

**Matthew J. Rutherford, Ph.D.**  
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## Interests

Testing of distributed systems; experimental evaluation of testing techniques; content-based networking; model-driven development and generative programming; software configuration management; software-engineering; software development life-cycle; web-application architecture and design.

## Education

**Ph.D. Computer Science, University of Colorado at Boulder      August, 2006**

Dissertation work focused on the development of an innovative simulation-based testing technique for distributed systems (committee chaired by Alexander Wolf and Antonio Carzaniga). Additional research in the areas of content-based networking and experimentation with highly-distributed systems. Qualifying exams in software engineering, artificial intelligence and databases. Additional advanced coursework in artificial intelligence and generative programming.

**M.S. Computer Science, University of Colorado at Boulder      December, 2001**

Thesis research focused on a technique for automatic reconfiguration of enterprise-level distributed systems (committee chaired by Alexander Wolf). Studied processor trace cache architecture in an independent study (advised by Dan Connors). Advanced course work in algorithms, middleware, software engineering, computer architecture, programming languages, user interface design and neural networks.

**B.S.E. Civil Engineering, Princeton University      June, 1996**

Thesis research focused on the development of an integrated GIS/GPS system for facilitating field research (committee chaired by James Smith). Broad curriculum in civil engineering with an emphasis on software development, water resources and environmental engineering. Minor in environmental studies.

## Employment

### Assistant Professor

Department of Computer Science, University of Denver      September, 2008 - present

### Chief Technology Officer

MaxAcceleration      May, 2006 - present

Worked in the technical leadership role for a startup providing software to regional and shortline railroads over the Internet. Accomplishments include: development and execution of the technical strategy; design and development of an innovative web-application generation framework; deployment and support of multiple mission-critical products; participation in business-development in both pre- and post-sales roles.

## Postdoctoral Researcher

University of Colorado at Boulder

August, 2006 - December, 2007

Postdoctoral research focused on extending research topics related to evaluating and testing distributed systems and engineering content-based networking protocols and systems.

## Research Assistant

University of Colorado at Boulder

September, 2002 - July, 2006

Investigated various aspects of software engineering with an emphasis on evaluation and testing of distributed systems. Other research topics include content-based networking, model-driven development and generative programming.

## Co-founder and Chief Engineer

Chronos Software, Inc.

April, 1999 - September, 2002

Co-founder of a successful software consultancy specializing in database-driven software systems. Responsibilities included: software architecture, design and implementation; leading a team of engineers through the development life-cycle of numerous projects; administration of client's production systems during iterative release cycles; client relations; business development; and various organizational and administrative tasks.

## Software Engineer

Riverside Technology, inc.

July, 1996 - July, 1998

Lead developer on a number of software systems used operationally by the National Weather Service, Panama Canal Commission and the State of Colorado. Most were used for decision support of water resources issues. Specific responsibilities included: designing and developing software in C/C++ and Java for Informix databases, administering a heterogeneous network of UNIX workstations including the corporate WWW and FTP sites, and developing scripts and utilities to assist with cross-platform software development.

## Publications

### Journal Papers

- Matthew J. Rutherford, Antonio Carzaniga, Alexander L. Wolf, "Evaluating Test Suites and Adequacy Criteria using Simulation-Based Models of Distributed Systems," *IEEE Transactions on Software Engineering*, IEEE Computer Society, 34 (4), July, 2008.

### Conference Papers

- Matthew J. Rutherford, Antonio Carzaniga, Alexander L. Wolf, "Simulation-Based Testing of Distributed Systems," *Proceedings of 14th ACM SIGSOFT Symposium on Foundations of Software Engineering (FSE)*, Portland, OR, November, 2006.
- Yanyan Wang, Matthew J. Rutherford, Antonio Carzaniga, Alexander L. Wolf, "Automating Experimentation on Distributed Testbeds," *Proceedings of 20th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pp. 164-173, Long Beach, CA, USA, November, 2005.
- Antonio Carzaniga, Matthew J. Rutherford, Alexander L. Wolf, "A Routing Scheme for Content-Based Networking," *Proceedings of IEEE INFOCOM 2004*, pp. 918-928, Hong Kong, China, March, 2004.
- Matthew J. Rutherford, Alexander L. Wolf, "A Case for Test-Code Generation in Model-Driven Systems," *Second International Conference on Generative Programming and Component Engineering (GPCE)*, pp. 377-396, Erfurt, Germany, September, 2003.

- Matthew J. Rutherford, Kenneth M. Anderson, Antonio Carzaniga, Dennis Heimbigner, Alexander L. Wolf, “Reconfiguration in the Enterprise JavaBean Component Model,” *Proceedings of IFIP/ACM Working Conference on Component Deployment (CD)*, pp. 67-81, Berlin, Germany, June, 2002.

## Refereed Workshop Papers

- Matthew J. Rutherford, “Integrating a Performance Analysis Kit into Model-Driven Development,” *Proceedings of 5th GPCE Young Researchers Workshop 2003*, Erfurt, Germany, September, 2003.

## Theses

- Matthew J. Rutherford, “Adequate System-Level Testing of Distributed Systems,” *PhD Thesis*, University of Colorado at Boulder, August, 2006.
- Matthew J. Rutherford, “EJB-ARK: Enterprise JavaBean Automatic Reconfiguration Framework,” *Master Thesis*, University of Colorado at Boulder, December, 2001.
- Matthew J. Rutherford, “The Fully Integrated Environmental Location and Data System: A GPS/GIS System,” *Bachelor Thesis*, Princeton University, June, 1996.

## Technical Reports

- Matthew J. Rutherford, Antonio Carzaniga, Alexander L. Wolf, “Distributed System Failures: Observations and Implications for Testing,” *Technical Report CU-CS-994-05*, Computer Science Department, University of Colorado at Boulder, April, 2005.

## Teaching

- **Professor**  
*Introduction to Computer Science, Honors* Fall Quarter 2008 (September - December)  
Taught the Honors section of the Computer Science Department’s undergraduate introductory sequence. The course used Savitch and Carrano’s *Java: An Introduction to Problem Solving and Programming*, Fifth Edition. The class meetings were a combination of lecture and lab. The students implemented their own game / simulation for a final project.
- **Professor**  
*Topics in Distributed Stream Processing* Fall Quarter 2008 (September - December)  
Co-taught a graduate student research seminar based around scholarly articles in the area of distributed stream processing. The class meetings were organized around two or three articles that were presented and discussed each week. The students implemented some key parts of a new distributed stream processing platform called DUP and prepared demonstrations using the platform and common UNIX tools.
- **Instructor**  
*Web-Application Programming for the New York City Fire Department* December, 2007  
Lead a training course for FDNY personnel on Java web-application development using Struts. This course was attended by developers and managers and received excellent reviews.
- **Teaching Assistant**  
*CSCI 1300: Computer Science 1: Programming* Spring, 1999  
Conducted weekly recitation and office hours, graded homework assignments, quizzes and tests. Received a “Very Good” overall rating from the course instructor.
- **Instructor**  
*Unix Shell Scripting* September, 2007  
Lead a virtual training course for Lockheed-Martin personnel on Unix Shell Scripting with Bash. This

course was attended by software developers and system administrators. Anonymous reviews of this course were excellent including perfect scores on evaluation questions related to subject knowledge and ability to answer questions; also received a near-perfect score on ability to explain information clearly.

## Talks

### Conference Talks

- Matthew J. Rutherford, “Simulation-Based Testing of Distributed Systems,” *14th ACM SIGSOFT Symposium on Foundations of Software Engineering (FSE)*, Portland, OR, November, 2006.
- Matthew J. Rutherford, “A Case for Test-Code Generation in Model-Driven Systems,” *Second International Conference on Generative Programming and Component Engineering (GPCE)*, Erfurt, Germany, September 25, 2003.

### Workshop Talks

- Matthew J. Rutherford, “Integrating a Performance Analysis Kit into Model-Driven Development (GPCE-YRW),” *5th GPCE Young Researchers Workshop 2003*, Erfurt, Germany, September 25, 2003.

### Miscellaneous Talks

- Matthew J. Rutherford, “Plumbing the Internet,” *University of Denver Alumni Symposium 2008*, Denver, CO, October 3, 2008.

## Service

### Academic Community Service

- **Workshop Co-Chair**  
*2009 International Conference on Software Testing (ICST)* August, 2008 - April, 2009  
Member of the committee tasked with selecting and organizing the workshops associated with ICST.
- **Reviewer**  
*International Conference on Software Engineering (ICSE)* October, 2008
- **Reviewer**  
*Software Quality Journal (Springer)* October, 2008
- **PlanetLab Site Technical Administrator**  
*Software Engineering Research Lab (SERL)* November, 2004 - November, 2007  
Responsible for installing and maintaining the SERL machines that are part of the PlanetLab global distributed testbed.
- **SEWORLD Administrator**  
*Software Engineering Research Lab (SERL)* October, 2005 - present  
Administrator of the SEWORLD email list.
- **SEWORLD Moderator**  
*Software Engineering Research Lab (SERL)* September, 2004 - October, 2005  
Moderator of the SEWORLD email list.
- **Workshop Organizing Committee**  
*2005 GPCE Young Researchers Workshop* January, 2005 - September, 2005  
Leader of the organizing committee for 7th GPCE Young Researchers Workshop that took place in Tallinn, Estonia.

- **Reviewer**  
*Fundamental Approaches to Software Engineering (FASE 2005)* April, 2005
- **Reviewer**  
*Generative Programming and Component Engineering (GPCE 2004)* October, 2004
- **Reviewer**  
*International Conference on Dependable Systems and Networks (DSN 2004)* June, 2004
- **Workshop Organizing Committee**  
*2004 Net.Object Days and GPCE Young Researchers Workshops* February, 2004 - October, 2004  
 Member of the organizing committee for the two young researchers workshops that grew out of the 2003 NODe/GPCE Young Researchers Workshop.

## Professional Service

- **Technology Committee Chair**  
*Princeton Entrepreneur's Network* September, 2002 - present  
 PrincetonEN is a not-for-profit organization devoted to facilitating the founding, funding, and servicing of rapid-growth companies, primarily involving Princeton alumni/ae.