meta-Simulation Design and Performance Analysis", In *Proceedings of the 2004 Winter Simulation Conference (WSC '04)*, pages 206–214 December 2004.
24. M. Peters and **C. D. Carothers**, "An Algorithm for Fully Reversible Optimistic Parallel Simulation", In *Proceedings of the 2003 SCS/ACM/IEEE Winter Simulation Conference (WSC '03)*, pages 864–871 December 2003.
25. K. Sequeira, M. J. Zaki, B. K. Szymanski, and **C. D. Carothers**, "Improving Spatial Locality using Data Mining", In *Proceedings of the* 9^{th} *Conference on Knowledge Discovery and Data Mining (KDD)*, August 2003.
26. C. Hsu and **C. D. Carothers**, "A Self-Scheduling Model Using Agent-Base, Peer-to-Peer Negotiation and Open Common Schema", In *Proceedings of the* 17^{th} *International Conference on Production Research (ICPR '03)*, Blacksburg VA, August 2003.
27. G. Yaun, **C. D. Carothers**, and S. Kalyanaraman, "Large-Scale TCP Models Using Optimistic Parallel Simulation", In *Proceedings of the* 17^{th} *ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation (PADS '03)*, page 153– 161, June 2003. **BEST PAPER AWARD.**
28. B. Bouqata, **C D. Carothers**, B. K. Szymanski and M. J. Zaki, "Understanding Filesystem Performance for Data Mining Applications", In *Proceedings of the* 6^{th} *Workshop on High-Performance Data Mining*, May 2003.
29. **C. D. Carothers**, "*XSim*: Real-Time Analytic Parallel Simulations", *In Proceedings of the 16th ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation (PADS 2002)*, pages 27–34, June 2002.
30. G. Yaun, **C. D Carothers**, S. Adali and D. Spooner, "Optimistic Parallel Simulation of a Large-Scale View Storage System", In *Proceedings of 2001 SCS/ACM/IEEE Winter Simulation Conference (WSC'01)*, pages 1363–1371, December 2001.
31. **C. D. Carothers**, D. Bauer and S. Pearce, "ROSS: A High-Performance, Low Memory, Modular Time Warp System," In *Proceedings of the 14th ACM/IEEE/SCS Workshop of Parallel on Distributed Simulation (PADS 2000)*, pages 53–60, May 2000.
32. **C. D. Carothers**, K. S. Perumalla, R. M. Fujimoto, "The Effect of State-Saving in Optimistic Simulation on A Cache-Coherent Non-Uniform Memory Access Architecture," In *Proceedings of the 1999 SCS/ACM/IEEE Winter Simulation Conference*, December 1999.
33. **C. D. Carothers**, K. S. Perumalla, R. M. Fujimoto, "Efficient Opti-

mistic Parallel Simulations using Reverse Computation," *Proceedings of the 13th ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation (PADS 99)*, pages 126–135, May 1999. **BEST PAPER AWARD.**

34. **C. D. Carothers**, M. I. Hybinette, and R. M. Fujimoto, "Toward Parallelization of Large-Scale Ada Simulations Using Time Warp," *Proceedings of the 1998 Summer Computer Simulation Conference*, pages 600–606, July 1998.
35. **C. D. Carothers**, B. Topol, R. M. Fujimoto, J. T. Stasko, and V. S. Sunderam, "Visualizing Parallel Simulations in Network Computing Environments," (conference version), *Proceedings of the 1997 SCS/ACM/IEEE Winter Simulation Conference*, pages 110–117, December 1997.
36. **C. D. Carothers**, R. M. Fujimoto, R. M. Weatherly, and A. L. Wilson. "Design and Implementation of HLA Time Management in the RTI version F.0," *Proceedings of the 1997 SCS/ACM/IEEE Winter Simulation Conference*, pages 373–380, December 1997.
37. **C. D. Carothers**, and R. M. Fujimoto, "Background Execution of Time Warp Programs," *Proceedings of the 10th ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation (PADS '96)*, pages 12–19, May 1996.
38. **C. D. Carothers**, R. M. Fujimoto and Y-B. Lin, "A Re-dial Model for Personal Communications Services Networks," *Proceedings of the IEEE 45th Vehicular Technology Conference" (VTC '95)*, pages 135–139, July 1995.
39. **C. D. Carothers**, R. M. Fujimoto and Y-B. Lin, "A Case Study in Simulating PCS Networks Using Time Warp," *Proceedings of the 9th ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation (PADS '95)*, pages 87–94, June 1995.
40. **C. D. Carothers**, R. M. Fujimoto and P. England, "The Effect of Communication Overheads on Time Warp Performance: An Experimental Study," *Proceedings of the 8th Workshop on Parallel and Distributed Simulation (PADS '94)* , pages 118–125, July, 1994.

(b) **Conference Articles Under Review or In Preparation**

1. N/A

3. **Patents**

(a) **Patents Pending**

1. Accelerating Peer-to-Peer Content Distribution, General Electric Corporation. **C. D. Carothers**, J. Czechowski and W. D. Smith.

4. **In non-refereed articles**

(a) **Major articles**

1. D. Bauer, G. Yaun, **C. D. Carothers**, M. Yuksel, and S. Kalyanaraman, "ROSS.Net: An Optimistic Simulation Framework of Large-Scale Internet Models", *Invited Paper*, In *Proceedings of the 2003 SCS/ACM/IEEE Winter Simulation Conference (WSC '03)*, pages 703–711, December 2003.

2. **C. D. Carothers**, R. M. Fujimoto and Y-B. Lin, "Simulating Population Dependent PCS Network Models Using Time Warp," *Invited Paper*, *Proceedings of the 1995 SCS/ACM/IEEE Winter Simulation Conference (WSC '95)*, pages 555–562, December 1995.
3. **C. D. Carothers**, R. M Fujimoto, Y-B Lin and P. England, "Distributed Simulation of Large-Scale PCS Networks,", *Invited Paper*, *Proceedings of the Second International Workshop on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems*, pages 2–6, February 1994.

(b) **Letters of correspondence, book reviews, etc.**

1. **C. D. Carothers**, B. K. Szymanski and M. Zaki, "Performance Mining of Large-Scale Data-Intensive Applications", Extended Abstract, In *Proceedings of the International Parallel and Distribution Processing Symposium (IPDPS 2002)*, April 2002.
2. **C. D. Carothers**, M. J. Zaki, and B. K. Szymanski, "ISSAC: An Intelligent System for Exploiting Speculative Execution and Active Code in Large-Scale Distributed Simulations," (extended abstract), In *Proceedings of the 1999 Dagsthul Workshop on Agent-Based Simulation*, Dagsthul, Germany, May, 1999.
3. **C. D. Carothers**, B. Topol, R. M. Fujimoto, J. T. Stasko, and V. Sunderam, "Middleware-Specific Visualization Support for Parallel Simulations in Cluster Environments," (extended abstract). *Proceedings of the 1997 Cluster Computing Conference (CCC'97)*, May 1997.

(c) **Technical Reports**

1. **C. D. Carothers**, D. Bauer, S. Pearce. "ROSS: Rensselaer's Optimistic Simulation System, User's Guide", Rensselaer Polytechnic Institute Technical Report, TR-02-12, `http://www.cs.rpi.edu/tr/02-12.pdf`, 2002.
2. S. Adali, D. Spooner, and **C. D. Carothers**. "CAVES: A Configurable Application View Storage System," Rensselaer Polytechnic Institute Technical Report, TR-02-2000.

V. **Research Grants and Contracts**
(Give title of project, other senior investigators, starting and completion dates, amount of funding, sponsoring agency.)

A. **Proposals Approved and Funded**

1. "Extreme-Scalable Hybrid Programming for Computation and Upgrading I/O in NekCEM Code", C. D. Carothers (Sole PI/PD). Department of Energy, NekCEM group within the MCS Divsion of Argonne National Labs. *Award Period: Janurary, 2012 – May, 2012*, *Amount Value: $29,500.*
2. "MRI: Acquisition of a Balanced Environment for Simulation", C. D. Carothers (PI), P. Fox, (Co-PI), J. Myers (Co-PI), M. Shephard (Co-PI), L. Zhang (Co-PI). NSF-MRI Program, *Award Period: September, 2011 – August, 2014*, *Amount Value: $2,657,633*

3. "Massively Parallel VHDL Modeling and Simulation Using the ROSS Discrete-Event Simulation Framework", C. D. Carothers (Sole PI/PD), Air Force Research Laboratory, *Award Period: April, 2011 – August, 2012*, *Award Value: $154,775.*
4. "Petascale Adaptive CFD", K. Jansen (PI), C. D. Carothers (Co-PI), O. Sahni (Co-PI), M. Shephard (Co-PI). Department of Energy Early Science Program for computer time on the 800,000 processor "Mira" IBM Blue Gene/Q. *Award Period: To be determined when machine is available in Q3/2011*, *Award Value: 150,000,000 CPU-hours.*
5. "CoDES: Enabling Co-Design of Multi-Layer Exascale Storage Architectures", C. D. Carothers (RPI/PI), Rob Ross (ANL/PI) and Sam Lang (ANL/Co-PI), Department of Energy, Advanced Architectures and Critical Technologies for Exascale Computing Program, *Award Period: September 2010 – August 2013*, *Award Value: $2.3M total, $432K RPI, $1.9M ANL/LLNL.*
6. "Petascale Adaptive CFD for Anisotropic Flows", K. Jansen (PI), C. D. Carothers (Co-PI), O. Sahni (Co-PI), M. Shephard (Co-PI). 2010 Innovative and Novel Computational Impact on Theory and Experiment (INCITE) Award, Department of Energy for computer time on the 163,840 processor IBM Blue Gene/P. *Award Period: Janurary 2010 – Janurary, 2011*, *Award Value: 20,000,000 CPU-hours.*
7. "CRI: CI-P: SPADE: A High-Performance Computing Platform for Support of Robotics Research and Education", J. Trinkle (PI), and Carothers (Co-PI), NSF Computing Research Infrastructure Program, *Contract Period: Oct, 2009 – Sept 2010*, *Award Value: $ 40,000.*
8. "Large-Scale, High-Fidelity 802.11 Network Models Using the ROSS/ROSS.Net Parallel Simulation Framework", C. D. Carothers (Sole PI/PD). Army Research Lab (ARL), *Contract Period: September 2009 – August 2012*, *Award Value: $410,361.*
9. "Advancing the Frontiers of Visualization at Rensselaer", M. S. Shephard (PD), K. E. Jansen (Co-PD), B. M Cutler(Co-PI), C. D. Carothers (Co-PI), B. Roysam (Co-PI), M. Embrechts (Co-PI), A. Todorski (Co-PI). IBM SUR Equipment Award. *Contract Period: May 2009 – April 2010 Award Value: $250,000.*
10. "Petascale Adaptive CFD for Anisotropic Flows", K. Jansen (PI), C. D. Carothers (Co-PI), O. Sahni (Co-PI), M. Shephard (Co-PI). 2009 Innovative and Novel Computational Impact on Theory and Experiment (INCITE) Award, Department of Energy for computer time on the 163,840 processor IBM Blue Gene/P. *Award Period: Janurary 2009 – Janurary, 2010*, *Award Value: 5,000,000 CPU-hours.*
11. "Petascale Adaptive Computational Fluid Dynamics", K. Jansen (PI) , C.D. Carothers (Co-PI), A. Oberai (Co-PI), M. Shephard (Co-PI), NSF/PetaAPPS Program. *Contract Period: September 2008 – August 2011. Contract Value: $1,000,000.*

12. "IBM/CCNI Research Projects: Multithreaded / Parallel Electronic Design Automation (EDA) Applications", C. D. Carothers (PI), International Business Machine (IBM), *Contract Period: October 2007 – August 2011. Contract Value to Date: $211,000 has been committed. Potential for 1 year extension to 2012 for an additional $72,000. Note: this project is part of an umbrella of projects funded by IBM with a total potential value of $2,500,000. Prof. Mark Shephard is the project director for the whole profolio of projects.*
13. "Digital Download Acceleration", C. D. Carothers. NBC/Universal Studios sponsered leave research at General Electric Global Research Center, *Contract Period: Janurary 2007 – August 2007. Contract Value: $100,000.* Used to support Sabbatical leave.
14. "Digital Download Acceleration", C. D. Carothers. NBC/Universal Studios sponsered sabbatical research at General Electric Global Research Center, *Contract Period: September 2005 – August 2006. Contract Value: $100,000.* Used to support Sabbatical leave.
15. "NeTS-NR ROSS.Net: A Platform for Integrated Large-Scale Network Design of Experiments and Simulation", S. Kalyanaraman (Co-PI), and C. D. Carothers (Co-PI), NSF/NeTS-NR Program, CCR-0435259, *Award Period: September 2005 – December 2009*, *Award Value: $500,000.*
16. "MRI: Acquisition of Infrastructure for Research in Grid Computing and Multiscale Systems Computation", M. Shephard (PI), C. D. Carothers (Co-PI), S. Garde (Co-PI), J. Trinkle (Co-PI), and C. Varela (Co-PI), NSF/MRI-0420703, *Award Period: September 2004 – May, 2007*, *Award Value: $500,000.* RPI cost-sharing of $214,000 for a total equipment budget of $714,000.
17. "Improving Spatial Locality Using Data Mining", M. Zaki (PI), C. D. Carothers (Co-PI) and B. K. Szymanski (Co-PI), NSF-NGS, *Award Period: May, 2004 – December, 2005*, *Award Amount: $14,500.*
18. "Tools and Techniques for Internet Protocol Management", AT&T Research Lab, S. Kalyanaraman (PI), B. Sikdar (Co-PI) and C. D. Carothers (Co-PI), *Award Period: January 2002 – May 2007*, *Award Amount: $250,000 total.*
19. "High Performance Robust Network Management: Theoretical Foundation and Practical Design Tools", M. Arcak (Co-PI), B. Azimi-Sadjadi (Co-PI), C. D. Carothers (Co-PI), S. Kalyanaraman (Co-PI), B. Sikdar (Co-PI), J. Wen (PI), Rensselaer Exploratory Seed Program, *Award Period, January 2002 – May, 2003*, *Award Value: $50,000.*
20. "Processing and Display of Volume Images and High Resolution Image Sequences", R. J. Radke (Co-PI), W. A. Perlman (Co-PI), J. W. Woods, (Co-PI), C. D. Carothers (Co-I), Q. Ji (Co-I), K. Rajan (Co-I), X. C. Zhang (Co-I), NSF-EIA, Experimental and Investigative Activities Program, EIA-0224433, *Award Period: August, 2002 – July, 2004*, *Award Value: $109,067.*
21. "CAREER: Scalable, High-Performance Network Simulations Using Reverse Computation", C. D. Carothers (sole PI), NSF-CCR, Operating Systems and Compiler Program, CCR-0133488, *Award Period: June, 2002 – June, 2007*,

Award Value: $375,000. **note: proposal ONE of THREE out of 31 to be given the Highly-Competitive ranking**.

22. "Performance Mining of Large-Scale Data-Intensive Distributed Object Applications", M. J. Zaki (PI), C. D. Carothers (Co-PI), B. K. Szymanski (Co-PI), NSF-NGS Next Generation Software Program, EIA-0110708, *Award Period: September, 2001 – August, 2004*, *Award Value: $409,000*.
23. "Experimental Partnership – Real Time Computer Vision Spatial Mapping and Referencing for Minimally Invasive Surgery", B. Roysam (Co-PI), C. V. Stewart (Co-PI) and C. D. Carothers (Co-PI). NSF-EIA Experimental Systems Program. EIA-0000417, *Award Period: October, 2001 – October, 2003*, *Award Value: $15,000*.
24. "Real-Time Computer Vision Spatial Mapping and Referencing for Minimally Invasive Surgery", B. Roysam (PI), C. V. Stewart (Co-PI) and C. D. Carothers (Co-PI). NSF-EIA Experimental Systems Program. EIA-0000417 *Award Period: October, 2000 – October, 2004*, *Award Value: $1,300,000*.
25. "Scalable Online Network Modeling and Simulation", B. K. Szymanski (PI), C. D. Carothers (Co-PI), S. Kalyanaraman , and K. S. Vastola (Co-PI). DARPA Network Modeling and Simulation Program, F30602-00-2-0537,*Award Period: June 2000 – September, 2003*, *Award Amount: $950,000*.
26. "CAVES: Creating Test Applications", S. Adali (PI), C. D. Carothers (Co-PI), and D. Spooner (Co-PI), NSF-IIS Information and Data Management Program, IIS-9876932, *Award Period: September, 2000 – August, 2004*, *Award Value: $6,000*.
27. "CAVES: A Configurable Application View Storage", S. Adali (PI), C. D. Carothers (Co-PI), and D. Spooner (Co-PI). NSF-IIS Information and Data Management Program, IIS-9876932, *Award Period: September, 1999 – August, 2004*, *Award Value : $266,000*.

B. **Proposals Pending**

1. "Single-Discipline Center for Predictive Simulation of Multiphase Multiscale Thermal Transport (M2T2)", A. Oerai (PI), M. K. Shephard (Co/PI), K. E. Jansen (Co/PI), O. Sahni, and C. D. Carothers (Co/PI), DOE/NNSA Advanced Simulation and Computing Predictive Science Academic Alliance Program II (PSAAP II) Program, Pre-proposal phase, *Award Potential: $10,000,000 ($2M per year for 5 years).*

C. **Briefly describe your current research interests**

Massively parallel and distributed systems, massively parallel simulation of discrete systems, data modeling (i.e., data mining and HMMs) and real-time systems . Most recent focus has been the modeling of the large-scale networks – wired, wireless, peer-2-peer, etc.

VI. Editorship of Journals and Reviews of Manuscripts, Books and Research Proposals

(Give organization of journals, significant items reviewed, date.)

(a) **Editorships**

2011	**Guest Editor**, Special Issue on Network Science, Journal of Defense Modeling and Simulation.
2006–Present	**Associate Editor**, SIMULATION: Transactions of the Society for Modeling and Simulation International.
2006-2010	**Associate Editor**, ACM Transactions on Modeling and Computer Simulation.
2006	**Guest Editor**, "Best of PADS" Special Issue for SIMULATION: Transactions of the Society for Modeling and Simulation International, Volume 82, Number 1, January 2006.
1999	**Guest Editor** of First SCS SIMULATION/Transactions Joint Special-Issue on Parallel and Distributed Simulation. SIMULATION, Transactions of the Society for Modeling and Simulation International, Volume 16, Number 1, March 1999.

(b) **Refereeing**

1. **Program Committee**, 2011 International SIMUTools Conference.
2. **Program Committee**, 2006 IEEE International Symposium on Distributed Simulation and Real Time Applications (DS-RT).
3. **Program Co-Chair**, 2005 Workshop on Parallel and Distributed Simulation (PADS), single-term only.
4. **Program Committee**, The Twelfth International Conference on Parallel and Distributed Systems (ICPADS). 2006
5. **Program Committee**, Workshop on Parallel and Distributed Simulation (PADS). 2000–Present.
6. **Program Committee**, *International Workshop on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS)*. 2001–2004.
7. **Referee/Reviewer:**
   ACM Computing Reviews,
   IEEE INFOCOMM – The Conference on Computer Communication,
   ACM Transactions on Modeling and Simulation (TOMACS),
   IEEE Transactions on Parallel and Distributed Systems (TPDS),
   Journal on Parallel and Distributed Computing (JPDC)
   Parallel Computing Journal (Elsevier)
   Workshop on Parallel and Distributed Simulation (PADS),
   International Workshop on Modeling, Analysis, and
   Simulation of Computer and Telecommunication Systems (MASCOTS),
   Winter Simulation Conference (WSC),
   Mobile Computing Conference (MCC),
   The Hawaii International Conference on System Sciences (HICSS)
8. **Panel Reviewer**, NSF CAREER Program, 2003.
9. **Panel Reviewer**, NSF-ITR Program, 2000 and 2002.

VII. Service

A. Service to University

1. *University, school, and departmental committees and dates for each.*
   (a) **University**
   (b) Co-Chair/Editor, Computer Science/IT Working Group Committee, 2010.
   (c) Faculty Governance Review Committee, 2008.
   (d) Ad Hoc on Campus Research Computing, July, 2001 – Present.
   (e) **School**
   Ad Hoc Committee on Infrastructure, November, 2000 – December, 2000.
   Chair, Facilities and Infrastructure Committee, September, 2001 – Present
   (f) **Department**
   Chair, Lab Committee, 2004 – Present.
   Member, Planning Committee, 2004 – Present.
   Member, Space Utilization Committee, 2003 – Present.
   Chair, Lab Committee, 2000 – 2003.
   Member, Lab Committee, 2003 – present.
   Member, Graduate Program Committee, 1999–2000.
2. **Other service and administrative activities.**
   Participated in Rensselaer Day Recruitment, Fall 1999, Fall 2000 and Fall 2001.
3. **Undergraduate student advising and counseling (year and number).**
   1999 – 35 students
   2000 – 40 students
   2001 – 43 students
   2002 – 41 students
   2003 – 23 students
   2003 – 25 students
   2004 – 25 students
   2005 – 25 students
   2006 – Away on Sabbatical
   2007 – Away on Leave
   2008 – 28 students
   2009 – 40 students
   2010 – 40 students
   2011 – 40 students
4. **Graduate student advising and counseling (year and number).**
   1999 – 4 students
   2000 – 8 students
   2001 – 9 students
   2002 – 7 students

2003 – 6 students
2004 – 7 students
2005 – 4 students
2006 – 3 students
2007 – 3 students
2008 – 4 students
2009 – 7 students
2009 – 8 students
2010 – 8 students
2011 – 8 students

B. **Professional Societies**

(Give memberships, positions held, dates.)

ACM Association for Computing Machinery, Member
IEEE Computer Society, Member

C. **Community and Public Service**

Pledge Drive Volunteer, WAMC, Northeast Public Radio, 2000.

VIII. Professional and Public Lectures

(a) Conference/Workshop Presentations

1. "On Deciding Between Conservative and Optimsitic Approaches on Massively Parallel Platforms", *Invited & Reviewed*, In *Proceedings of the 2010 SCS/ACM/IEEE Winter Simulation Conference (WSC '10)*, December 2010. **C. D. Carothers (presenter)** and K. S. Perumalla.
2. ""Scalable Time Warp on Blue Gene Supercomputers", presented at the *23rd Workshop on Principles of Advanced and Distributed Simulation (PADS '09)*, June 22-26, 2009. D. Bauer and **C. D. Carothers (presenter)**.
3. "Analysis of Cluster Failures on Blue Gene Supercomputing Systems", Presented at the 2009 NSF Blue Waters/TeraGrid Workshop on Fault Tolerance, March 19-20. **C. D. Carothers (RPI)** and T. J. Hacker (Purdue), presenters.
4. "Petascale Adaptive Computional Fluid Dymamics", presented at the *2008 NSF Blue Waters Workshop*, October 2008, K. Jansen and **C. D Carothers**, presenters.
5. **C. D. Carothers (presenter)** , R. LaFortune, W. D. Smith and M. Gilder. "A Case Study in Modeling Large-Scale Peer-to-Peer File-Sharing Networks Using Discrete-Event Simulation",*Proceedings of the 2nd European Modeling AND Simulation Symposium*, Barcelona, Spain, October 2006.
6. "Sharing Event Data in Optimistically Scheduled Multicast Applications", In *Proceedings of the 2005 Winter Simulation Conference (WSC '05)*, December 2005, Poster Session, Orlando, Florida, December 5, 2005, G. Yaun (Presenter), D. Bauer (Presenter), and **C. D. Carothers (presenter)**.

7. "Seven-O'Clock: A New Distributed GVT Algorithm Using Network Atomic Operations", In *Proceedings of the 19th Workshop on Principles of Advanced and Distributed Simulation (PADS '05)*, June 2005, Monterey, California, D. Bauer, G. Yaun, **C. D. Carothers (Presenter)**, S. Kalyanaraman, and M. Yuksel.
8. "Algorithm for Optimizing Energy Use and Path Resilience in Sensor Networks", to appear in *Proceedings of the 2nd nd European Workshop on Wireless Sensor Networks*, Poster Session, Istanbul, Turkey, Feb, 1 2005. L. Bush (Presenter), **C. D. Carothers** and B. K. Szymanski.
9. "Large-Scale Network Protocol Meta-Simulation Design and Performance Analysis", In *Proceedings of the 2004 Winter Simulation Conference (WSC '04)*, December 2004, D. Bauer (Presenter), G. Yaun, **C. D. Carothers**, M. Yuksel and S. Kalyanaraman,
10. "An Algorithm for Fully Reversible Optimistic Parallel Simulation," presented at the *2003 Winter Simulation Conference (WSC '03)*, December 10th, 2003. M. Peters (presenter) and **C. D. Carothers**.
11. "ROSS.Net: An Optimistic Simulation Framework of Large-Scale Internet Models", presented at the *2003 Winter Simulation Conference (WSC '03)*, December 7th, 2003. D. Bauer (presenter), G. Yaun, **C. D. Carothers**, M. Yuksel, and S. Kalyanaraman.
12. "Improving Spatial Locality using Data Mining," presented at the 9^{th} *Conference on Knowledge Discovery and Data Mining (KDD '03)*, *poster session*, August 25th, 2003. K. Sequeira (presenter), M. J. Zaki, B. K. Szymanski, and **C. D. Carothers**.
13. "Large-Scale TCP Models Using Optimistic Parallel Simulation," presented at the 17^{th} *Workshop on Parallel and Distributed Simulation (PADS 2003)*, June 13th, 2003. G. Yaun (presenter), **C. D. Carothers**, and S. Kalyanaraman.
14. "Understanding Filesystem Performance for Data Mining Applications," presented at the 6^{th} *Workshop on High-Performance Data Mining (HPDM '03)*, May 3rd, 2003. B. Bouqata (presenter), **C D. Carothers**, B. K. Szymanski and M. J. Zaki.
15. "*XSim*: Real-Time Analytic Parallel Simulations," presented at the *16th Workshop on Parallel and Distributed Simulation (PADS 2002)*, May 12th, 2002. **C. D. Carothers (presenter)**.
16. "Optimistic Parallel Simulation of a Large-Scale View Storage System," presented at the *2001 Winter Simulation Conference (WSC'01)*, December 10th, 2001. G. Yaun (presenter), **C. D Carothers**, S. Adali and D. Spooner.
17. "ROSS: A High-Performance, Low Memory, Modular Time Warp System," presented at the *14th Workshop of Parallel on Distributed Simulation (PADS 2000)*, May 29th, 2000. **C. D. Carothers (presenter)**, D. Bauer and S. Pearce.

18. "The Effect of State-Saving in Optimistic Simulation on A Cache-Coherent Non-Uniform Memory Access Architecture," presented at the *1999 Winter Simulation Conference*, December 13th, 1999. **C. D. Carothers (presenter)**, K. S. Perumalla, R. M. Fujimoto.
19. "Efficient Optimistic Parallel Simulations Using Reverse Computation," presented at the *13th Workshop on Parallel and Distributed Simulation (PADS 99)*, May 2nd, 1999. **C. D. Carothers**, K. S. Perumalla (presenter), R. M. Fujimoto.
20. "Toward Parallelization of Large-Scale Ada Simulations Using Time Warp," presented at the *1998 Summer Computer Simulation Conference*, July 26th, 1998. **C. D. Carothers (presenter)**, M. I. Hybinette, and R. M. Fujimoto.
21. "Visualizing Parallel Simulations in Network Computing Environments," presented at the *1997 Winter Simulation Conference*, December 8th, 1997. **C. D. Carothers (co-presenter)**, B. Topol (co-presenter), R. M. Fujimoto, J. T. Stasko, and V. S. Sunderam.
22. "Design and Implementation of HLA Time Management in the RTI version F.0," presented at the *1997 Winter Simulation Conference*, December 8th, 1997. **C. D. Carothers (presenter)**, R. M. Fujimoto, R. M. Weatherly, and A. L. Wilson.
23. "Background Execution of Time Warp Programs," presented at the *10th Workshop on Parallel and Distributed Simulation (PADS '96)*, May 23rd, 1996. **C. D. Carothers (presenter)**, and R. M. Fujimoto.
24. "A Re-dial Model for Personal Communications Services Networks," presented at the *45th IEEE Vehicular Technology Conference" (VTC '95)*, July 27th, 1995. **C. D. Carothers (presenter)**, R. M. Fujimoto and Y-B. Lin.
25. "A Case Study in Simulating PCS Networks Using Time Warp," presented at the *9th Workshop on Parallel and Distributed Simulation (PADS '95)*, June 15th, 1995. **C. D. Carothers (presenter)**, R. M. Fujimoto and Y-B. Lin.
26. "The Effect of Communication Overheads on Time Warp Performance: An Experimental Study," presented at the *8th Workshop on Parallel and Distributed Simulation (PADS '94)* , July 7th, 1994. **C. D. Carothers**, R. M. Fujimoto (presenter) and P. England.

(b) **Invited Lectures or Presentations**

1. "Supercomputer Storage System Models for the Age of Exascale Computing", 9th International Conference on Parallel Processing and Applied Mathematics (PPAM 2011), Torun, Poland, September 12th, 2011. **C. D. Carothers (presenter)**.
2. "Scalable Parallel I/O Alternatives for Massively Parallel Partitioned Solver Systems", Center for High-Performance Computing (CHPC), Cape Town, South Africa, July 15th, 2011. **C. D. Carothers (presenter)**.
3. "Life at the Near Petascale Edge: A Tale to Two Applications", Presented at the Robotics System Science Conference, Workshop 3 "Toward High-

Performance Computing Support for the Analysis, Simulation, and Planning of Robotic Contact Tasks", June 27th, 2011. **C. D. Carothers (presenter)**.

4. "Life at the Near Petascale Edge: A Tale to Two Applications", Presented at the IBM T. J. Watson, Yorktown Heights Facility. Hosted by the Exascale Computing Team, August 20th, 2009. **C. D. Carothers (presenter)**.
5. "Life at the Near Petascale Edge: A Tale to Two Applications", Presented at the General Electric Research Center's (GRC) Advanced Computing Group Seminar Series, April 9th, 2009. **C. D. Carothers (presenter)**.
6. "ROSS: Parallel Discrete-Event Simulation on Near Petasacle Supercomputers", Presented at the Airforce Research Labs, Rome, NY, April 1st, 2009.**C. D. Carothers (presenter)**.
7. "Research In Parallel and Distributed Simulation Systems," presented at the *GE Corporate Research and Development Center*, February, 22, 2002. **C. D. Carothers (presenter)**.
8. "ROSS: A High-Performance, Low Memory, Modular Time Warp System," presented at the *Rensselaer Department of Computer Science Colloquium Series*, November 2, 2000. **C. D. Carothers (presenter)**.
9. "ISSAC: An Intelligent System for Exploiting Speculative Execution and Active Code in Large-Scale Distributed Simulations," presented at the *1999 Dagsthul Workshop on Agent-Based Simulation*, Dagsthul, Germany, May 7, 1999. **C. D. Carothers (presenter)**, B. K. Szymanski and M. J. Zaki.
10. "Efficient Optimistic Parallel Simulation Using Reverse Computation," presented at the *Rensselaer, Hartford CSI Seminar Series*, November 20, 1998. **C. D. Carothers (presenter)**.
11. "Simulating Population Dependent PCS Network Models Using Time Warp," presented at the *1995 Winter Simulation Conference (WSC '95)*, December 4th, 1995. **C. D. Carothers (presenter)**, R. M. Fujimoto and Y-B. Lin.
12. "Distributed Simulation of Large-Scale PCS Networks,", presented at the *Second International Workshop on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems*, February 1st, 1994. **C. D. Carothers**, R. M Fujimoto (presenter), Y-B Lin and P. England.

IX. Honors and Awards

1. **BEST PAPER** at the 2009 Workshop on Principals of Advanced and Distributed Simulation (PADS '09).
2. **BEST PAPER** at the 2003 Workshop on Parallel and Distributed Simulation (PADS '03).
3. **NSF CAREER Award** 2002.
4. **BEST PAPER** at the 1999 Workshop on Parallel and Distributed Simulation (PADS '99).

5. **MITRE Program Recognition Award** for contributions on the DoD High Level Architecture (HLA) project.

X. **Sabbatical Leaves, Off-campus Study Programs and Foreign Professional Travel**

1. **Singapore:** *20th ACM/IEEE/SCS Workshop on Principles of Advanced and Distributed Simulation (PADS 2006)*, to attend in May, 2006.
2. **Sabbatical Leave:** GE Corporate Research and Development Center, Niskyuna, New York, October 2005 thru May, 2007.
3. **Bologna, Italy:** *14th Workshop of Parallel on Distributed Simulation (PADS 2000)*, May 2000.
4. **Dagsthul, Germany:** *Workshop on Agent-Based Simulation*, May 1999.

Date: _____ Signature: _____