GEORGE CANDEA

Assistant Professor of Computer Science

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RESEARCH INTERESTS

Dependability of software systems, with particular emphasis on reliability, safety, and high availability. I focus on the challenges of assuring dependability in systems that operate at large scale, have millions of lines of code and hundreds to thousands of threads, and are written by hundreds to thousands of programmers. I seek solutions that are both novel and practical, while also increasing programmer productivity. I favor an interdisciplinary approach combining operating systems, programming languages, formal methods, and software engineering.

EDUCATION

Stanford University
Ph.D. in Computer Science 2005
Thesis: Crash-Only Software and Microreboot: A Design and Technique for Achieving High Availability in Frequently Failing Software Systems (Advisor: Prof. Armando Fox)

Massachusetts Institute of Technology
M.Eng. in Electrical Engineering & Computer Science 1998
Thesis: Flexible and Efficient Sharing of Protected Operating System Abstractions in Exokernels (Advisor: Prof. Frans Kaashoek)

B.S. in Electrical Engineering & Computer Science 1997
Project: A Filesystem for the Rover Mobile Computing Toolkit (Advisor: Prof. Frans Kaashoek)

WORK EXPERIENCE

Ecole Polytechnique Fédérale de Lausanne – EPFL (Lausanne, Switzerland)
Assistant Professor of Computer Science 2006-present
Director of the Dependable Systems Laboratory

Aster Data Systems, Inc. (now part of Teradata, San Carlos, CA)
Co-Founder & Member of the Board of Directors 2005-2011
Chief Scientist 2006-2009
Chief Technology Officer 2005-2006

Stanford University (Stanford, CA)
Research Assistant, Department of Computer Science 1999-2005

Oracle Corp. (Redwood Shores, CA)
Senior Member of Technical Staff, Distributed Systems & Caching Group 1999-2003
Member of Technical Staff, Distributed Systems & Caching Group 1998-1999

Microsoft Research (Redmond, WA)
Research Intern, Operating Systems & Networking Group 1997

IBM Research (Yorktown Heights, NY and Hawthorne, NY)
Research Intern, Mobile Systems & Applications Group 1996
Research Intern, Infrastructure Systems & Software Group 1995

HONORS

Best Paper Award, Intl. Conf. on Architectural Support for Prog. Lang. and Operating Sys. (ASPLOS) 2011

Research Vision Award 2010
Conferred at OSDI by the Computing Community Consortium for "Automated Software Reliability Services"

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"

Teaching Fellow, Stanford University 2003

Best Paper Award, USENIX Windows NT Symposium 1998

PROFESSIONAL SERVICE

Member of Program Committees

- SOSP (Symp. on Operating Systems Principles): 2009 (WIP), 2011
- OSDI (Symp. on Operating Systems Design and Implementation): 2010
- EuroSys (ACM SIGOPS/EuroSys European Conference on Computer Systems): 2009, 2011, 2012
- ASPLOS (ACM Conf. on Architectural Support for Programming Languages and Operating Systems): 2010
- USENIX (USENIX Annual Technical Conference): 2007, 2009, 2011
- DSN (Intl. Conf. on Dependable Systems and Networks): 2008, 2009, 2010, 2011
- HotOS (Workshop on Hot Topics in Operating Systems): 2007, 2009
- SPIN (Intl. SPIN Workshop on Model Checking of Software): 2011
- TRANSACT (Workshop on Transactional Computing): 2008
- ICDCS (Intl. Conf. on Distributed Computing Systems): 2007
- DSMS (Workshop on the Design of Self-Managing Systems): 2003
- EASY (Workshop on Evaluating and Architecting System Dependability): 2002

Program Chair

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

I started this HotDep workshop in 2005 to serve as a bridge between the systems community and the classical fault-tolerant computing community. The workshop succeeded and is presently in its seventh edition.

Departmental Service

- EPFL I&C MS admissions 2009-2010
- EPFL I&C Summer Research Institute (with Prof. Rüdiger Urbanke) 2009-2010
- EPFL I&C "Friday Four o'clock Forum" (with Prof. Matthias Grossglauser) 2011
- EPFL I&C "Know Thy Neighbor" seminar (with Prof. Rüdiger Urbanke) 2010-2011

Started this bi-weekly seminar with Prof. Urbanke to encourage collaboration and mutual awareness within our school. Each talk routinely draws 100+ participants. Videos and further information at http://ktn.epfl.ch/.

TEACHING

- ***Software Engineering*** (undergraduate level) 2008 - 2011

Designed from scratch this 3rd year undergraduate course. Videotaped lectures are at http://sweng.epfl.ch. In the most recent anonymous student evaluation (CRAFT), students rated the course 5.6 out of 6.

- ***Software Development*** (undergraduate level) 2010

New undergraduate course that bridges the gap between academic and real-world software construction: working in large teams, using code bases that cannot be fully comprehended, interacting with customers, planning features, and estimating costs. The 22-student class developed as one big team Pocket Campus, a smartphone-based guide for the EPFL community to locate friends, spot and rate lunch food, plan courses, route between points of interest, get information on buildings and campus events, etc. A video of the demo and release is at http://sweng.epfl.ch/project/release. Anonymous student evaluation (CRAFT) rated the course 6.0 (out of 6).

- ***Principles of Dependable Systems*** (M.S. level) 2003 (at Stanford), 2006, 2007
- ***Advanced Topics in Software Systems*** (Ph.D. level) 2007 - 2009
- ***Advanced Topics in Operating Systems*** (Ph.D. level) 2010

RESEARCH ADVISING

Postdoc

- Johannes Kinder – *Using Abstract Interpretation in the Analysis of System Binaries* 2011-present

Doctoral theses

- Horatiu Jula – *Automatic Immunity Against Concurrency Bugs in Large Software Systems* 2007-2011
- Silviu Andrica – *Testing & Quantifying Software Systems' Resilience to Human Errors* 2008-present
- Vitaly Chipounov – *Automated Reverse Engineering of Closed-Source Software* 2008-present
- Cristian Zamfir – *Execution Synthesis: A Technique for Automated Software Debugging* 2008-present
- Stefan Bucur – *Cluster-based Parallel Symbolic Execution* 2009-present
- Radu Banabic (co-advised) – *Automated Vulnerability Discovery in Distributed Systems* 2010-present
- Volodymyr Kuznetsov – *Automated Testing of Proprietary Closed-Source Software* 2010-present
- Baris Kasikci – *Automated Classification of Hard-to-Diagnose Software Bugs* 2011-present

Masters theses

- Vitaly Chipounov – *State Machine Extraction and Analysis for Device Drivers* 2008
- Yohann Coppel – *DepAn: A Tool for Visualizing, Analyzing, and Refactoring Large Applications* 2008
- Alexander Sennhauser – *A Framework for Disk-Level Fault Injection* 2008
- Lucian Variu – *An Effective Tool for Hardware-Level Fault Injection* 2008
- Eric Bisolfati – *LibTrac: A Tool for Studying Application–Library Interaction and Behavior* 2009
- Paul Marinescu – *LFI: A Practical and General Library-Level Fault Injector* 2009
- Manohar Jonnalagedda – *Application Symmetry between On-Premise and Cloud Platforms* 2010
- Andreas Kirchner (T.U. Wien) – *A Platform for Hospital Campus Mobile Applications* 2011

Undergraduate & Masters semester projects

- Ivan Kviatkevich – *Leveraging Social Networks on Mobile Phones* 2010
- Loïc Frund – *Virtualized LLVM Execution Engine* 2010
- Thomas Rensch – *Deadlock Immunity for Mobile Phones* 2010
- Abson Sae-Tang – *An Open-Source Graphical Schema Editor for Relational Databases* 2010
- Thomas Schwery – *Dynamic Binary Translator from x86 to LLVM* 2010
- Tarek Benoudina – *Using Smartphone WiFi Triangulation for On-Campus Routing* 2011
- Florian Laurent – *A Platform for University Campus Smartphone Applications* 2011
- Jonas Schmid – *Smarphone-based Augmented Reality Friend Finder* 2011
- Johan Leuenberger – *Pocket Campus* 2011
- Gianluca Dal Mas – *Pocket Campus* 2011
- Jeremiah Menétrey – *Pocket Campus* 2011
- Pascal Scheiben – *Pocket Campus* 2011
- Oriane Rodriguez – *Pocket Campus* 2011
- Elodie Triponez – *Pocket Campus* 2011
- Guillaume Ulrich – *Pocket Campus* 2011

DOCTORAL DISSERTATION COMMITTEES

- Jorrit Herder – *Fault Tolerance in MINIX 3* 2010
  (Thesis advisors: Andrew Tanenbaum and Herbert Bos, Vrije Universiteit, Amsterdam)
- Fábio Oliveira – *Operator-Proof Systems Management with HAL* 2010
  (Thesis advisor: Ricardo Bianchini, Rutgers University, New Jersey)
- Olivier Rütti – *Concurrency and Dynamic Update for Group Communication Protocols* 2008
  (Thesis advisor: André Schiper, EPFL, Lausanne)

PEER-REVIEWED JOURNAL AND CONFERENCE PAPERS

In our area ("systems"), publishing in the top conferences is considered more important than top journals. Top conferences use a rigorous review process with acceptance rates hovering around 15%; each accepted paper receives a large number of reviews by program committee members, typically 5-7. For example, *Deadlock Immunity: Enabling Systems To Defend Against Deadlocks* below was reviewed by 11 referees. Our top conferences "shepherd" accepted papers, i.e. the program committee members supervise the revision of the accepted papers according to the reviewers' comments. In Citeseer's most recent available conference impact ranking (http://citeseerx.ist.psu.edu/stats/venues), OSDI had the 2nd highest impact among all conferences in

computer science, ASPLOS was #8, EuroSys #11, and USENIX #23. In "systems" we place the students as primary authors and advisors last, except when major differences in contribution warrant a different order.

1. ***S2E: A Platform for In-Vivo Multi-Path Analysis of Software Systems*** (**Best Paper Award**)
   Vitaly Chipounov, Volodymyr Kuznetsov, George Candea
   Intl. Conf. on Architectural Support for Programming Lang. and Operating Systems (ASPLOS), 2011
2. ***Parallel Symbolic Execution for Automated Real-World Software Testing***
   Stefan Bucur, Vlad Ureche, Cristian Zamfir, George Candea
   6th ACM SIGOPS European Conf. on Computer Systems (EuroSys), Salzburg, Austria, 2011
3. ***Communix: A Collaborative Deadlock Immunity Framework***
   Horatiu Jula, Pinar Tozun and George Candea
   Intl. Conf. on Dependable Systems and Networks (DSN), Hong Kong, 2011
4. ***WaRR: High Fidelity Web Application Record-and-Replay***
   Silviu Andrica and George Candea
   Intl. Conf. on Dependable Systems and Networks (DSN), Hong Kong, 2011
5. ***Predictable Performance and High Query Concurrency for Data Analytics***
   George Candea, Neoklis Polyzotis, Radek Vingralek
   The VLDB Journal, Special issue: Best Papers of VLDB, Volume 20, Issue 2, pp. 227-248, 2011
6. ***Low-Overhead Bug Fingerprinting for Faster Debugging***
   Cristian Zamfir and George Candea
   Intl. Conference on Runtime Verification (RV), Malta, 2010
7. ***Testing Closed-Source Binary Device Drivers with DDT***
   Volodymyr Kuznetsov, Vitaly Chipounov, George Candea
   USENIX Annual Technical Conference (USENIX), Boston, MA, 2010
8. ***An Extensible Technique for High Precision Testing of Recovery Code***
   Paul Marinescu, Radu Banabic, George Candea
   USENIX Annual Technical Conference (USENIX), Boston, MA, 2010
9. ***Automated Software Testing as a Service***
   George Candea, Stefan Bucur, Cristian Zamfir
   1st ACM Symposium on Cloud Computing (SOCC), Indianapolis, IN, 2010
10. ***iProve: A Scalable Approach to Consumer-Verifiable Software Guarantees***
    Silviu Andrica, Horatiu Jula, George Candea
    Intl. Conference on Dependable Systems and Networks (DSN), Chicago, IL, 2010
11. ***Studying Application-Library Interaction and Behavior with LibTrac***
    Eric Bisolfati, Paul Marinescu, George Candea
    Intl. Conference on Dependable Systems and Networks (DSN), Chicago, IL, 2010
12. ***Execution Synthesis: A Technique for Automated Software Debugging***
    Cristian Zamfir and George Candea
    5th ACM SIGOPS European Conf. on Computer Systems (EuroSys), Paris, France, 2010
13. ***Reverse Engineering of Binary Device Drivers with RevNIC***
    Vitaly Chipounov and George Candea
    5th ACM SIGOPS European Conf. on Computer Systems (EuroSys), Paris, France, 2010
14. ***Drivolution: Rethinking the Database Driver Lifecycle***
    Emmanuel Cecchet and George Candea
    10th Intl. Middleware Conference (Middleware), Industrial Track, Urbana-Champaign, IL, 2009
15. ***A Scalable, Predictable Join Operator for Highly Concurrent Data Warehouses***
    George Candea, Neoklis Polyzotis, Radek Vingralek
    Proceedings of the VLDB Endowment (PVLDB), Volume 2, Issue 1, pp. 277-288, August 2009
16. ***LFI: A Practical and General Library-Level Fault Injector***
    Paul Marinescu and George Candea
    Intl. Conference on Dependable Systems and Networks (DSN), Lisbon, Portugal, 2009
17. ***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
18. ***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
19. ***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

20. ***Autonomous Recovery in Componentized Internet Applications***
George Candea, Emre Kiciman, Shinichi Kawamoto, Armando Fox
Cluster Computing Journal, Volume 9, Issue 1, February 2006
21. ***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
22. ***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
23. ***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
24. ***Improving Availability with Recursive Microreboots: A Soft-State System Case Study***
George Candea, James Cutler, Armando Fox
Performance Evaluation Journal, Volume 56, Issues 1-3, January 2004
25. ***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
26. ***Vassal: Loadable Scheduler Support for Multi-Policy Scheduling*** (Best Paper Award)
George Candea and Mike Jones
2nd USENIX Windows NT Symposium, Seattle, WA, 1998

PEER-REVIEWED WORKSHOP PAPERS

27. ***Debug Determinism: The Sweet Spot for Replay-Based Debugging***
Cristian Zamfir, Gautam Altekar, George Candea, Ion Stoica
Workshop on Hot Topics in Operating Systems (HotOS), Napa, CA, 2011
28. ***Exterminating Bugs via Collective Information Recycling***
George Candea
7th Workshop on Hot Topics in System Dependability (HotDep), Hong Kong, China, 2011
29. **Automated Vulnerability Discovery in Distributed Systems**
Radu Banabic, George Candea, Rachid Guerraoui
7th Workshop on Hot Topics in System Dependability (HotDep), Hong Kong, China, 2011
30. **Platform-wide Deadlock Immunity for Mobile Phones**
Horatiu Jula, Thomas Rensch, George Candea
7th Workshop on Hot Topics in System Dependability (HotDep), Hong Kong, China, 2011
31. **Enabling Sophisticated Analysis of x86 Binaries with RevGen**
Vitaly Chipounov and George Candea
7th Workshop on Hot Topics in System Dependability (HotDep), Hong Kong, China, 2011
32. ***Cloud9: A Software Testing Service***
Liviu Ciortea, Cristian Zamfir, Stefan Bucur, Vitaly Chipounov, George Candea
ACM Intl. Workshop on Large Scale Distributed Systems and Middleware (LADIS), Big Sky, MT, 2009
33. ***Selective Symbolic Execution***
Vitaly Chipounov, Vlad Georgescu, Cristian Zamfir, George Candea
5th Workshop on Hot Topics in System Dependability (HotDep), Lisbon, Portugal, 2009
34. ***Pathscore-Relevance: A Metric for Improving Test Quality***
Silviu Andrica and George Candea
5th Workshop on Hot Topics in System Dependability (HotDep), Lisbon, Portugal, 2009
35. ***Toward Quantifying System Manageability***
George Candea
4th Workshop on Hot Topics in System Dependability (HotDep), San Diego, CA, 2008
36. ***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
37. ***Deprogramming Large Software Systems***
Yohann Coppel and George Candea
4th Workshop on Hot Topics in System Dependability (HotDep), San Diego, CA, 2008

38. ***A Scalable, Sound, Eventually-Complete Algorithm for Deadlock Immunity***
Horatiu Jula and George Candea
Workshop on Runtime Verification (RV), Budapest, Hungary, 2008
39. ***Toward Self-Healing Multitier Services***
Brian Cook, Shivnath Babu, George Candea, Songyun Duan
2nd Intl Workshop on Self-Managing Database Systems (WSMDS), Instanbul, Turkey, 2007
40. ***Automatic Failure-Path Inference: A Generic Introspection Technique for Internet Applications***
George Candea, Mauricio Delgado, Michael Chen, Armando Fox
3rd IEEE Workshop on Internet Applications (WIAPP), San Jose, CA, 2003
41. ***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
42. ***Crash-Only Software***
George Candea and Armando Fox
9th Workshop on Hot Topics in Operating Systems (HotOS), Lihue, Hawaii, 2003
43. ***A Utility-Centered Approach to Building Dependable Infrastructure Services***
George Candea and Armando Fox
10th ACM SIGOPS European Workshop, Saint-Emilion, France, 2002
44. ***Designing for High Availability and Measurability***
George Candea and Armando Fox
1st Workshop on Evaluating and Architecting System Dependability (EASY), Göteborg, Sweden, 2001
45. ***Recursive Restartability: Turning the Reboot Sledgehammer into a Scalpel***
George Candea and Armando Fox
8th Workshop on Hot Topics in Operating Systems (HotOS), Schloss Elmau, Germany, 2001

INVITED PAPERS AND TECHNICAL REPORTS

46. ***Accurately Classifying Data Races with Portend***
Baris Kasikci, Cristian Zamfir, George Candea
EPFL Technical Report No. 164776, April 2011
47. ***Automating the Debugging of Datacenter Applications with ADDA***
Gautam Altekar, Cristian Zamfir, George Candea, Ion Stoica
U.C. Berkeley Technical Report No. UCB/EECS-2011-22, April 2011
48. ***Dynamically Translating x86 to LLVM using QEMU***
Vitaly Chipounov and George Candea
EPFL Technical Report No. 149975, July 2010
49. ***AFEX: An Automated Fault Explorer for Faster System Testing***
Lorenzo Keller, Paul Dan Marinescu, George Candea
EPFL Technical Report No. 151651, July 2008
50. ***Recovery Oriented Computing: Building Multitier Dependability***
George Candea, Aaron Brown, Armando Fox, David Patterson
IEEE Computer, Vol. 37, No. 11, November 2004
51. ***Predictable Software: A Shortcut to Dependable Computing***
George Candea
Stanford Technical Report SWIG-2004-03, March 2004
52. ***End-User Effects of Microreboots in Three-Tiered Internet Systems***
George Candea and Armando Fox
Stanford Technical Report SWIG-2004-04, March 2004
53. ***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
U.C. Berkeley Technical Report UCB/CSD-02-1175, March 2002

KEYNOTES & INVITED TALKS

1. ***Automated Cloud-Based Software Reliability Services***
   International Symposium on Engineering Secure Software and Systems, Madrid, Spain (February 2011)
2. ***In-Vivo Multi-Path Analysis for Real-World Software Systems***
   Eurosys Workshop on Rigorous Systems Engineering, Salzburg, Austria (April 2011)
3. ***Scalable Symbolic Execution for Real-Sized Software Systems***
   Workshop on Synthesis, Verification and Analysis of Rich Models, Saarbrücken, Germany (April 2011)
4. ***Silicon Valley Startup - A Personal Journey***
   Venture Ideas, Lausanne, Switzerland (November 2010)

COLLOQUIUM & SEMINAR TALKS

5. ***Automated Software Reliability Services***
   Google Tech Talk, Mt. View (July 2010), Vrije Universiteit Amsterdam (September 2010)
6. ***Collaborative Vaccination in the Dimmunix Immunity Framework***
   University of Illinois at Urbana-Champaign (October 2009)
7. ***Failure Immunity: Teaching Systems To Defend Against Failures***
   U.C. San Diego, U. of Washington, Hewlett-Packard Labs, Microsoft Research Redmond, Microsoft Research Silicon Valley (March 2009)
8. ***Deadlock Immunity: Teaching Systems To Defend Against Deadlocks***
   Stanford University, U.C. Berkeley, University of Cambridge Computer Lab, Microsoft Research Cambridge (December 2008 - January 2009)
9. ***Software Quality Assurance: Some Practical Considerations***
   INRIA Grenoble - Rhône-Alpes (May 2007)
10. ***A Reboot-based Approach to High Availability***
    Carnegie Mellon U., EPFL I&C Colloquium, NYU Computer Science Colloquium, Max Planck Institute SWS Colloquium, Pennsylvania State U., Purdue University, University of Chicago, U.C. Santa Cruz, U. of Illinois at Urbana-Champaign, U. of Pennsylvania, University of Utah (February-April 2005)

CONFERENCE & WORKSHOP TALKS

11. ***Automated Software Reliability Services***
    9th Symposium on Operating Systems Design and Implementation (OSDI), Vancouver, Canada, 2010
12. ***Automated Software Testing as a Service***
    1st ACM Symposium on Cloud Computing (SOCC), Indianapolis, IN, 2010
13. ***Deadlock Immunity: Enabling Systems To Defend Against Deadlocks***
    8th Symposium on Operating Systems Design and Implementation (OSDI), San Diego, CA, 2008
14. ***Toward Quantifying System Manageability***
    4th Workshop on Hot Topics in System Dependability (HotDep), San Diego, CA, 2008
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    6th Symposium on Operating Systems Design and Implementation (OSDI), San Francisco, CA, 2004
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    3rd IEEE Workshop on Internet Applications (WIAPP), San Jose, CA, 2003
17. ***JAGR: An Autonomous Self-Recovering Application Server***
    5th International Workshop on Active Middleware Services (AMS), Seattle, WA, 2003
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20. ***Designing for High Availability and Measurability***
    1st Workshop on Evaluating and Architecting System Dependability (EASY), Göteborg, Sweden, 2001
21. ***Recursive Restartability: Turning the Reboot Sledgehammer into a Scalpel***
    8th Workshop on Hot Topics in Operating Systems (HotOS), Elmau, Germany, 2001
22. ***Vassal: Loadable Scheduler Support for Multi-Policy Scheduling***
    2nd USENIX Windows NT Symposium, Seattle, WA, 1998 (Best Paper Award)

PATENTS

1. ***Methods and systems for multi-policy resource scheduling***
   George Candea and Harvey Eneman (US PTO #6,785,756 – granted 31-Aug-2004)
2. ***High-throughput extract-transform-load of program events for subsequent analysis***
   George Candea, Anastasios Argyros, Mayank Bawa (US PTO #11/613,036 – pending)
3. ***System and method for using failure casting to manage failures in computer systems***
   George Candea, Mayank Bawa, Anastasios Argyros, (US PTO #11/692,113 – pending)
4. ***System and method for join-partitioning for local computability of queries in shared-nothing clusters***
   Mayank Bawa, Anastasios Argyros, George Candea (US PTO #11/670,936 – pending)
5. ***High-concurrency query operator and method***
   George Candea and Neoklis Polyzotis (US PTO #12/779,040 – pending)
6. ***Systems and methods of library-level fault injection***
   George Candea, Paul Marinescu (US PTO #61/388,637 – pending)
7. ***System and method for testing closed-source binary device drivers***
   George Candea, Vitaly Chipounov, Volodymyr Kuznetsov (US PTO #61/388,629 – pending)
8. ***System and method for automated software debugging with execution synthesis***
   Cristian Zamfir, George Candea (US PTO #61/416,765 – pending)
9. ***System and method for in-vivo multi-path analysis of software systems***
   George Candea, Vitaly Chipounov, Volodymyr Kuznetsov (US PTO #61/405,224 – pending)
10. ***System and method for reverse engineering of binary device drivers***
    Vitaly Chipounov, George Candea (US PTO #61/415,379 – pending)
11. ***Automated software reliability services***
    George Candea (US PTO #61/424,057 – pending)
12. ***Parallel automated testing platform for software systems***
    Stefan Bucur, George Candea, Cristian Zamfir (US PTO #61/430,191 – pending)

RESEARCH FUNDING (EXTERNAL)

1. ***AutoSRS: Automated Software Reliability Services***
   Sole PI: George Candea
   Google Focused Research Award ($750,000 unrestricted gift)
2. ***Developing Immunity Against Failures in Large Concurrent Software Systems***
   Sole PI: George Candea
   Swiss National Science Foundation ($314,000 for 3 years)
3. ***Failure Immunity for Embedded Software in Consumer Devices***
   Sole PI: George Candea
   Microsoft Corporation ($206,000 for 3 years)
4. ***Selective Symbolic Execution***
   Sole PI: George Candea
   Microsoft Research Fellowship Award ($136,000 for 3 years)
5. ***S^2E: A Platform for Selective Symbolic Execution***
   Sole PI: George Candea
   Google Faculty Research Award ($47,000 for 1 year)
6. ***Teaching Undergraduate Software Engineering Through Hands-On Experience***
   Sole PI: George Candea
   Google Inc. ($10,000 gift)
   Amazon.com, Inc. ($5,000 gift)
7. ***The Datacenter Observatory***
   Co-PI in a larger group of faculty members (PI: W. Zwaenepoel)
   Swiss National Science Foundation ($317,000 for 1 year)

MEDIA COVERAGE

My recent research has been the subject of interviews with IEEE Computer, MIT Technology Review, Wired Magazine, Lausanne-FM Radio, Pressetext, L'Atelier, and has been covered in articles in Scientific American, Der Spiegel, PC World, Scientific Computing, The Register, Science Daily, Innovations Report, Computerworld, ACM Tech News, EE Times, Sci-Tech Today, Techno Science, Continuity Central, and several other technical publications in Brazil, France, Germany, Italy, Japan, Portugal, The Netherlands, and Vietnam.

MISCELLANEOUS

Martial Arts

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

Languages

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