PHILIP J. HATCHER

Education

1985	Ph.D.	Computer Science	Illinois Institute of Technology
1979	M.S.	Computer Science	Purdue University
1978	B.S.	Mathematics	Purdue University

Experience

2019–	Professor Emeritus of Computer Science, University of New Hampshire
2018	Acting Chair of Computer Science, University of New Hampshire
2007–2011	Chair of Computer Science, University of New Hampshire
2003–2006	Chair of Computer Science, University of New Hampshire
1997–1999	Chair of Computer Science, University of New Hampshire
1997–2019	Professor of Computer Science, University of New Hampshire
1997	Professor Invité, École Normale Supérieure de Lyon
1992–1997	Associate Professor of Computer Science, University of New Hampshire
1993	Parallel Programming Tools Consultant, Kendall Square Research Corporation
1992–1993	Technical Languages Consultant, Digital Equipment Corporation
1986–1992	Assistant Professor of Computer Science, University of New Hampshire
1981–1986	Instructor and Laboratory Manager, Illinois Institute of Technology

Honors

2017–2020	Class of 1944 Professorship Award, University of New Hampshire
1996–1998	Waite Professorship, University of New Hampshire
1992	Outstanding Faculty Award, University of New Hampshire
1978	Phi Beta Kappa, Purdue University

Professional Service

2012	Program Committee, 27th IEEE International Parallel and Distributed Processing Symposium
2004	Program Committee, Systems Software, International Conf. on High Performance Computing
2001	Program Committee, workshop on Java in High Performance Computing, HPCN 2001
2000	Guest Editor, *Parallel Computing*, issue on Parallel Computing for Irregular Applications
1998	Vice Chair, Workshop on Parallel Languages, Euro-Par '98
1997	Program Committee, Fifth Annual Workshop on I/O in Parallel and Distributed Systems
1993	Program Committee, Second Annual Symposium on Issues and Obstacles in the Practical Implementation of Parallel Algorithms and the Use of Parallel Machines
1992–1996	Associate Editor, IEEE Parallel and Distributed Technology
1992	Program Committee, First Annual Symposium on Issues and Obstacles in the Practical Implementation of Parallel Algorithms and the Use of Parallel Machines

Grants and Contracts

"XANSation Evaluation," $14,000, Lamprey Networks, Inc., grant funded May 2006 (with S. Valcourt).

"U.S.A.–France Cooperative Research: Implementing a Cluster Version of Java with the PM2 Distributed and Multithreaded Run-Time System," $14,000, National Science Foundation and INRIA (France), grant funded May 2001 (with R. Russell, L. Bougé and R. Namyst).

"U.S.A.–France Cooperative Research: A Parallel Programming Environment for C*," $14,000, National Science Foundation and INRIA (France), grant funded January 1998 (with R. Russell, L. Bougé and R. Namyst).

"Laboratory for Advanced Communication Systems," $475,859, National Science Foundation, grant funded September 1996 (with R.D. Bergeron, J. Bernhard, M. Carter, E. Freuder, B. Reinhold and R. Russell).

"Evaluating the PSR DPCE Compiler," $11,000, Pacific-Sierra Research Corp., grant funded May 1996.

"A High-Bandwidth Network Testbed for Parallel Computation," $121,547, National Science Foundation, grant funded May 1995 (with R.D. Bergeron, E. Freuder, R. Russell and T. Sparr).

"Support for UNH C*," $123,600, MRJ Inc., grant funded June 1995.

"Data-Parallel Compiler Technologies for Future-Generation Multicomputers," $316,000, National Science Foundation, grant funded May 1993 (with M. Quinn).

"High-Performance C," $28,000, Digital Equipment Corporation, grant funded August 1992.

"A Network Version of Dataparallel C," $47,000, Oregon Advanced Computing Institute and IBM Corporation, grant funded May 1992 (with M. Quinn).

"An Extended Dataparallel C Programming Environment on the Intel iWARP," $40,000, Oregon Advanced Computing Institute and Intel Corporation, grant funded September 1991 (with M. Quinn).

"Porting the UNH/OSU C* Compiler to the Intel iPSC/2 and iPSC/860," $20,000, Oregon Advanced Computing Institute and Intel Corporation, grant funded January 1991 (with M. Quinn).

"Data Parallel Programming on Diverse Architectures: Tools and Algorithms," $327,000, National Science Foundation, grant funded August 1989 (with M. Quinn).

"A C* Compiler for Hypercube Multicomputers," $47,000, National Science Foundation, grant funded January 1989 (with M. Quinn).

"Research Experiences for Undergraduates," $40,000, National Science Foundation, grant funded May 1987.

Monograph

P. Hatcher and M. Quinn. *Data-Parallel Programming on MIMD Computers*, The MIT Press, 1991.

Book Chapters

S. Chappelow, P. Hatcher and J. Mason. "Optimizing Data-Parallel Stencil Computations in a Portable Framework," in Szymanski and Sinharoy, editors, *Languages, Compilers, and Run-Time Systems for Scalable Computers*, Kluwer Academic Publishers, 1995.

L. Hamel, P. Hatcher, M. Quinn. "An Optimizing C* Compiler for a Hypercube Multicomputer," in Saltz and Mehrotra, editors, *Languages, Compilers, and Run-Time Environments for Distributed Memory Machines*, Elsevier Science Publishers, 1992.

M. Quinn, P. Hatcher, and B. Seevers. "Implementing a Data Parallel Language on a Tightly Coupled Multiprocessor," in Nicolau, Gelernter, Gross and Padua, editors, *Advances in Languages and Compilers for Parallel Processing*, Pitman/MIT Press, 1991.

Refereed Journal Publications

R. Maddamsetti, P. Hatcher, A. Green, B. Williams, D. Marks, and R. Lenski. "Core Genes Evolve Rapidly in the Long-Term Evolution Experiment with *Escherichia coli*," *Genome Biology and Evolution*, 9(4), 2017.

C. Peeters, V. Cooper, P. Hatcher, B. Verheyde, A. Carlier, and P. Vandamme. "Comparative Genomics of *Burkholderia multivorans*, a Ubiquitous Pathogen with a Highly Conserved Genomic Structure," *PLOS ONE*, 12(4), 2017.

Y. Wang, C. Diaz-Arenas, D. Stoebel, K. Flynn, E. Knapp, M. Dillon, A. Wunsche, P. Hatcher, F. Moore, V. Cooper, and T. Cooper. "Benefit of Transferred Mutations is Better Predicted by the Fitness of Recipients than by their Ecological or Genetic Relatedness," *Proceedings of the National Academy of Sciences*, 113(18), 2016.

R. Maddamsetti, P. Hatcher, S. Cruveiller, C. Medigue, J. Barrick, and R. Lenski. "Synonymous Genetic Variation in Natural Isolates of *Escherichia coli* Does Not Predict Where Synonymous Substitutions Occur in a Long-Term Experiment," *Molecular Biology and Evolution*, 32(11), 2015.

F. Abebe-Akele, L. Tisa, V. Cooper, P. Hatcher, E. Abebe and W. Thomas. "Genome Sequence and Comparative Analysis of a Putative Entomopathogenic *Serratia* Isolated from *Caenorhabditis briggsae*," *BMC Genomics*, 16(531), 2015.

J. Colbourne, M. Pfrender, D. Gilbert, W. K. Thomas, A. Tucker, T. Oakley, S. Tokishita, A. Aerts, G. Arnold, M. Kumar Basu, D. Bauer, C. Cáceres, L. Carmel, C. Casola, J.-H. Choi, J. Detter, Q. Dong, S. Dusheyko, B. Eads, T. Fröhlich, K. Geiler-Samerotte, D. Gerlach, P. Hatcher, S. Jogdeo, J. Krijgsveld, E. Kriventseva, D. Kültz, C. Laforsch, E. Lindquist, J. Lopez, J. Manak, J. Muller, J. Pangilinan, R. Patwardhan, S. Pitluck, E. Pritham, A. Rechtsteiner, M. Rho, I. Rogozin, O. Sakarya, A. Salamov, S. Schaack, H. Shapiro, Y. Shiga, C. Skalitzky, Z. Smith, A. Souvorov, W. Sung, Z. Tang, D. Tsuchiya, H. Tu, H. Vos, M. Wang, Y. Wolf, H. Yamagata, T. Yamada, Y. Ye, J. Shaw, J. Andrews, T. Crease, H. Tang, S. Lucas, H. Robertson, P. Bork, E. Koonin, E. Zdobnov, I. Grigoriev, M. Lynch, and J. Boore. "The Ecoresponsive Genome of *Daphnia pulex*," *Science*, 331(6017):555–561, 2011.

K. Flynn, S. Vohr, P. Hatcher and V. Cooper. "Evolutionary Rates and Gene Dispensability Associate with Replication Timing in the Archaeon *Sulfolobus islandicus*," *Genome Biology and Evolution*, 2:859–869, 2010.

V. Cooper, S. Vohr, S. Wrockledge, P. Hatcher. "Why Genes Evolve Faster on Secondary Chromosomes in Bacteria," *PLoS Computational Biology*, 6(4), 2010.

A. Lapadula, P. Hatcher, A. Hanneman, D. Ashline, H. Zhang and V. Reinhold. "OSCAR: An Algorithm for Assigning Oligosaccharide Topology from MS^n Data," *Analytical Chemistry*, 77(19):6271–6279, 2005.

M. Reno, P. Hatcher, L. Bougé and G. Antoniu. "Cluster Computing with Java," *IEEE Computing in Science and Engineering*, 7(2):34–39, 2005.

T. Kielmann, L. Bougé, P. Hatcher and H. Bal. "Enabling Java for High-Performance Computing: Exploiting Distributed Shared Memory and Remote Method Invocation," *Communications of the ACM*, 44(10):110–117, 2001.

G. Antoniu, L. Bougé, P. Hatcher, M. MacBeth, K. McGuigan, and R. Namyst. "The Hyperion System: Compiling Multithreaded Java Bytecode for Distributed Execution," *Parallel Computing*, 27(10):1279-1297, 2001.

M. Quinn and P. Hatcher. "On the Utility of Communication-Computation Overlap in Data-Parallel Programs," *Journal of Parallel and Distributed Computing* 33(2):197–204, 1996.

D. Lickly and P. Hatcher. "C++ and Massively Parallel Computers," *Scientific Programming* 2(4):193–202, 1993.

M. Quinn, B. Seevers, and P. Hatcher. "A Parallel Programming Environment Supporting Data-Parallel Modules," *International Journal of Parallel Programming* 12(5):363–386, 1992.

M. Quinn, B. Seevers, and P. Hatcher. "Implementing a Time-Driven Simulation on a MIMD Computer using a SIMD Language," *International Journal of Computer Simulation* 1(2):21–39, 1992.

P. Hatcher, M. Quinn, A. Lapadula, B. Seevers, R. Anderson, and R. Jones. "Data-Parallel Programming on MIMD Computers," *IEEE Transactions on Parallel and Distributed Computing* 2(3):377–383, July 1991.

P. Hatcher. "The Equational Specification of Efficient Compiler Code Generation," *Computer Languages* 16(1):81–95, January 1991.

M. Quinn and P. Hatcher. "Data Parallel Programming on Multicomputers," *IEEE Software* 7(5):69–76, September 1990.

Refereed Conference Publications

H. Hu, Y. Rzhanov, P. Hatcher and R.D. Bergeron. "Binary Adapted Semi-Global Matching Based on Image Edges," in *Proceedings of the Seventh International Conference on Digital Image Processing*, April 2015.

J. Jackson and P. Hatcher. "Efficient Parallel Execution of Sequence Similarity Analysis Via Dynamic Load Balancing," in *Proceedings of the ISCA 3rd International Conference on Bioinformatics and Computational Biology*, March 2011.

T. Fogal, H. Childs, S. Shankar, J. Kruger, R.D. Bergeron, P. Hatcher. "Large Data Visualization on Distributed Memory Multi-GPU Clusters," in *Proceedings of High Performance Graphics 2010*, June 2010.

G. Antoniu, P. Hatcher, M. Jan and D. Noblet. "Performance Evaluation of JXTA Communication Layers," in *Proceedings of the Fifth International Workshop on Global and Peer-to-Peer Computing*, May 2005.

G. Antoniu and P. Hatcher. "Remote Object Detection in Cluster-Based Java," in *Proceedings of the 3rd Workshop on Java for Parallel and Distributed Computing*, April 2001.

G. Antoniu, L. Bougé, P. Hatcher, M. MacBeth, K. McGuigan, and R. Namyst. "Compiling Multithreaded Java Bytecode for Distributed Execution," in *Proceedings of European Conference on Parallel Computing*, August 2000. (Distinguished paper: one of only five selected from 328 submissions.)

G. Antoniu, L. Bougé, P. Hatcher, M. MacBeth, K. McGuigan, and R. Namyst. "Implementing Java Consistency Using a Generic, Multithreaded DSM Runtime System," in *Proceedings of the International Workshop on Java for Parallel and Distributed Computing*, May 2000.

M. MacBeth, K. McGuigan and P. Hatcher. "Executing Java Threads in Parallel in a Distributed-Memory Environment," in *Proceedings of the IBM Centre for Advanced Studies Conference*, November 1998.

L. Bougé, P. Hatcher, R. Namyst and C. Perez. "A Multithreaded Runtime Environment with Thread Migration for a HPF Data-Parallel Compiler," in *Proceedings of the International Conference on Parallel Architectures and Compilation Techniques*, October 1998.

R. Russell and P. Hatcher. "Efficient Kernel Support for Reliable Communication," in *Proceedings of the ACM Symposium on Applied Computing*, February 1998.

J. Moore, P. Hatcher and M. Quinn. "Efficient Data-Parallel Files via Automatic Mode Detection," in *Fourth Annual Workshop on I/O in Parallel and Distributed Systems*, May 1996.

J. Moore, P. Hatcher and M. Quinn. "Stream*: Fast, Flexible Data-Parallel I/O," in *Proceedings of Parallel Computing '95*, September 1995.

P. Hatcher and M. Quinn. "Supporting Data-Level and Processor-Level Parallelism in Data-Parallel Programming Languages," in *Proceedings of the 26th Hawaii International Conference on Systems Sciences*, January 1993.

P. Hatcher, M. Quinn, A. Lapadula, and R. Anderson. "Compiling Data-Parallel Programs for MIMD Architectures," in *Proceedings of European Workshop on Parallel Computing*, pp. 28–39, March 1992.

P. Hatcher, M. Quinn, R. Anderson, A. Lapadula, B. Seevers, and A. Bennett. "Architecture-Independent Scientific Programming in Dataparallel C: Three Case Studies," in *Proceedings of Supercomputing '91*, pp. 208–217, November 1991.

P. Hatcher, A. Lapadula, R. Jones, M. Quinn, and R. Anderson. "A Production-Quality C* Compiler for a Hypercube Multicomputer," in *Proceedings of the Third SIGPLAN Symposium on Principles and Practice of Parallel Programming*, pp. 73–82, April 1991.

P. Hatcher, M. Quinn, A. Lapadula, R. Anderson, R. Jones. "Dataparallel C: A SIMD Language for Multicomputers," in *Proceedings of the Sixth Distributed Memory Computing Conference*, April 1991.

P. Hatcher and M. Quinn. "C*-Linda: A Programming Environment with Multiple Data Parallel Modules and Parallel I/O," in *Proceedings of the 24th Hawaii International Conference on Systems Sciences*, pp. 382–389, January 1991.

M. Quinn and P. Hatcher. "Compiling SIMD Programs for MIMD Architectures," in *Proceedings of the IEEE International Conference on Computer Languages*, pp. 291–296, March 1990.

P. Hatcher and J. Tuller. "Efficient Retargetable Compiler Code Generation," in *Proceedings of the IEEE International Conference on Computer Languages*, pp.25–30, October 1988.

M. Quinn, P. Hatcher, and K. Jourdenais. "Compiling C* Programs for a Hypercube Multicomputer," in *Proceedings of the ACM/SIGPLAN Parallel Programming: Experience with Applications, Languages, and Systems*, pp. 57–65, July 1988.

P. Hatcher and T. Christopher. "High-Quality Code Generation via Bottom-up Tree Pattern Matching," in *Conference Record of the Thirteenth Annual ACM Symposium on Principles of Programming Languages*, pp. 119–130, January 1986.

T. Christopher, P. Hatcher, and R. Kukuk. "Using Dynamic Programming in a Graham-Glanville Style Code Generator," in *Proceedings of the ACM SIGPLAN Symposium on Compiler Construction*, pp. 25–36, June 1984.

T. Christopher and P. Hatcher. "A Network Computer for Distributed Software Research," in *Proceedings of the 1983 ACM Conference on Personal and Small Computers*, pp. 9–13, December 1983.

Other Publications

P. Hatcher, R. Russell, M. Quinn and S. Kumaran. "Implementing Data-Parallel Programs on Commodity Clusters," in *Proceedings of the Spring School on Data Parallelism*, Les Ménuires (France), March 1996. Published in Perrin and Darte, editors, *The Data Parallel Programming Model: Foundations, HPF Realization, and Scientific Applications*, Springer-Verlag, Lecture Notes in Computer Science, Volume 1132, 1996.

S. Batra, P. Hatcher, and R. Russell. "The Design and Implementation of Data-Parallel Files," presented at the *Workshop on Modeling and Specification of I/O*, October 1995. Publication via the World Wide Web.

P. Hatcher. "The Joy of Data-Parallel Programming," in *Proceedings of the Dartmouth Institute for Advanced Graduate Studies in Parallel Computation Symposium*, pp. 19–30, June 1992.

W. Tichy, M. Philippsen, and P. Hatcher. "A Critique of the Programming Language C*," *Communications of the ACM*, 35(6):21–25, June 1992. Appeared as Technical Correspondence.

P. Hatcher. "NSF-REU Program Helps Computer Science Students and Teachers See Value in Education," *Journal of College Science Teaching* 18(3):168–169, January 1989.

Theses Supervised

Seth Hager, M.S., September 2016
"Migrating Thread-Based Intentional Concurrent Programming to a Task-Based Paradigm"

Nicholas Craycraft, B.S., May 2016
"A System for Intentional, Multithreaded Java"

Han Hu, M.S., June 2015
"Binary Adapted Semi-Global Matching Based on Image Edges"

Chris Hebert, M.S., May 2015
"Inferring Types to Eliminate Ownership Checks in an Intentional Javascript Compiler"

Michaela Tremblay, B.S., May 2015
"Throwing Exceptions for Concurrency Errors"

Niels Widger, M.S., May 2014
"Deterministic Execution in a Java-like Language"

James Jackson, M.S., September 2012
"The Accessibility and Scalability of Gene Family Analysis"

Ben Decato, B.S., May 2012
"Patterns of Evolution in Bacteria"

Brad Larsen, M.S., December 2010
"Compiling an Array Language to a Graphics Processor"

James Jackson, B.S., May 2010
"Load-Balancing Genome Similarity Analysis"

Brad Larsen, B.S., August 2008
"Object Replication in the Large Address Space Virtual Machine"

Lina Faller, B.S., May 2008
"An Investigation of Palindromic Sequences in the *Pseudomonas fluorescens* SBW25 Genome"

Anthony Lapadula, Ph.D., September 2007
"GlySpy: A Software Suite for Assigning Glycan Topologies from Sequential Mass Spectral Data"

Stephen Todd, M.S., December 2006
"Comparing the XAM API with File System Programming"

Kevin Clark, M.S., May 2005
"Evaluating the Performance of Hyperion, a Distributed Shared Memory Implementation of Java"

David Noblet, B.S., December 2004
"JXTA Communication Performance Evaluation"

Matt Reno, M.S., February 2003
"Comparing the Performance of Distributed Shared Memory and Message Passing Programs Using the Hyperion Java Virtual Machine on Clusters"

Joel Daniels, B.S., December 2002
"Improving Wide-Area Network Performance in Computational Grid Applications"

Mark MacBeth, M.S., July 1999
"Compiling Java Bytecode for a Distributed Environment"

Mehul Dholakia, M.S., December 1998
"A Simulator for the UNH DPCE Compiler"

Todd Medlock, M.S., August 1998
"Supporting Internode Communications on Clusters of Commodity SMP Machines"

Keith McGuigan, B.S., May 1998
"A Distributed Java Virtual Machine"

Daniel Luchaup, M.S., December 1997
"A Data-Parallel C Extensions Compiler Front End"

Craig Smith, M.S., August 1997
"CUB: A Debugger for C*"

Dana Cook, M.S., May 1997
"Implementing Data-Parallel Programs for Shared-Memory Multiprocessors"

Steve Chappelow, M.S., January 1996
"Improving Stencil Communications in C* Programs"

Sanjay Batra, M.S., August 1995
"Data-Parallel Files"

James R. Mason, M.S., May 1994
"Optimizing Irregular Communication in C*"

Kathleen P. Herold, M.S., August 1992
"A Retargetable C* Run-time Library for Mesh-Connected MIMD Multicomputers"

Anthony J. Lapadula, M.S., December 1991
"An Optimizing Dataparallel C Cross-Compiler for Hypercube Multicomputers"

Robert R. Jones, M.S., December 1991
"Compiling the New C*"

John L. Donovan, M.S., December 1990
"Compiler Components Generated from High-Level Specifications"

Margaret M. Cawley, M.S., December 1990
"Improvement of a Table-Driven Tree-Rewriting System"

Lutz H. Hamel, M.S., May 1990
"An Optimizing C* Compiler for the NCUBE Multicomputer"

Jose M. Garcia, M.S., May 1990
"An Object Transformation Language"

Gina L. Ross, M.S., December 1989
"An Attribute Grammar Evaluator Via Equational Logic"

Jeffrey W. Tuller, M.S., December 1989
"Designing a User Interface to UNH-CODEGEN"

Invited Talks

Institut de Recherche en Informatique et Systemes Aleatoir, France, June 2004

Vrije Universiteit, Netherlands, October 2003

Institut de Recherche en Informatique et Systemes Aleatoir, France, June 2002

Laboratoire Informatique et Distribution of the Institut d'Informatique et Mathematiques Appliquees de Grenoble, France, June 2001

Vrije Universiteit, Netherlands, June 2001

International Research Center for Computer Science, Germany, August 2000

University of Trier, Germany, August 2000

École Normale Supérieure de Lyon, France, March 2000

First Workshop on Parallel Computing for Irregular Applications, Orlando, Florida, January 1999

Laboratoire d'Informatique Fondamentale de Lille, France, June 1997

École Normale Supérieure de Lyon, France, January 1997

University of Southampton, United Kingdom, May 1996

École Normale Supérieure de Lyon, France, April 1996

Spring School on Data Parallelism, Les Ménuires, France, March 1996

Workshop on Object-Oriented Approaches to Parallel Programming, Southampton, United Kingdom, March 1996

University of Connecticut, March 1996

Supercomputing '95, Tutorial on Data-Parallel C Extensions, December 1995

Supercomputing '93, Panel Session on Parallel C Standardization, November 1993

Dartmouth College, School on Parallel Programming, June 1993

GMD-Berlin, Germany, April 1993

GMD-St. Augustin, Germany, April 1993

Supercomputing '92, Workshop on Data-Parallel Languages, November 1992

Dartmouth College, February 1992

Boston College, December 1991

Argonne National Laboratory, October 1991

International Research Center for Computer Science, Germany, May 1991

Williams College, May 1991

University of Southern Maine, March 1991

Michigan State University, May 1990

NASA Institute for Computer Applications in Science and Engineering, May 1990

Oregon State University, December 1989

Oregon Center for Advanced Technology Education, December 1989

Standards Work

Key contributor to the Data Parallel C Extensions (DPCE) technical report approved by the ANSI C committee in December 1994. Primary author of the specification of elemental and nodal functions.

Teaching Experience

Introduction to Scientific Programming

Data Processing and File Management

Systems Programming

Programming Languages

Assembly Language Programming and Machine Organization

Compiler Construction

Advanced Compiler Construction

Operating Systems

Formal Language Theory

Programming Languages for Parallel Computers

Introduction to Parallel Programming

Introduction to Distributed and Parallel Programming