

GEORGE CANDEA

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RESEARCH INTERESTS

Dependability of software systems, with particular emphasis on reliability, high availability, and manageability. Generally operate at the intersection of operating systems, programming languages, and software engineering; develop tools, techniques, and runtimes that both improve dependability and increase programmer productivity. Seek pragmatic solutions targeted primarily at large-scale real-life software with millions of lines of code running in highly concurrent systems with hundreds to thousands of threads.

EDUCATION

- 2005 **Ph.D. in Computer Science**
 Stanford University (Stanford, CA)
 Dissertation: Crash-Only Software and Microreboot: A Design and Technique for Achieving High Availability in Frequently-Failing Software Systems
- 1998 **M.Eng. in Computer Science & Electrical Engineering**
 Massachusetts Institute of Technology (Cambridge, MA)
 Thesis: Flexible and Efficient Sharing of Protected Abstractions in Exokernels
- 1997 **B.S. in Computer Science & Electrical Engineering**
 Massachusetts Institute of Technology (Cambridge, MA)

WORK EXPERIENCE

- 2006 - **Assistant Professor of Computer Science**
present *EPFL – École Polytechnique Fédérale de Lausanne (Lausanne, Switzerland)*
- 2006 - **Chief Scientist & Co-Founder**
2009 *Aster Data Systems, Inc. (Redwood City, CA)*
- 2005 – **Chief Technology Officer & Co-Founder**
2006 *Aster Data Systems, Inc. (Redwood City, CA)*
- 1999 – **Research Assistant**
2005 *Stanford University (Stanford, CA)*
- 1998 – **Senior Member of Technical Staff**
2003 *Oracle Corporation (Redwood Shores, CA)*
- 1997 **Research Intern**
 Microsoft Research (Redmond, WA)
- 1996 **Research Intern**
 IBM T. J. Watson Research Center (Yorktown Heights, NY)
- 1995 **Research Intern**
 IBM T.J. Watson Research Center (Hawthorne, NY)

HONORS

- *TR35 Young Technology Innovators Award* (2005) – Conferred by the MIT Technology Review to “the top 35 young technologists worldwide who have demonstrated potential to profoundly impact the world.”
- Member of the *TR35 Judging Panel* (2006, 2007, 2008)
- *Teaching Fellow*, Stanford University, 2003
- *Best Paper Award*, USENIX Windows NT Symposium, 1998

PROFESSIONAL ACTIVITY

Program Committee Member

- OSDI 2010 (Symposium on Operating Systems Design and Implementation)
- DSN 2010 (Intl. Conf. on Dependable Systems and Networks)
- ASPLOS 2010 (ACM Conf. on Architectural Support for Programming Langs. and Operating Systems)
- SOSOP 2009 (Symposium on Operating Systems Principles) Work in Progress Committee
- DSN 2009 (Intl. Conf. on Dependable Systems and Networks)
- USENIX 2009 (USENIX Annual Technical Conference)
- EuroSys 2009 (ACM EuroSys Conference)
- HotOS 2009 (Workshop on Hot Topics in Operating Systems)
- DSN 2008 (Intl. Conf. on Dependable Systems and Networks)
- TRANSACT 2008 (Workshop on Transactional Computing)
- USENIX 2007 (USENIX Annual Technical Conference)
- HotOS 2007 (Workshop on Hot Topics in Operating Systems)
- ICDCS 2007 (Intl. Conf. on Distributed Computing Systems)
- DSMS 2003 (Workshop on the Design of Self-Managing Systems)
- EASY 2002 (Workshop on Evaluating and Architecting System Dependability)

Program Co-Chair

- 2nd Workshop on Hot Topics in System Dependability (HotDep), 2006 (with Prof. Ken Birman)
- 1st Workshop on Hot Topics in System Dependability (HotDep), 2005 (with Dr. David Oppenheimer)

Program Co-Chair

- Co-organized the 10th EPFL I&C Summer Research Institute (with Prof. Rüdiger Urbanke)

TEACHING ACTIVITY

- Software Engineering (undergraduate level) – Fall 2008, Fall 2009
- Principles of Dependable Systems (M.S. level) – Fall 2006 & Fall 2007 @ EPFL, Fall 2003 @ Stanford
- Advanced Topics in Software Systems (Ph.D. level) – Fall 2009
- Advanced Topics in Computer Systems (Ph.D. level) – Fall 2007, Fall 2008

STUDENT ADVISING

Doctoral students

- Silviu Andrica (2008-present)
- Vitaly Chipounov (2008-present)
- Cristian Zamfir (2008-present)
- Horatiu Jula (2007-present)

Masters students

- Eric Bisolfati (2009)
- Paul Marinescu (2009)
- Vitaly Chipounov (2008) – now PhD student at EPFL
- Johann Coppel (2008) – now at Google, Inc.
- Alexander Sennhauser (2008) – now at Aster Data, Inc.
- Lucian Variu (2008)

EXTERNAL FUNDING

- *Developing Immunity Against Failures in Large Concurrent Software Systems*
Principal Investigator: George Candea
Swiss National Science Foundation (297,000 CHF)
- *Failure Immunity for Embedded Software in Consumer Devices*
Principal Investigator: George Candea
Microsoft Corporation (195,000 CHF)

PEER-REVIEWED PUBLICATIONS

- *Cloud9: A Software Testing Service*
Liviu Ciortea, Cristian Zamfir, Stefan Bucur, Vitaly Chipounov, George Candea
3rd ACM Intl. Workshop on Large Scale Distributed Systems and Middleware, Big Sky, MT, Oct. 2009
- *Drivolution: Rethinking the Database Driver Lifecycle*
Emmanuel Cecchet and George Candea
10th Intl. Middleware Conference (Middleware), Industrial Track, Urbana-Champaign, IL, Dec. 2009
- *Cloud9: A Software Testing Service*
Liviu Ciortea, Cristian Zamfir, Stefan Bucur, Vitaly Chipounov, George Candea
3rd ACM Intl. Workshop on Large Scale Distributed Systems and Middleware, Big Sky, MT, Oct. 2009
- *A Scalable, Predictable Join Operator for Highly Concurrent Data Warehouses*
George Candea, Neoklis Polyzotis, Radek Vingralek
35th Intl. Conference on Very Large Data Bases (VLDB), Lyon, France, August 2009
- *LFI: A Practical and General Library-Level Fault Injector*
Paul D. Marinescu and George Candea
Intl. Conference on Dependable Systems and Networks (DSN), Lisbon, Portugal, June 2009
- *Selective Symbolic Execution*
Vitaly Chipounov, Vlad Georgescu, Cristian Zamfir, George Candea
5th Workshop on Hot Topics in System Dependability (HotDep), Lisbon, Portugal, June 2009
- *Pathscore-Relevance: A Metric for Improving Test Quality*
Silviu Andrica and George Candea
5th Workshop on Hot Topics in System Dependability (HotDep), Lisbon, Portugal, June 2009
- *Deadlock Immunity: Enabling Systems To Defend Against Deadlocks*
Horatiu Jula, Daniel Tralamazza, Cristian Zamfir, George Candea
8th Symposium on Operating Systems Design and Implementation (OSDI), San Diego, CA, 2008
- *Toward Quantifying System Manageability*
George Candea
4th Workshop on Hot Topics in System Dependability (HotDep), San Diego, CA, 2008
- *Reverse-Engineering Drivers for Safety and Portability*
Vitaly Chipounov and George Candea
4th Workshop on Hot Topics in System Dependability (HotDep), San Diego, CA, 2008
- *Deprogramming Large Software Systems*
Yohann Coppel and George Candea
4th Workshop on Hot Topics in System Dependability (HotDep), San Diego, CA, 2008
- *Middleware-Based Database Replication: The Gaps Between Theory and Practice*
Emmanuel Cecchet, George Candea, Anastasia Ailamaki
ACM SIGMOD Intl. Conference on Management of Data (SIGMOD), Vancouver, BC, Canada, 2008
- *ConfErr: A Tool for Assessing Resilience to Human Configuration Errors*
Lorenzo Keller, Prasang Upadhyaya, George Candea
Intl. Conference on Dependable Systems and Networks (DSN), Anchorage, AK, 2008
- *A Scalable, Sound, Eventually-Complete Algorithm for Deadlock Immunity*
Horatiu Jula and George Candea
Workshop on Runtime Verification (RV), Budapest, Hungary, 2008
- *Toward Self-Healing Multitier Services*
Brian Cook, Shivnath Babu, George Candea, Songyun Duan
2nd Intl Workshop on Self-Managing Database Systems (WSMDS), Istanbul, Turkey, 2007

- Autonomous Recovery in Componentized Internet Applications
George Candea, Emre Kiciman, Shinichi Kawamoto, Armando Fox
Cluster Computing Journal, Vol. 9, No. 1, February 2006
- Combining Visualization and Statistical Analysis to Improve Failure Detection and Localization
P. Bodik, G. Friedman, L. Biewald, HT Levine, G. Candea, A. Fox, M. Jordan, D. Patterson
2nd IEEE International Conference on Autonomic Computing (ICAC), Seattle, WA, 2005
- Improving Availability with Recursive Microreboots: A Soft-State System Case Study
George Candea, James Cutler, Armando Fox
Performance Evaluation Journal, Vol. 56, Nos. 1-3, 2004
- Microreboot – A Technique for Cheap Recovery
George Candea, Shinichi Kawamoto, Yuichi Fujiki, Greg Friedman, Armando Fox
6th Symposium on Operating Systems Design and Implementation (OSDI), San Francisco, CA, 2004
- OnCall: Defeating Spikes with a Free-Market Application Cluster
James Norris, Keith Coleman, Armando Fox, George Candea
1st Intl. Conference on Autonomic Computing (ICAC), New York, NY, 2004
- Automatic Failure-Path Inference: A Generic Introspection Technique for Internet Applications
George Candea, Mauricio Delgado, Mike Chen, Armando Fox
3rd IEEE Workshop on Internet Applications (WIAPP), San Jose, CA, 2003
- JAGR: An Autonomous Self-Recovering Application Server
George Candea, Emre Kiciman, Steve Zhang, Pedram Keyani, Armando Fox
5th International Workshop on Active Middleware Services (AMS), Seattle, WA, 2003
- Crash-Only Software
George Candea and Armando Fox
9th Workshop on Hot Topics in Operating Systems (HotOS), Lihue, Hawaii, 2003
- Reducing Recovery Time in a Small Recursively Restartable System
George Candea, James Cutler, Armando Fox, Rushabh Doshi, Priyank Garg, Rakesh Gowda
Intl. Conference on Dependable Systems and Networks (DSN), Washington, DC, 2002
- A Utility-Centered Approach to Building Dependable Infrastructure Services
George Candea and Armando Fox
10th ACM SIGOPS European Workshop, Saint-Émilien, France, 2002
- Designing for High Availability and Measurability
George Candea and Armando Fox
1st Workshop on Evaluating and Architecting System Dependability (EASY), Göteborg, Sweden, 2001
- Recursive Restartability: Turning the Reboot Sledgehammer into a Scalpel
George Candea and Armando Fox
8th Workshop on Hot Topics in Operating Systems (HotOS), Elmau, Germany, 2001
- Vassal: Loadable Scheduler Support for Multi-Policy Scheduling
George Candea and Mike Jones
2nd USENIX Windows NT Symposium, Seattle, WA, 1998 (Best Paper Award)

INVITED PAPERS AND TECHNICAL REPORTS

- Recovery Oriented Computing: Building Multitier Dependability
George Candea, Aaron Brown, Armando Fox, David Patterson
IEEE Computer, Vol. 37, No. 11, November 2004
- Predictable Software: A Shortcut to Dependable Computing
George Candea
Stanford Technical Report, March 2004
- End-User Effects of Microreboots in Three-Tiered Internet Systems
George Candea and Armando Fox
Stanford Technical Report, March 2004
- Recovery Oriented Computing (ROC): Motivation, Definition, Techniques, and Case Studies
D. Patterson, A. Brown, P. Broadwell, G. Candea, M. Chen, J. Cutler, P. Enriquez, A. Fox, E. Kiciman, M. Merzbacher, D. Oppenheimer, N. Sastry, W. Tetzlaff, N. Treuhaft
UC Berkeley Technical Report UCB/CSD-02-1175, March 2002

PATENTS

- Methods and systems for multi-policy resource scheduling
George Candea and Harvey Eneman (US# 6,785,756)
- High-throughput extract-transform-load of program events for subsequent analysis
George Candea, Anastasios Argyros, Mayank Bawa (US# 11/613,036 – pending)
- System and method for using failure casting to manage failures in computer systems
George Candea, Mayank Bawa, Anastasios Argyros, (US# 11/692,113 – pending)
- System and method for join-partitioning for local computability of queries over shared-nothing clusters
Mayank Bawa, Anastasios Argyros, George Candea (US# 11/670,936 – pending)
- High-concurrency query operator and method
George Candea and Neoklis Polyzotis (US# 61,177,287 – provisional)

MISCELLANEOUS

Martial Arts

- Studying Shotokan Karate since 1990; presently hold a Shodan black belt
- Captain of Stanford's JKA Karate team (2000-2005)
- Individual competition results:
 - 3rd place in kata @ Shinkyu Shotokan Tournament (2004)
 - 2nd place in kumite @ JKA/AMAS State Championship (2003)
 - 1st place in kata and 2nd place in kumite @ JKA of Northern California Tournament (1999)

Languages

- English: fluent
- Romanian: fluent
- French: good
- German: good
- Spanish: good