# Petr Kuznetsov

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Last updated: July 13, 2013

## Education

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| **Ph. D.** | Computer Science, Ecole Polytechnique Fédérale de Lausanne (EPFL) (nomination for the best EPFL thesis award) | 2005 |
| **M. Sc.** | Mathematics, *cum laude*, Saint-Petersburg Institute of Fine Mechanics and Optics (Technical University) | 1997 |
| **B. Sc.** | Mathematics, *cum laude*, Saint-Petersburg Institute of Fine Mechanics and Optics (Technical University) | 1995 |

## Research Interests

Distributed algorithms and systems

Synchronization and fault-tolerance

Consistency and availability in large-scale systems

Algebraic and combinatorial topology in computing

## Professional Experience

2013–present

Professor. Department of Network and Computer Science (INFRES), Télécom ParisTech

2008–2013

Senior research scientist. Technische Universität Berlin/Deutsche Telekom Research Laboratories, Germany.

2005–2008

Post-doctoral researcher. Max Planck Institute for Software Systems, Germany.

2000–2005

Research assistant and (from 2001) Ph.D. student. Distributed Programming Lab, EPFL, Switzerland.

1997–1999

Systems engineer in networking and system integration. Business Computer Center, Saint-Petersburg, Russia.

1996–1997

Instructor in Novell Authorized Training Center, Saint-Petersburg, Russia.

1994–1996

Participant in Russian–Dutch research project "Nonlinear problems in resonance". January–February 1996 — guest researcher at the Department of Technical Mathematics and Informatics of Delft University of Technology, The Netherlands.

## Professional Activities

- Program committee member: 25th ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2006), 13th International Conference on Parallel and Distributed Systems (ICPADS 2007), 28th IEEE International Conference on Distributed Computing Systems (ICDCS 2008), 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS 2009), 3rd ACM SIGOPS/SIGACT Workshop on Reliability, Availability, and Security (WRAS 2010), 24th International Symposium on Distributed Computing (DISC 2010), 26th International Symposium on Distributed Computing (DISC 2012), 14th International Conference on Distributed Computing and Networking (ICDCN 2013).
- Co-organizer of WTTM 2011, Third Workshop on the Theory of Transactional Memory
- Publicity chair of the ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (2008–2009).
- Co-organizer of BFTW$^3$ 2009, Workshop on Theory and Practice of Byzantine Fault Tolerance
- Reviewing for conferences: ACM Symposium of Principle of Distributed Computing (PODC), ACM Symposium on Theory of Computing (STOC), International Symposium of Distributed Computing (DISC), International Conference on Principles of Distributed Systems (OPODIS), Foundations of Software Technology and Theoretical Computer Science (FSTTCS), International Workshop on Peer-to-Peer Systems (IPTPS), International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS), International Conference on Concurrency Theory (CONCUR).

- Reviewing for journals: Journal of the ACM (JACM), Distributed Computing (DC), Information and Computation (IC), The Computer Journal, IEEE Transactions on Parallel and Distributed Systems (TPDS), IEEE/ACM Transactions on Networking (ToN), Information Processing Letters (IPL), SIAM Journal on Computing (SICOMP), IEEE Transactions on Dependable and Secure Computing (TDSC).

## Teaching

- Network Protocols and Architectures (NPA), Technical University of Berlin, Winter Term 2012
- Theory of Distributed Computing I: Algoroithms and Lower Bounds (TDC I), Technical University of Berlin, Summer Term 2011.
- Advanced Topics in Distributed Computing. Computer Science Department, University of Saarland, Winter term 2007/2008.
- Foundations of Distributed Computing. Computer Science Department, University of Saarland, Summer term 2007.
- Distributed Algorithms. School of Computer and Communication Sciences, EPFL, 2001-2005. Teaching assistant.
- Selected Topics in Distributed Algorithms. School of Computer and Communication Sciences, EPFL, 2002-2005. Teaching assistant.

## Publications

### Journals


[1] R. Guerraoui, V. Hadzilacos, P. Kuznetsov, S. Toueg. The Weakest Failure Detectors to Solve Quittable Consensus and Nonblocking Atomic Commit. In *SIAM J. Comput. (SICOMP)*, 41(6): 1343-1379, 2012.

[2] Y. Afek, P. Kuznetsov, and I. Nir. Renaming and the Weakest Family of Failure Detectors. In *Distributed Computing Journal (DC)*, 25(6): 411-425, 2012.

[3] E. Gafni and P. Kuznetsov. On Set Consensus Numbers. In *Distributed Computing Journal (DC)*, 24(3-4): 149-163, 2011.

[4] P. Attie, R. Guerraoui, P. Kuznetsov, N. Lynch, and S. Rajsbaum. The Impossibility of Boosting Distributed Service Resilience. In *Information and Computation*, 209(6):927-950, 2011.

[5] R. Guerraoui, F. Freiling, and P. Kouznetsov. The Failure Detector Abstraction (a survey). In *ACM Computing Surveys*, 43(2), June 2011.

[6] H. Attiya, R. Guerraoui, D. Hendler, and P. Kuznetsov. The Cost of Obstruction-Free Implementations. *Journal of the ACM*, 56(4), June 2009.

[7] R. Guerraoui, M. Herlihy, P. Kuznetsov, N. Lynch, and C. Newport. On the Weakest Failure Detector Ever. In *Distributed Computing Journal*, 21(5):353-366 (2009).

[8] R. Guerraoui and P. Kuznetsov. The Gap in Circumventing the Impossibility of Consensus. *Journal of Computer and System Sciences*, 74(5):823-830 (2008).

[9] R. Guerraoui and P. Kouznetsov. Failure Detectors as Type Boosters. *Distributed Computing Journal*, 20(5):343-358 (2008).

[10] R. Guerraoui, M. Kapalka, and P. Kouznetsov. The Weakest Failure Detectors to Boost Obstruction-Freedom. *Distributed Computing Journal*, 20(6): 415-433 (2007).

[11] C. Delporte-Gallet, H. Fauconnier, R. Guerraoui, and P. Kouznetsov. Mutual exclusion in asynchronous systems with failure detectors. *Journal of Parallel and Distributed Computing (JPDC)*, 65(4):492–505, April 2005.

[12] P. T. Eugster, R. Guerraoui, S. B. Handurukande, A.-M. Kermarrec, and P. Kouznetsov. Lightweight probabilistic broadcast. *ACM Transactions on Computer Systems*, 21(4):341–374, November 2003.

### Refereed Conferences

[13] Hagit Attiya, Sandeep Hans, Petr Kuznetsov, Srivatsan Ravi. Safety of Deferred Update in Transactional Memory In *ICDCS 2013*, Philadelphia, 2013

[14] M. Canini, P. Kuznetsov, D. Levin, S. Schmid. Software Transactional Networking: Concurrent and Consistent Policy Composition. In *HotSDN 2013, ACM SIGCOMM*, Hongkong, 2013

[15] C. Delporte-Gallet, H. Fauconnier, E. Gafni, P. Kuznetsov. Wait-Freedom with Advice. To appear in *31st ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2012)*, July 2012.

[16] P. Kuznetsov and S. Ravi. On the Cost of Concurrency in Transactional Memory In *15th International Conference On Principles Of Distributed Systems (OPODIS 2011)*, December 2011

[17] C. Delporte-Gallet, H. Fauconnier, E. Gafni, P. Kuznetsov. Brief Announcement: On the Meaning of Solving a Task with a Failure Detector. In Proceedings of the *25th International Conference on Distributed Computing (DISC 2011)*, September 2011

[18] H. Attiya, R. Guerraoui, D. Hendler, P. Kuznetsov, M. Michael, M. Vechev Laws of Order: Expensive Synchronization in Concurrent Algorithms Cannot be Eliminated. In *38th ACM SIGACT-SIGPLAN Symposium on Principles of Programming Languages (POPL 2011)*, January 2011.

[19] A. Post, J. Navarro, P. Kuznetsov, P. Druschel Autonomous Storage Management for Personal Devices with PodBase In *USENIX Annual Technical Conference (USENIX ATC)*, June 2011.

[20] E. Gafni and P. Kuznetsov Relating L-Resilience and Wait-Freedom via Hitting Sets. In *12th International Conference on Distributed Computing and Networking (ICDCN 2011)*, January 2011.

[21] E. Gafni and P. Kuznetsov Turning Adversaries into Friends: Simplified, Made Constructive, and Extended. In *14th International Conference On Principles Of Distributed Systems (OPODIS 2010)*, December 2010. September 2010.

[22] Dan Alistarh, Gilles Trédan, Ioannis Avramopoulos, Petr Kuznetsov Routing Attacks as a Viable Threat: Can Software Systems Protect Themselves? In *6th Workshop on Hot Topics in System Dependability (HotDep 2010)*, September 2010.

[23] E. Gafni and P. Kuznetsov On L-Resilient Adversaries, Hitting Sets and Colorless Tasks (BA). In *29th ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2010)*, July 2010.

[24] P. Kuznetsov and S. Schmid. Towards Network Games with Social Preferences. In *17th International Colloquium on Structural Information and Communication Complexity (SIROCCO 2010)*, June 2010.

[25] A. Haeberlen, P. Kuznetsov. The Fault Detection Problem. To appear in *Proceedings of the 11th International Conference On Principles Of Distributed Systems (OPODIS 2009)*, December 2009.

[26] E. Gafni, P. Kuznetsov. On Set Consensus Numbers. In *23rd International Symposium on Distributed Computing (DISC 2009)* (nominated best paper).

[27] E. Gafni, P. Kuznetsov. The Weakest Failure Detector for Solving $k$-Set Agreement. In *28th ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2009)*.

[28] A. Singh, P. Fonseca, P. Kuznetsov, R. Rodrigues, and P. Maniatis. Zeno: Eventually Consistent Byzantine Fault Tolerance. In *6th USENIX Symposium on Networked Systems Design and Implementation (NSDI '09)*.

[29] A. Post, P. Kuznetsov, P. Druschel. PodBase: Transparent storage management for personal devices. In the *7th International Workshop on Peer-to-Peer Systems (IPTPS '08)*, February 2008.

[30] E. Gafni, P. Kuznetsov. N-Consensus is the Second Strongest Object for N+1 Processes. In *Proceedings of the 11th International Conference On Principles Of Distributed Systems (OPODIS 2007)*, December 2007.

[31] A. Haeberlen, P. Kuznetsov, and P. Druschel. PeerReview: Practical Accountability for Distributed Systems. In *Proceedings of the 21st ACM Symposium on Operating Systems Principles (SOSP 2007)*, October 2007.

[32] R. Guerraoui, M. Herlihy, P. Kouznetsov, N. Lynch, C. Newport. On the Weakest Failure Detector Ever. In *Proceedings of the 26th Annual ACM Symposium on Principles of Distributed Computing (PODC)*, August 2007.

[33] R. Rodrigues, P. Kouznetsov, B. Bhattacharjee. Large-Scale Byzantine Fault Tolerance: Safe but Not Always Live. In *Proceedings of the Third Workshop on Hot Topics in System Dependability (HotDep'07)*, June 2007.

[34] B. Bhattacharjee, R. Rodrigues, P. Kouznetsov. Secure Lookup without (Constrained) Flooding. *Workshop on Recent Advances on Intrusion-Tolerant Systems (WRAITS)*, March 2007.

[35] A. Haeberlen, P. Kouznetsov, and P. Druschel. The Case for Byzantine Fault Detection. In *Proceedings of the Second Workshop on Hot Topics in System Dependability (HotDep '06)*, November 2006.

[36] R. Guerraoui, M. Kapalka, and P. Kouznetsov. The Weakest Failure Detectors to Boost Obstruction-Freedom. In *Proceedings of the 20th International Symposium on Distributed Computing (DISC'06)*, September 2006.

[37] H. Attiya, R. Guerraoui, D. Hendler, and P. Kouznetsov. Synchronizing without locks is inherently expensive. In *Proceedings of the 25th Annual ACM Symposium on Principles of Distributed Computing (PODC)*, pages 300-307, July 2006.

[38] H. Attiya, R. Guerraoui, and P. Kouznetsov. Computing with Reads and Writes in the Absence of Step Contention. In *Proceedings of the 19th International Symposium on Distributed Computing (DISC'05)*, September 2005.

[39] P. C. Attie, R. Guerraoui, P. Kouznetsov, N. A. Lynch, and S. Rajsbaum. The impossibility of boosting distributed service resilience. In *Proceedings of the 25th IEEE International Conference on Distributed Computing Systems (ICDCS'05)*, June 2005.

[40] R. Guerraoui, P. Kouznetsov, and B. Pochon. On the asynchronous computability theorem. In *Proceedings of the 6th Workshop on Geometric and Topological Methods in Concurrency and Distributed Systems Theory (GETCO 2004)*, Amsterdam, October 2004.

[41] C. Delporte-Gallet, H. Fauconnier, R. Guerraoui, V. Hadzilacos, P. Kouznetsov, and S. Toueg. The weakest failure detectors to solve certain fundamental problems in distributed computing. In *Proceedings of the 23rd Annual ACM Symposium on Principles of Distributed Computing (PODC)*, pages 338–346, July 2004.

[42] P. T. Eugster, R. Guerraoui, and P. Kouznetsov. Delta-Reliable Broadcast: A Probabilistic Measure of Broadcast Reliability. In *Proceedings of the 24th IEEE International Conference on Distributed Computing Systems (ICDCS'04)*, 2004.

[43] R. Guerraoui and P. Kouznetsov. On failure detectors and type boosters. In *Proceedings of the 17th International Symposium on Distributed Computing (DISC'03)*, October 2003.

[44] R. Guerraoui, P. Kouznetsov, and B. Pochon. A note on set agreement with omission failures. In *Proceedings of the 4th Workshop on Geometric and Topological Methods in Concurrency and Distributed Systems Theory (GETCO 2002)*, Toulouse, October 2002.

[45] S. Blanc, R. Guerraoui, K. Hess, P. Kouznetsov, P. E. Parent, B. Pochon, and O. Sauvageot. Using the topological characterization of synchronous models. In *Proceedings of the 4th Workshop on Geometric and Topological Methods in Concurrency and Distributed Systems Theory (GETCO 2002)*, Toulouse, October 2002.

[46] R. Guerraoui and P. Kouznetsov. On the weakest failure detector for non-blocking atomic commit. In *Proceedings of the 2nd IFIP International Conference on Theoretical Computer Science (TCS 2002)*, pages 461–473, August 2002.

[47] R. Guerraoui, S. B. Handurukande, A.-M. Kermarrec, and P. Kouznetsov. Reducing noise in gossip-based reliable broadcast. In *Proceedings of the 20th Symposium on Reliable Distributed Systems (SRDS 2001)*, October 2001.

[48] P. T. Eugster, R. Guerraoui, S. B. Handurukande, A.-M. Kermarrec, and P. Kouznetsov. Lightweight probabilistic broadcast. In *IEEE International Conference on Dependable Systems and Networks (DSN2001)*, July 2001.

### Technical Reports

[49] V. Gramoli, P. Kuznetsov, and S. Ravi Pessimistic Locks and Optimistic Transactions TR in arxiv: CoRR abs/1103.1302 (`http://arxiv.org/abs/1203.4751`)

[50] E. Gafni and P. Kuznetsov L-Resilient Adversaries and Hitting Sets TR in arxiv: CoRR abs/1004.4701 (`http://arxiv.org/abs/1004.4701`)

[51] P. Kuznetsov. Simple CHT: A New Derivation of the Weakest Failure Detector for Consensus. In submission.

[52] A. Singh, P. Fonseca, P. Kuznetsov, R. Rodrigues, and P. Maniatis. Defining Weakly Consistent Byzantine Fault Tolerant Services. (Invited paper) In the *2nd Large-Scale Distributed Systems and Middleware Workshop (LADIS'08)*, September 2008.

[53] R. Guerraoui, V. Hadzilacos, P. Kuznetsov, and S. Toueg. The Weakest Failure Detectors to Solve Quittable Consensus and Non-Blocking Atomic Commit. In submission.

The papers are available online at `http://www.net.t-labs.tu-berlin.de/~petr/publications.html`

## Selected Presentations

- *Relating L-Resilience and Wait-Freedom via Hitting Sets.* ICDCN 2011, Bangalore, India, January 6th, 2011.
- *WF=NWF? On Models of Distributed Computing which are not Fundamentally Different.* EPFL systems seminar, Lausanne, Switzerland, Novemver 12th, 2010.
- *On Set Consensus Numbers.* DISC 2009, Elche, Spain, September 24th, 2009.
- *The Weakest Failure Detector for Solving k-Set Agreement.* PODC 2009, Calgary, Alberta, Canada, August 11th, 2009.
- *Determining the Weakest Failure Detectors for Distributed Computing Problems.* BIRS Workshop on Lower Bounds for Distributed Computing, Banff, Alberta, Canada, January 27th, 2009.
- *N-Consensus is the Second Strongest Object for N+1 Processes.* OPODIS 2007, Point-a-Pitre, December 17th, 2007.
- *On the Weakest Failure Detector Ever.* PODC 2007, Portland, August 15th, 2007.

- *Large-Scale Byzantine Fault Tolerance: Safe but Not Always Live.* FuDiCo III, Bertinoro, June 7th, 2007.
- *Synchronizing without Locks is Inherently Expensive.* PODC 2006, Denver, July 26th, 2006.
- *Computing with Reads and Writes in the Absence of Step Contention.* DISC 2005, Krakow, September 27th, 2005.
- *The Weakest Failure Detector Question in Distributed Computing.* Technion, Haifa, January 6th, 2005. Hebrew University of Jerusalem, DANSS seminar, January 9th, 2005.
- *On the Asynchronous Computability Theorem.* GETCO 2004, Amsterdam, October 27th, 2004.
- *The Weakest Failure Detectors to Solve Certain Fundamental Problems in Distributed Computing.* PODC 2004, St. John's, July 28th, 2004.
- *Delta-Reliable Broadcast: A Probabilistic Measure of Broadcast Reliability.* ICDCS 2004, Tokyo, March 26th, 2004.
- *On Failure Detectors and Type Boosters.* DISC 2003, Sorrento, October 3rd, 2003.

## External Funding

- TransForm: Foundations of Transactional Memory (Marie Curie Initial Training Network), accepted in January 2010. `http://ics.forth.gr/carv/transform/`
- Euro-TM COST Action Proposal "Transactional Memories: Foundations, Algorithms, Tools, and Applications" (IC1001). Accepted in January 2011. `http://www.eurotm.org/`
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## Supervised students

- Srivatsan Ravi (graduate school, TU Berlin), 2010-present
- Dan Alistarh (graduate student, EPFL, internship at TU Berlin), 2010
- Michal Kapalka (IC Doctoral School student, EPFL), 2005

## Certificates and Memberships

- Member of the ACM.
- Microsoft Certified System Engineer (MCSE).
- Nortel Networks Certified Support Specialist in Network Management and Switching.
- Nortel Networks Certified Engineer in VoIP technology.

## Awards

- Finalist for the best EPFL Ph.D. thesis award, 2005.
- EPFL award for exceptional research contribution, 2004.
- Russian Federation Presidential Student Grant, 1995.
- Saint-Petersburg State University Young Researcher Grant, 1994.
- Participant in Saint-Petersburg student mathematical contests in 1992, 1993, 1994 (respectively, 3rd, 2nd and 1st places in the team score).

## Personal

**Languages:** Russian (native), English (fluent), French (fluent), German (basics).

**Marital status:** Married+1.

**Hobbies:** Reading, skiing, hiking, kayaking.