

Shahin Kamali

PERSONAL INFORMATION

Address: Computer Science and Artificial Intelligence Laboratory,
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Nationality: Canadian, Iranian.

EDUCATION

- **University of Waterloo**, Waterloo, Canada.

Ph.D. in Computer Science, Sept. 2008 - Sept. 2014

Thesis Title: *Alternative Approaches for Analysis of Bin Packing and List Update Problems.*

Advisor: Alejandro (Alex) López-Ortiz.

Thesis Committee: David S. Johnson (Columbia University), Jochen Könemann (Combinatorics and Optimization, University of Waterloo), J. Ian Munro (Computer Science, University of Waterloo), Jonathan Buss (Computer Science, University of Waterloo).

Relevant Coursework: *Online algorithms: Competitive analysis and beyond, Advanced Topics in Data Structures, Graph Theoretic Algorithms, Mathematical Foundations of Computer Networking, Numeric Computation for Financial Modelling, Computational Techniques in Biological Sequence Analysis, Advanced Topics in Distributed Information Systems.*

- **Concordia University**, Montreal, Canada.

M.Sc. in Computer Science, Sept. 2006 - Aug. 2008

Thesis Title: *Broadcasting in Weighted-Vertex Graphs.*

Advisor: Hovhannes A. Harutyunyan.

Relevant Coursework: *Discrete Mathematics of Paul Erdős, Advanced Algorithm Design, Statistical Natural Language Processing, Computational Geometry*

- **University of Tehran**, Tehran, Iran.

B.Sc. in Computer Science, Sept. 2002 - Aug. 2006

Overall GPA: 17.77/20, Last year GPA: 18.36/20

RESEARCH INTERESTS

- Big data applications of online and streaming algorithms, e.g., resource allocation and server consolidation in cloud, graph partitioning for social networks, and data compression.
- Design and analysis of approximation algorithms, particularly for online and streaming problems such as bin packing, scheduling and various graph algorithmic problems.
- Performance engineering of software systems
- Data compression and succinct data structures.
- Graph optimization problems such as broadcasting and gossiping in communication networks.

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ACADEMIC EXPERIENCE

- Post-doctoral Fellow & Associate, Sept. 2015 - now
Computer Science and Artificial Intelligence Laboratory (CSAIL)
Massachusetts Institute of Technology.
- Post-doctoral Fellow, Oct. 2014 - Aug. 2015
Algorithms and Complexity Research Group
School of Computer Science, University of Waterloo.
- Visiting Researcher, Sept. 2014 - Dec. 2014
(Under the support of the France-Canada Research Fund)
Laboratoire d'Informatique Algorithmique: Fondements et Applications (LIAFA), University
Paris Diderot (Paris 7).
Laboratoire d'Informatique de Paris 6 (LIP6), Pierre-and-Marie-Curie University (Paris 6).
- Research Assistant, Sept. 2008 - Sept. 2014
Algorithms and Complexity Research Group (Oct. 2009 - Sept. 2014)
Database Group (Sept. 2008 - Oct. 2009)
School of Computer Science, University of Waterloo.
- Visiting Researcher, Marc. 2012 - July 2012
(Under the support of NSERC Michael Smith award)
Department of Mathematics and Computer Science (IMADA),
University of Southern Denmark.
- Research Assistant, Sept. 2006 - Aug. 2008
Networks Research Labs, Department of Computer Science and Software Engineering, Con-
cordia University.
- Research Assistant, Jan. 2003 - Aug. 2005
University of Tehran United (UTUtd) Robotic Research Group, Computer Science Depart-
ment, University of Tehran.

TEACHING EXPERIENCE

Qualifications:

- **Kaufman Teaching Certificate Program (KTCP)**, MIT Teaching & Learning Lab,
June 2016 (see <http://tll.mit.edu/design/kaufman-teaching-certificate-program-ktcp> for more
information).
- **Certificate in University Teaching (CUT)**, Centre for Teaching Excellence at Univer-
sity of Waterloo, September 2014
(see <https://uwaterloo.ca/centre-for-teaching-excellence/support-graduate-students/certificate-university-teaching> for more information).
My final project was about *Efficient Use of Classroom Response Systems in Teaching Math-
ematics and Computer Science Courses*.

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Experience:

- **Instructor:** Data Structures and Data Management (two sections), University of Waterloo, Spring 2015.
Data Structures and Data Management, University of Waterloo, Winter 2014.
- **Guest Lecturer:** Online algorithms & Applications, University of Waterloo, Spring 2014.
- **Teaching Assistant:** Algorithms (Fall 2009, Winter 2009, Spring 2011), Data Structures and Data Management (Winter 2009, Winter 2012, Fall 2013), Data Types and Structures (Fall 2008, Spring 2010), Introduction to Database Management (Spring 2009, Winter 2011), Computer Applications in Business (Spring 2009, Fall 2012), Advanced Algorithm Design and Analysis (Fall 2011)
(All in University of Waterloo)

PUBLICATIONS

REFEREED JOURNAL PAPERS:

- 1 Joan Boyar, Shahin Kamali, Kim S. Larsen, and Alejandro López-Ortiz, On the List Update Problem with Advice. To appear in *Information and Computation*.
- 2 Hovhannes A. Harutyunyan and Shahin Kamali, Efficient Broadcast Trees for Weighted Vertices. *Discrete Applied Mathematics*, volume 216, pp. 598-608, 2017.
- 3 Sushmita Gupta, Shahin Kamali, and Alejandro López-Ortiz, On Advice Complexity of the k -server Problem under Sparse Metrics. *Theory of Computing Systems (TOCS)*, volume 59(3), pp. 476-499, 2016.
- 4 Joan Boyar, Shahin Kamali, Kim S. Larsen, and Alejandro López-Ortiz, Online Bin Packing with Advice. *Algorithmica*, volume 74(1), pp. 507-527, 2016.
- 5 Reza Dorrigiv, Robert Fraser, Meng He, Shahin Kamali, Akitoshi Kawamura, Alejandro López-Ortiz, and Diego Seco, On Minimum and Maximum-Weight Minimum Spanning Trees with Neighborhoods. *Theory of Computing Systems (TOCS)*, volume 16(2), pp. 220-250, 2015.
- 6 Arash Farzan and Shahin Kamali, Compact Navigation and Distance Oracles for Graphs with Small Treewidth. *Algorithmica*, volume 69(1), pp. 92-116, 2014.

REFEREED CONFERENCE PAPERS:

- 7 Shahin Kamali, Compact Navigation Oracles for Graphs with Bounded Cliquewidth. To appear in *Proceedings of Data Compression Conference (DCC)*, 2016.
- 8 Shahin Kamali and Alejandro López-Ortiz, An All-Around Near-Optimal Solution for the Classic Bin Packing Problem, *Proceedings of the 26th International Symposium on Algorithms and Computation (ISAAC)*, pp. 727-739, 2015.
- 9 Shahin Kamali, Efficient Bin Packing Algorithms for Resource Provisioning in the Cloud. To appear in *Proceedings of the International Workshop on Algorithmic Aspects of Cloud Computing (ALGO-CLOUD)*, part of *ALGO*, 2015.

- 10 Fabio Petroni, Leonardo Querzoni, Khuzaima Daudjee, Shahin Kamali, and Giorgio Iacoboni, HDRF: Stream-Based Partitioning for Power-Law Graphs. Proceedings of the 24th ACM International Conference on Information and Knowledge Management (CIKM), pp. 243-252, 2015.
- 11 Shahin Kamali, Alejandro López-Ortiz, and Zahed Rahmati, Online Packing of Equilateral Triangles. Proceedings of the 27th Canadian Conference on Computational Geometry (CCCG), 2015.
- 12 Spyros Angelopoulos, Christoph Dürr, Shahin Kamali, Marc Renault, and Adi Rosén, Online Bin Packing with Advice of Small Size. Proceedings of the 14th Algorithms and Data Structures Symposium (WADS), pp. 40-53, 2015.
- 13 Daniel Nicoara, Shahin Kamali, Khuzaima Daudjee, and Lei Chen, Hermes: Dynamic Partitioning for Distributed Social Network Graph Databases. Proceedings of the 18th International Conference on Extending Database Technology (EDBT), pp. 25-36, 2015.
- 14 Shahin Kamali and Alejandro López-Ortiz, Efficient Online Strategies for Renting Servers in the Cloud. Proceedings of the 41st Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM), pp. 277-288, 2015.
- 15 Shahin Kamali and Alejandro López-Ortiz, Almost Online Square Packing. Proceedings of the 26th Canadian Conference on Computational Geometry (CCCG), 2014.
- 16 Khuzaima Daudjee, Shahin Kamali, and Alejandro López-Ortiz, Online Fault-Tolerant Server Consolidation Problem. Proceedings of the 26th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), pp. 12-21, 2014.
- 17 Shahin Kamali and Alejandro López-Ortiz, Better Compression through Better List Update Algorithms. Proceedings of the 24th Data Compression Conference (DCC), pp. 372-381, 2014.
- 18 Joan Boyar, Shahin Kamali, Kim S. Larsen, and Alejandro López-Ortiz, Online Bin Packing with Advice. Proceedings of the 31st International Symposium on Theoretical Aspects of Computer Science (STACS), pp. 174-186, 2014.
- 19 Joan Boyar, Shahin Kamali, Kim S. Larsen, and Alejandro López-Ortiz, On the List Update Problem with Advice. Proceedings of the 8th International Conference on Language and Automata Theory and Applications (LATA), pp. 210-221, 2014. (Invited to Elsevier Information and Computation special issue for LATA'14)
- 20 Shahin Kamali and Alejandro López-Ortiz, A Survey of Algorithms and Models for List Update. Proceedings of the Conference on Space Efficient Data Structures, Streams and Algorithms (in Honor of J. Ian Munro) (IanFest), pp. 251-266, 2013.
- 21 Sushmita Gupta, Shahin Kamali, and Alejandro López-Ortiz, On Advice Complexity of the k -server Problem under Sparse Metrics. Proceedings of the 20th International Colloquium on Structural Information and Communication Complexity (SIROCCO), pp. 55-67, 2013.
- 22 Bairong Lei, Ivan Surya, Shahin Kamali, and Khuzaima Daudjee, Data Partitioning for Video-on-Demand Services. Proceedings of the 12th International Symposium on Network Computing and Applications (NCA), pp. 49-54, 2013.
- 23 Shahin Kamali, Susana Ladra, Alejandro López-Ortiz, and Diego Seco, Context-Based Algorithms for the List-Update Problem under Alternative Cost Models. Proceedings of the 23rd Data Compression Conference (DCC), pp. 361-370 2013.

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- 24 Francisco Claude, Reza Dorrigiv, Shahin Kamali, Alejandro López-Ortiz, Pawel Pralat, Jazmín Romero, Alejandro Salinger, and Diego Seco, Broadcasting in Conflict Aware Multi-Channel Networks. Proceedings of the 7th International Workshop on Algorithms and Computation (WALCOM), pp. 158-169, 2013.a
- 25 Reza Dorrigiv, Robert Fraser, Meng He, Shahin Kamali, Akitoshi Kawamura, Alejandro López-Ortiz, and Diego Seco, On Minimum and Maximum-Weight Minimum Spanning Trees with Neighborhoods. Proceedings of the 10th Workshop on Approximation and Online Algorithms (WAOA), pp. 93-106, 2012. (Invited to Theory of Computing System special issue for WAOA'12)
- 26 Shahin Kamali, Pedram Ghodsnia, and Khuzaima Daudjee, Dynamic Data Allocation with Replication in Distributed Systems, Proceedings of the 30th International Performance Computing and Communications Conference (IPCCC), pp. 1-8, 2011.
- 27 Arash Farzan and Shahin Kamali, Compact Navigation and Distance Oracles for Graphs with Small Treewidth, Proceedings of the 38th International Colloquium on Automata, Languages and Programming (ICALP), pp. 268-280, 2011.
- 28 Hovhannes A. Harutyunyan and Shahin Kamali, Optimum Broadcasting in Complete Weighted-Vertex Graphs, Proceedings of the 36th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM), pp. 489-502, 2010.
- 29 Hovhannes A. Harutyunyan and Shahin Kamali, Efficient Broadcasting in Networks with Weighted Nodes, Proceedings of the 14th International Conference on Parallel and Distributed Systems (ICPADS), pp. 879-884, 2008.
- 30 Hovhannes A. Harutyunyan and Shahin Kamali, Broadcasting in Weighted-Vertex Graphs, Proceedings of the 6th International Symposium on Parallel and Distributed Processing with Applications (ISPA), pp. 301-307, 2008.
- 31 Hovhannes A. Harutyunyan, Shahin Kamali, and Talin Moradian, Multi-Shared-Trees Based Multicasting in Mesh-Connected Networks, Proceedings of the 12th International Conference on parallel and distributed processing Techniques and Applications (PDPTA), pp. 178-182, 2008.
- 32 HesamAddin Torabi Dashti, Nima Aghaeepour, Sahar Asadi, Meysam Bastani, Zahra Delafkar, Fatemeh Disfani, Serveh Ghaderi, Shahin Kamali, Sepideh Pashami, and Alireza Siahpirani, Dynamic Positioning Based on Voronoi Cells (DPVC), Proceedings of the 9th RoboCup International Symposium, pp. 219-229, 2005.

OTHER PUBLICATIONS:

- 33 Shahin Kamali, Online List Update, To appear in Encyclopedia of Algorithms.
- 34 HesamAddin Torabi Dashti, Shahin Kamali, and Nima Aghaeepour, Positioning in Robots Soccer (book chapter), Robotic Soccer, I-Tech Education and Publishing, 2007.

AWARDS AND HONOURS

- Natural Sciences and Engineering Research Council of Canada Postdoctoral Fellowships Program (NSERC PDF) scholarship, 2015-2017.
- NSERC Japan Society for the Promotion of Science Postdoctoral Fellowships (NSERC-JSPS), 2015-2017 (declined).

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- University of Waterloo Doctoral Thesis Completion Award, 2014.
- Derick Wood Memorial Graduate Scholarship, 2013-2014.
- Ontario Graduate Scholarship (OGS), 2012-2013.
- University of Waterloo President's Graduate Scholarship (PGS), 2012-2013.
- Natural Sciences and Engineering Research Council of Canada Michael Smith Foreign Study Supplements (NSERC MSFSS) scholarship, 2012.
- Natural Sciences and Engineering Research Council of Canada Alexander Graham Bell Canada Graduate Scholarships (NSERC CGS - D3), 2009-2012.
- University of Waterloo President's Graduate Scholarship (PGS), 2009-2012.
- University of Waterloo Mathematics Graduate Experience Award, 2008-2012.
- University of Waterloo Graduate Entrance Scholarship, 2008-2009.
- First place in international U.S.Open competitions in soccer robots 3D-simulation league, together with University of Tehran UTUtd team, Atlanta , Georgia, 2005.
- 6th place in international RoboCup competitions in soccer robots 3D-simulation league, together with University of Tehran UTUtd team, Osaka, Japan, Summer 2005.

TALKS

- *All-Around Near-Optimal Solutions for the Online Bin Packing Problem.*
International Symposium on Algorithms and Computation (ISAAC), Dec. 2015.
- *Practical applications of online bin packing*
Workshop on New Techniques in Online Algorithms (ANR-NeTOC) (Invited Talk), Nov. 2015.
- *Efficient Bin Packing Algorithms for Resource Provisioning in the Cloud.*
International Workshop on Algorithmic Aspects of Cloud Computing (ALGO CLOUD), part of ALGO, Sept. 2015.
- *Online Packing of Equilateral Triangles.*
Canadian Conference on Computational Geometry (CCCG), Aug. 2015.
- *Online Bin Packing with Advice of Small Size.*
Algorithms and Data Structures Symposium (WADS), Aug. 2015.
- *Hermes: Dynamic Partitioning for Distributed Social Network Graph Databases.*
International Conference on Extending Database Technology (EDBT), Mar. 2015.
- *Online Bin Packing Problem: Alternative Analysis Methods and New Applications.*
ACO seminar, Carnegie Mellon University, Mar. 2015.
- *Efficient Online Strategies for Renting Servers in the Cloud.*
International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM), Jan. 2015.

- *Online Bin Packing Algorithms for Resource Allocation in the Cloud.*
Laboratoire d'Informatique Algorithmique: Fondements et Applications (LIAFA), Universit Paris Diderot - Paris 7, Oct. 2014.
- *Online Bin Packing Problem: Recent Developments and Applications.*
Laboratoire d'Informatique de Paris 6 (LIP6), Pierre-and-Marie-Curie University, Oct. 2014.
- *Almost Online Square Packing.*
Canadian Conference on Computational Geometry (CCCG), Aug. 2014.
- *Online Fault-Tolerant Server Consolidation Problem.*
ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), Jun. 2014.
- *Better Compression through Better List Update Algorithms.*
Data Compression Conference (DCC), Apr. 2014.
- *Online Bin Packing with Advice.*
International Symposium on Theoretical Aspects of Computer Science (STACS), Mar. 2014.
- *On the List Update Problem with Advice.*
International Conference on Language and Automata Theory and Applications (LATA), Mar. 2014.
- *Online Bin Packing Problem: Recent Developments and Advice Complexity.*
Algorithms and Complexity Seminar, University of Waterloo, Aug. 2013.
- *Data Partitioning for Video-on-Demand Services.*
International Symposium on Network Computing and Applications (NCA), Aug. 2013.
- *k-Server Problem: Recent Developments and Advice Complexity.*
Algorithms and Complexity Seminar, University of Waterloo, Jul. 2013.
- *On Advice Complexity of the k-server Problem under Sparse Metrics.*
International Colloquium on Structural Information and Communication Complexity (SIROCCO), Jul. 2013.
- *Broadcasting in Conflict Aware Multi-Channel Networks.*
International Workshop on Algorithms and Computation (WALCOM), Feb. 2013.
- *Compact Navigation and Distance Oracles for Graphs with Small Treewidth.*
International Colloquium on Automata, Languages and Programming (ICALP), Jul. 2011.
- *Dynamic Data Allocation with Replication in Distributed Systems.*
International Performance Computing and Communications Conference (IPCCC), Nov. 2011.
- *Dynamic Positioning Based on Voronoi Cells (DPVC).*
RoboCup International Symposium (RoboCup), Aug. 2005.

SERVICE

- Member of Postdoc Visiting Committee, MIT Electrical Engineering & Computer Science (EECS) department, 2016-17.
- Organizer of Algorithms and Complexity (A&C) seminars, School of computer Science, University of Waterloo, Aug. 2013 - Sept. 2014.
- Member of local organizing committee for the conference on Space Efficient Data Structures, Streams and Algorithms (IanFest 2013).
- Member of local organizing committee for the 25th Canadian Conference on Computational Geometry (CCCG 2013).
- Program Committee for:
 - World Wide Web (WWW) PhD Symposium, 2017
 - International Conference on Soft Computing and its Engineering (IcSoftComp), 2017
- Referee for:
 - Theoretical Computer Science, 2017.
 - Computing Surveys, 2017.
 - Scandinavian Symposium and Workshops on Algorithm Theory (SWAT), 2016.
 - IEEE Conference on Data Engineering (ICDE), 2016.
 - IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2016.
 - Journal of Computer and System Sciences, 2015.
 - Journal of Combinatorial Optimization, 2015.
 - European Symposium on Algorithms (ESA), 2015.
 - Canadian Conference on Computational Geometry (CCCG), 2015.
 - Annual ACM Symposium on Principles of Distributed Computing (PODC), 2015.
 - ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2015.
 - International Symposium on Computational Geometry (SOCG), 2015.
 - International Conference on Data Engineering (ICDE), 2015.
 - Discrete Applied Math (DAM), 2014.
 - International Conference on Management of Data (SIGMOD), 2014.
 - Workshop on Approximation and Online Algorithms (WAOA), 2014.
 - Journal of Discrete Algorithms (JDA), 2014.
 - Information Processing Letters (IPL), 2014.
 - Workshop on Algorithm Engineering and Experimentation (ALENEX), 2013.
 - Theory of Computing Systems (TOCS), 2013.
 - European Workshop on Computational Geometry (EuroCG), 2013.

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LEADERSHIP & COMMUNICATION

- Workshop on Leadership Skills for Engineering and Science Faculty (audited), MIT Professional Education (offered by Charles E. Leiserson and Chuck McVinnay), June 2016.
- Postdoc Leadership Workshop, MIT Department of Electrical Engineering and Computer Science, January 2016.
- Introduction to StandUp class, ImprovBoston, Winter 2017.
- One-to-one communication lessons by Dana Jay Bein, sponsored by Charles E. Leiserson, Fall 2016- Winter 2017.