

Dan Pei

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Education

- 2000-2005 **Ph.D.** in Computer Science UCLA. Advisor: Dr. Lixia Zhang
Ph.D. thesis “On Resilient Internet Routing” studied the security, fault-tolerance, and performance improvement/evaluation of large-scale systems in the context of Internet routing.
- 1997-2000 **M.S.** in Computer Science Tsinghua University, Beijing, China
Advisor: Dr. Dongsheng Wang. Master thesis “Design and Implementation of Process Migration and Checkpointing in Network of Workstations” studied the fault-tolerance of distributed systems.
- 1992-1997 **B.E.** in Computer Science Tsinghua University, Beijing, China

Working Experience

- September 2005-now Senior Member of Technical Staff - Research, Internet and Networking system, AT&T Labs - Research
- Summer 2003 **Summer Intern**, AT&T Labs-Research. Worked with Dr. William Aiello, Dr. Anna Gilbert, Dr. Tim Griffin, and Dr. Patrick McDaniel on BGP measurements.
- Summer 2002 **Summer Intern**, USC/Information Sciences Institute. Worked with Dr. Daniel Massey on packet delivery during routing convergence.
- Spring 2002 Teaching assistant for Computer Network Fundamentals (CS118), UCLA CSD undergraduate course. Responsibilities include weekly recitation, office hours, design and grading of homework, exams and projects.
- Summer 2001 **Summer Intern**, USC/Information Sciences Institute. Worked with Dr. Daniel Massey on formal specifications for BGP and RIP.

Selected Honors and Awards

- 2005 “**Outstanding Ph.D. Award**”, UCLA Computer Science Department
Annual award for best PhD thesis in UCLA Computer Science Department
- 2005 “**Best Paper Award**”, ICDCS 2005. Beichuan Zhang, **Dan Pei**, Daniel Massey and Lixia Zhang. “Timer Interactions in Route Flap Damping.”
- 2004 **IBM Ph.D. Fellowship**
“an annual, worldwide competitive program that honors exceptional PhD students in disciplines such as business, chemistry and computer science, as well as emerging technical fields.”
- 2003 **Dimitris N.Chorafas Foundation Award**
“awards scientific prizes worldwide for outstanding research in the engineering sciences, humanities and social sciences, medicine, and the natural sciences”.

- 1999 **“Outstanding Junior Researcher Award”**.
Based on research performance, awarded to top 9 students of all Ph.D. and M.S. students (more than 400 in total) in Computer Science Dept., Tsinghua University.
- 1992 Ranked 1st in Hebei Province in China’s 1992 National College Entrance Examination (http://en.wikipedia.org/wiki/National_College_Entrance_Examination)

Journal, magazine, conference and workshop publications

2009

Kai Chen, David R. Choffnes, Rahul Potharaju, Yan Chen, Fabian E. Bustamante, **Dan Pei**, and Yao Zhao. Where the Sidewalk Ends: Extending the Internet AS Graph Using Traceroutes From P2P Users. The Fifth ACM International Conference on emerging Networking EXperiments and Technologies (**CoNEXT 2009**). Rome, Italy. December 1-4, 2009. (**acceptance ratio: 17.1%=29/170**)

Tongqing Qiu, Lusheng Ji, **Dan Pei**, Jia Wang, Jun (Jim) Xu, and Hitesh Ballani. Locating Prefix Hijackers using LOCK. **USENIX Security 2009**, Montreal, Canada, August 2009 (**acceptance ratio: 14.7%=26/176**)

Ricardo Oliveira, **Dan Pei**, Walter Willinger, Beichuan Zhang, and Lixia Zhang. The (in)Completeness of the Observed Internet AS-level Structure. **ACM/IEEE Transactions on Networking**. A earlier version appeared in SIGMETRICS 2008.

Jeffrey Erman, Alexandre Gerber, Mohammad T. Hajiaghayi, **Dan Pei**, Oliver Spatscheck. Network Aware Forward Caching. **WWW 2009** (The 18th International World Wide Web Conference). Madrid, Spain. April 20-24, 2009. (**acceptance ratio: 11.7%=104/888**)

Yao Zhao, Zhaosheng Zhu, Yan Chen, **Dan Pei**, Jia Wang. Towards Efficient Large-Scale VPN Monitoring and Diagnosis under Operational Constraints. Proceedings of The 28th IEEE International Conference on Computer Communications (**Infocom 2009**). Rio de Janeiro, Brazil. April 20-25, 2009. (**acceptance ratio: 19.7%=282/1435**)

Elliott Karpilovsky, Alexandre Gerber, **Dan Pei**, Jennifer Rexford, Aman Shaikh. Quantifying the Extent of IPv6 Deployment. Proceeding of The tenth Passive and Active Measurement conference (**PAM 2009**). Seoul, Korea. April, 2009. (**acceptance ratio: 28.6%=22/77**)

Ricardo Oliveira, Beichuan Zhang, **Dan Pei**, Izhak-Ratzin, Lixia Zhang. Quantifying Path Exploration in the Internet. **ACM/IEEE Transactions on Networking**, June 2009. An earlier version appeared in ACM IMC 2006.

2008

Franck Le, Geoffrey G. Xie, **Dan Pei**, Jia Wang, and Hui Zhang. Shedding Light on the Glue Logic of the Internet Routing Architecture. Proceedings of ACM **SIGCOMM**, Seattle, WA. August 2008. (**acceptance ratio: 12.5%=36/288**)

Ricardo Oliveira, **Dan Pei**, Walter Willinger, Beichuan Zhang, and Lixia Zhang. In Search of the elusive Ground Truth: The Internet's AS-level Connectivity Structure. Proceedings of ACM SIGMETRICS, Annapolis, MD. June 2008. (**acceptance ratio: 17.9%=36/201**)

Changhoon Kim, Alexandre Gerber, Carsten Lund, **Dan Pei**, and Shubhabrata Sen. Scalable VPN Routing via Relaying. Proceedings of ACM SIGMETRICS, Annapolis, MD. June 2008. (**acceptance ratio: 17.9%=36/201**)

2007

Changxi Zheng, Lusheng Ji, **Dan Pei**, Jia Wang, and Paul Francis. A Light-Weight Distributed Scheme for Detecting IP Prefix Hijacks in Realtime. Proceedings of ACM SIGCOMM, Kyoto, Japan, August 2007. (**acceptance ratio: 13.6%=35/258**)

Patrick Verkaik, **Dan Pei**, Tom Scholl, Aman Shaikh, Alex C. Snoeren, and Jacobus E. van der Merwe. Wrestling Control from BGP: Scalable Fine-grained Route Control. USENIX Annual Technical Conference 2007. Santa Clara, June 2007. (**acceptance ratio: 26.5%=31/117**)

Lan Wang, Malleswari Saranu, Joel M. Gottlieb, **Dan Pei**. Understanding BGP Session Failures in a Large ISP. IEEE INFOCOM 2007, May 2007, Anchorage, Alaska, USA. (**acceptance ratio: 18%=252/1400**)

2006

Dan Pei, Jacobus Van Der Merwe. "BGP Convergence in MPLS VPNs". ACM IMC 2006. Rio de Janeiro, Brazil. Oct. 2006 (**acceptance ratio: 21.9%=34/155**)

Ricardo Oliveira, Beichuan Zhang, **Dan Pei**, Izhak-Ratzin, Lixia Zhang. "Quantifying Path Exploration in the Internet". ACM IMC 2006. Rio de Janeiro, Brazil. Oct. 2006 (**acceptance ratio: 21.9%=34/155**)

Mohit Lad, Dan Massey, **Dan Pei**, Yiguo Wu, Beichuan Zhang, and Lixia Zhang. "PHAS: a Prefix Hijack Alerting System". USENIX Security 2006, Vancouver, B.C., Canada, August 2006 (**acceptance ratio: 12.3%=22/179**)

Dan Pei, Beichuan Zhang, Daniel Massey and Lixia Zhang. "An Analysis of Path Vector Convergence Algorithms." *Elsevier Computer Networks Journal*, Volume 50, Number 3, February 2006

2005

Hyo-Joeng Shin, **Dan Pei**, Mohit Lad, Yanghee Choi, and Lixia Zhang. "The Impact of Multi-homing on Network Reliability and Stability: A Case Study". IEEE ICCCN 2005, San Diego, October 2005. (**acceptance ratio: 33%=87/260**)

Dan Pei, Matt Azuma, Daniel Massey, and Lixia Zhang. "BGP-RCN: Improving BGP Convergence through Root Cause Notification." *Elsevier Computer Networks Journal*, Volume 48, Issue 2, June 2005, Pages 175-194.

Beichuan Zhang, **Dan Pei**, Daniel Massey and Lixia Zhang. "Timer Interactions in Route Flap Damping." International Conference on Distributed Computing Systems (**ICDCS**) 2005, Columbus, Ohio, June 2005. This paper receives the "**Best Paper Award**" from ICDCS 2005. (**acceptance ratio: 13.8%=75/543**)

2004

Dan Pei, Xiaoliang Zhao, Daniel Massey, and Lixia Zhang. "A Study of BGP Path Vector Looping Behavior." International Conference on Distributed Computing Systems (**ICDCS**) 2004, Tokyo, Japan, March 2004. pp.720-729. (**acceptance ratio:17.7%=84/475**)

Dan Pei, Daniel Massey, and Lixia Zhang. "A Framework for Resilient Internet Routing Protocols." **IEEE Network**, vol. 18, no. 2, March 2004. pp5-12. An extended version is available as UCLA CSD TR030052.

2003

Dan Pei, Daniel Massey, and Lixia Zhang. "Detection of Invalid Routing Announcements in RIP Protocol." **IEEE GLOBECOM** 2003, San Francisco, December 2003. pp. 1450~1455. (**acceptance ratio: 34%=816/2400**)

Lan Wang, Xiaoliang Zhao, **Dan Pei**, Randy Bush, Daniel Massey, Lixia Zhang. "Protecting BGP Routes to Top Level DNS Servers." **IEEE Transactions on Parallel and Distributed Systems**. 14(9): 851-860, 2003.

Xiaoliang Zhao, **Dan Pei**, Daniel Massey, and Lixia Zhang. "A Study on Routing Behavior of Latin America Networks". IFIP/ACM Latin America Networking Conference (**LANC**) 2003. La Paz, Bolivia, October 2003.

Soon Tee Teoh, Kwan-Liu Ma, S. Felix Wu, Daniel Massey, Xiaoliang Zhao, **Dan Pei**, Lan Wang, Lixia Zhang, Randy Bush. "Visual-based Anomaly Detection for BGP Origin AS Change (OASC) Events." IFIP/IEEE Distributed Systems: Operations & Management (**DSOM**) 2003, Heidelberg, Germany, October 2003. pp. 155-168. (**acceptance ratio: 23.8%=20/84**)

Dan Pei, Lan Wang, Daniel Massey, S. Felix Wu, and Lixia Zhang. "A Study of Packet Delivery Performance during Routing Convergence." IEEE International Conference on Dependable Systems and Networks (**DSN**) 2003, San Francisco, June 2003. pp. 183~192. (**acceptance ratio: 30.8%=45/146**)

Lan Wang, Xiaoliang Zhao, **Dan Pei**, Randy Bush, Daniel Massey, Allison Mankin, S. Felix Wu, and Lixia Zhang. "Protecting BGP Routes to Top Level DNS Servers." IEEE International Conference on Distributed Computing Systems (**ICDCS**) 2003. Providence, Rhode Island, May 2003. pp. 322-331. (**acceptance ratio: 17.7%=72/406**)

Xiaoliang Zhao, Mohit Lad, **Dan Pei**, Lan Wang, Daniel Massey, S. Felix Wu, and Lixia Zhang. "Understanding BGP Behavior Through a Study of DoD Prefixes." **IEEE DISCEX 2003**. Washington, DC, April 2003. pp. 214-225. (**acceptance ratio: 30%**)

2002

Lan Wang, Xiaoliang Zhao, **Dan Pei**, Randy Bush, Daniel Massey, Allison Mankin, S. Felix Wu, and Lixia Zhang. "Observation and Analysis of BGP Behavior under Stress." ACM

SIGCOMM Internet Measurement Workshop (**IMW**) 2002, Marseille, France. October 2002. pp. 183 -195. (**acceptance ratio: 24.2% = 15/62 full papers**)

Dan Pei, Xiaoliang Zhao, Lan Wang, Daniel Massey, Allison Mankin, S. Felix Wu and Lixia Zhang. “Improving BGP Convergence through Consistency Assertions.” **IEEE INFOCOM** 2002, New York, June 2002. pp. 902-911. (**acceptance ratio: 20.5%=192/938**)

Xiaoliang Zhao, **Dan Pei**, Lan Wang, Daniel Massey, Allison Mankin, S. Felix Wu and Lixia Zhang. “Detection of Invalid Routing Announcement in the Internet.” IEEE International Conference on Dependable Systems and Networks (**DSN**) 2002, Washington DC, June 2002. pp. 59-68. (**acceptance ratio: 31% =48/156**)

2001

Xiaoliang Zhao, **Dan Pei**, Lan Wang, Daniel Massey, Allison Mankin, S. Felix Wu and Lixia Zhang, “An Analysis of BGP Multiple Origin AS(MOAS) Conflicts.” ACM SIGCOMM Internet Measurement Workshop (**IMW**) 2001. San Francisco, CA, Oct. 2001. pp. 31-35. (**acceptance ratio: 26.4%=14/53**)

2000

Dan Pei, Dongsheng Wang, Weimin Zheng, “Design and Implementation of a Low-Overhead File Checkpointing Approach.” IEEE International Conference on High Performance Computing in the Asia-Pacific Region(**HPC-Asia**) 2000. Beijing, May 2000. pp.439~441. (**acceptance ratio: 29%=120/413**)

1999

Dan Pei. “Modification Operation Buffering: A Low Overhead Approach to checkpoint User Files.” **The 29th International Symposium on Fault-Tolerant Computing (FTCS-29)**, Student Paper, pp. 36-38, June 1999.

Dan Pei, Wang Dongsheng, Zhang Youhui, Shen Meiming. “Quasi-asynchronous Migration: A Novel Migration Protocol for PVM Tasks.” **ACM SIGOPS Operating Systems Review**, 33(2): 5-15. (April 1999).

Other Publications

B. Zhang, V. Kambhampati, D. Massey, R. Oliveira, D. Pei, L. Wang and L. Zhang. A Secure and Scalable Internet Routing Architecture. Poster, ACM SIGCOMM, Pisa, Italy, Sept. 2006

Dan Pei, Mohit Lad, Beichuan Zhang, Daniel Massey and Lixia Zhang. “Route Diagnosis in Path Vector Protocols.” Available as a UCLA CSD TR-040039, October 2004. Also available as a poster in **SIGCOMM** 2004 Poster session.

William Aiello, Anna Gilbert, Patrick McDaniel, and **Dan Pei**. “Origin Disturbance in BGP.” Available as Technical Report, AT&T Labs - Research, TD-62TJF8, July 2004

Xiaoliang Zhao, Allison Mankin, Daniel Massey, **Dan Pei**, Lan Wang, S. Felix Wu, and Lixia Zhang. “Validation of Multiple Origin ASes Conflicts through BGP Community Attributes.” IETF Draft, November 2001.

Professional Activities

Conference Technical Committee Member:

IEEE Globecom 2010 - Next Generation Networking Symposium

IEEE Infocom 2010: The 29th IEEE International Conference on Computer Communications

Routing 2009: The first Symposium on Network Evolution and Routing Innovation

NPsec 2009: Fifth Workshop on Secure Network Protocols

IEEE ICDCS 2009 "Network and Internet Support for Distributed Applications" track

IEEE ICDCS 2008 "Network Architectures and Protocols" track

WWW 2007 (The 16th International World Wide Web Conference) "Industrial Practice and Experience" track. <http://www2007.org/>

Reviewer:

Journals: ACM/IEEE Transaction on Networking, Elsevier Computer Networks Journal, ACM Computer Communications Review, IEEE JSAC, ACM Transaction on Internet Technology, IEEE Network, ACM CACM, Journal of Computer (in Chinese), Journal of Software (in Chinese).

Conference: SIGCOMM 2004, SIGMETRICS 2005, IEEE ICNP 2008, IEEE INFOCOM 2009/2008/2007/2006/2003, DSN 2009, ICNP 2005, ACM CCS 2002, IEEE ICON 2004

IETF Activity:

One of the 23 acknowledged contributors to BGP standard (**RFC 4271**)