

Philip Brighten Godfrey

RAD Lab
465 Soda Hall
Computer Science Division
University of California at Berkeley
Berkeley, CA 94720-1776

pbg@cs.berkeley.edu
<http://www.cs.berkeley.edu/~pbg/>
Phone: 650-814-1962
Fax: 510-642-5775

Research Interests

Networking and distributed systems: in particular, routing architecture, algorithms for and analysis of distributed systems, and applications of theory to systems design.

Education

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| Expected
May 2008 | University of California at Berkeley , Ph.D. in Computer Science
Dissertation title: "Designing Distributed Systems for Heterogeneity"
Advisor: Prof. Ion Stoica
Major in CS Systems, minors in CS Theory and Statistics |
| December 2006 | University of California at Berkeley , M.S. in Computer Science
Thesis title: "Minimizing Churn in Distributed Systems"
Advisor: Prof. Ion Stoica |
| May 2002 | Carnegie Mellon University , B.S. in Computer Science
Minors in Jazz Performance and Trumpet Performance |

Awards and Honors

- Authored grant proposal with Ion Stoica (PI), "Stabilizing BGP, Safely", awarded support of \$98,700 by the Cisco Collaborative Research Initiative (CCRI) in January 2008.
- NSF Graduate Research Fellowship, 2004-2007.
- California Microelectronics Fellowship, 2002-2003.
- Phi Kappa Phi honor society, Spring 2002.
- Honorable Mention, Computing Research Association Outstanding Undergraduate Award Program, 2002. One of 44 from the US and Canada chosen for "outstanding research potential in an area of computing research."
- Honorable Mention, 2002 Google Scholarship. One of eight US students recognized.
- 2002 Andrew Carnegie Society Presidential Scholar. One of 34 recognized students in my graduating class.
- Phi Beta Kappa, October 2001 (early induction). One of 20 early inductees in my graduating class.
- CMU Small Undergraduate Research Grant, Spring 2002. Awarded by CMU's Undergraduate Research Initiative, and sponsored by Compaq Computer Corporation, for my research in Natural Language CAPTCHAs (see below).

Employment

- December
2006-March
2007 **Consultant, Rinera Networks, Inc.**
Design and simulation of algorithms for a component of a peer-to-peer video distribution system.
- August
2002-present **Graduate Student Researcher, University of California - Berkeley**
Advised by Prof. Ion Stoica, researched how distributed systems are affected by and can take advantage of *heterogeneous reliabilities* among the system's components, including development of methods to safely avoid failures in Internet routing, and a study of principles of minimizing churn applicable to many distributed systems which showed how randomization is an effective technique for avoiding failures. Modeled the effect of *capacity heterogeneity* on parallel systems, and designed a distributed hash table which effectively and efficiently adapts to heterogeneous nodes.
- May-August
2004 **Research intern, Intel Research Pittsburgh**
As part of the Open DHT project, designed and implemented a new version of the ReDiR rendezvous algorithm which automatically adapted to group size. Supervisor: Brad Karp.
- May-August
2002 **Engineering intern, Google Inc.**
Clustering of data for Froogle, a product search tool.
- August 2001 -
May 2002 **Undergraduate researcher, CAPTCHA project, Carnegie Mellon University**
Research in methods to automatically differentiate humans and computers using a natural language-based (i.e., text only) test. Advisor: Prof. Lenore Blum. See <http://captcha.net>.
- May-August
2001 **Engineering intern, Cray Inc.**
Design and implementation in C of a fast multi-link file transfer protocol and server for the Cray X1 supercomputer.
- May-August
2000 **Engineering intern, Cray Inc.**
Development of routing software for the Cray X1 memory subsystem. Involved translating a prototype from LISP to C++ and work on the routing algorithm.

Publications

Available at <http://www.cs.berkeley.edu/~pbg/>.

- P. Brighten Godfrey and Richard M. Karp. On the Price of Heterogeneity in Parallel Systems. To appear, *Theory of Computing Systems*. DOI: 10.1007/s00224-008-9102-5. Invited journal version of earlier SPAA 2006 publication.
- P. Brighten Godfrey. Balls and Bins with Structure: Balanced Allocations on Hypergraphs. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2008.
- P. Brighten Godfrey, Matthew Caesar, Ian Haken, Scott Shenker, and Ion Stoica. Stable Internet Route Selection. *Meeting of the North American Network Operators' Group (NANOG 40)*, June 2007.
- Alexandros G. Dimakis, P. Brighten Godfrey, Martin J. Wainwright, and Kannan Ramchandran. Network Coding for Distributed Storage Systems. *IEEE INFOCOM*, May 2007.

- Alexandros G. Dimakis, P. Brighten Godfrey, Martin J. Wainwright, and Kannan Ramchandran. The Benefits of Network Coding for Peer-to-Peer Storage Systems. *Third Workshop on Network Coding, Theory, and Applications (NETCOD)*, January 2007.
- P. Brighten Godfrey, Scott Shenker, and Ion Stoica. Minimizing Churn in Distributed Systems. *ACM SIGCOMM*, September 2006.
- P. Brighten Godfrey and Richard M. Karp. On the Price of Heterogeneity in Parallel Systems. *ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, July 2006.
- Sonesh Surana, Brighten Godfrey, Karthik Lakshminarayanan, Richard Karp and Ion Stoica. Load Balancing in Dynamic Structured P2P Systems. *Performance Evaluation*, Vo. 63, no. 6, pps. 217-240, March 2006.
- Sean Rhea, Brighten Godfrey, Brad Karp, John Kubiatowicz, Sylvia Ratnasamy, Scott Shenker, Ion Stoica, and Harlan Yu. OpenDHT: A Public DHT Service and Its Uses. *ACM SIGCOMM*, August 2005.
- P. Brighten Godfrey and Ion Stoica. Heterogeneity and Load Balance in Distributed Hash Tables. *IEEE INFOCOM*, March 2005.
- P. Brighten Godfrey and David Ratajczak. Naps: Scalable, Robust Topology Management in Wireless Ad Hoc Networks. *Information Processing in Sensor Networks (IPSN)*, April 2004.
- Brighten Godfrey, Karthik Lakshminarayanan, Sonesh Surana, Richard Karp, and Ion Stoica. Load Balancing in Dynamic Structured P2P Systems. *IEEE INFOCOM*, March 2004.
- Kamalika Chaudhuri, Brighten Godfrey, Satish Rao, and Kunal Talwar. Paths, Trees and Minimum Latency Tours. *FOCS 2003*: 36-45.

Papers under submission:

- P. Brighten Godfrey, Matthew Caesar, Ian Haken, Yaron Singer, Scott Shenker, and Ion Stoica. Stabilizing BGP, Safely.

Talks

January 2008	“Balls and Bins with Structure”, SODA 2008
July 2007	“Stable Internet Route Selection”, Tech Talk, Cisco Systems
June 2007	“Stable Internet Route Selection”, NANOG 40
September 2006	“Minimizing Churn in Distributed Systems”, SIGCOMM 2006
August 2006	“Minimizing Churn in Distributed Systems”, SDI/LCS Seminar Series, Carnegie Mellon University
July 2006	“On the Price of Heterogeneity in Parallel Systems”, SPAA 2006
March 2005	“Heterogeneity and Load Balance in Distributed Hash Tables”, INFOCOM 2005
April 2004	“Naps: Scalable, Robust Topology Management in Wireless Ad Hoc Networks”, IPSN 2004
January 2002	“Text Oriented CAPTCHAs”, First Workshop on Human Interactive Proofs, Xerox PARC

Teaching and Advising Experience

- October 2007 **Guest Lecture**, “Interdomain Routing”, EE122 (Undergraduate networking course; Instructor: Prof. Vern Paxson)
- September
2006-present **Advising** of undergraduate, Ian Haken, on research projects
- January-May
2006 **Private tutor** for a student in masters-level course CSC810.01, “Analysis of Algorithms II”. Instructor: Prof. James Wong, San Francisco State University
- January-May
2005 **Teaching assistant** for CS 270, “Combinatorial Algorithms and Data Structures”. Instructor: Prof. Christos Papadimitriou, University of California at Berkeley
- August-
December
2004 **Teaching assistant** for CS 61B, “Data Structures and Advanced Programming”. Instructor: Prof. Paul Hilfinger, University of California at Berkeley

Other Professional and Community Activities

- **Reviewer**, *Conferences*: EuroPar (2006), ACM SIGCOMM (2005, 2004), IPTPS (2005), HotNets (2005), ANCS (2005), NSDI (2004), DISC (2003), TRIDENTCOM (2008); *Journals*: IEEE/ACM Transactions on Networking (2007, 2006), Operations Research (2006, 2005, 2004), IEEE Transactions on Parallel and Distributed Systems (2007, 2006), Elsevier Journal on Ad Hoc Networks (2007, 2005), Elsevier Computer Networks (2006), Elsevier Performance Evaluation (2004), and others.
- **Compiled and maintained** a Repository of Availability Traces: Traces from measurement studies of a number of distributed systems, packaged in a common compact format (see <http://www.cs.berkeley.edu/~pbg/availability/>).
- **Member**, CS Graduate Student Association Faculty Candidate Evaluation Committee, 2007.
- **Student member**, graduate student admissions committee in Systems area, 2005.
- **Co-organizer**, International House Debate Club, 2004-2006 (see my article in the International House Times, Spring 2006, p. 3: <http://ihouse.berkeley.edu/a/times/spring2006.pdf>)

References

- **Prof. Ion Stoica**
Associate Professor, Computer Science Division
University of California at Berkeley
Berkeley, CA 94720-1776
510-643-4007
istoica@cs.berkeley.edu
- **Prof. Scott Shenker**
Professor, Computer Science Division
University of California at Berkeley
Berkeley, CA 94720-1776
510-666-2880
shenker@icsi.berkeley.edu
- **Prof. Richard M. Karp**
University Professor, Department of Electrical Engineering and Computer Sciences
University of California at Berkeley
Berkeley, CA 94720-1776
510-642-4274 x 122
karp@cs.berkeley.edu
- **Prof. Emin Gün Sirer**
Associate Professor, Computer Science Department
Cornell University
Ithaca, NY 14853
607-255-7673
egs@systems.cs.cornell.edu