

REZA DORRIGIV

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WORK EXPERIENCE :

- **Staff Research Engineer**, July 2013 - present
Samsung Research America – Silicon Valley, Computer Science Lab
Mountain View, California

As part of Computer Science Lab and then Distributed Systems Group (part of Computer Science Innovation Center) I worked on several projects, applying my expertise in algorithms and data structures to Systems and Databases domains:

1. **Datahawk:** A high-performance data streaming platform (for time-series and IoT data) that can be fine-tuned for the workload and underlying hardware platform
Developed efficient storage and indexing for time-series and other multidimensional data to support significantly higher ingestion and query performance on historical and fresh data. Used a KD-Tree based idea for fast clustering of the incoming records into segments and an R-Tree for a global index on the segments. Developed a visualization tool for Datahawk users to configure pipelines of actors and components. This tool was based on Eclipse EMF and Sirius and was connected to Datahawk endpoint using ZeroMQ. Developed a traffic generator for multidimensional data (trajectories of moving objects) for system testing and development.
2. **TeraTriple:** Massive Scale Semantic Web Data Handling
Developed efficient and scalable semantic web knowledge base management with trillions of RDF triples/facts. Built on open-source Sesame, exploited techniques of parallel execution and storage I/O, caching, and SPARQL query optimization to achieve good performance.
3. **KV-Cache:** Scalable High-Performance In-Memory Key-Value Cache using a Microkernel-Based Design
Developed high-performance system software (e.g., device drivers, protocol stacks) in user space for web-object caching by taking advantage of multicore/manycore scaling and truly absolute zero-copy.

- **NSERC Postdoctoral Fellow**, January 2012 - June 2013
 Dalhousie University, Halifax, Nova Scotia, Canada
 Supervisor: Dr. Norbert Zeh
 Remark: NSERC Postdoctoral fellowship is a very competitive scholarship awarded by Natural Sciences and Engineering Research Council of Canada
 Worked on IO-efficient algorithms as well as advice complexity of online algorithms.
 - **Postdoctoral Fellow and Sessional Instructor**, May 2010 - December 2011
 University of Waterloo, Waterloo, Ontario, Canada
 Supervisor: Dr. Alejandro López-Ortiz
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EDUCATION :

- **Ph.D. in Computer Science**, 2010
 University of Waterloo, Waterloo, Ontario, Canada
 GPA=92.88 over 100
 Supervisor: Dr. Alejandro López-Ortiz
 Thesis Title: Alternative Measures for the Analysis of On-line Algorithms
 Outstanding Achievement in Graduate Studies award for a PhD student, University of Waterloo, Spring 2010 Convocation
 Relevant Course Work: *Algorithm Design and Analysis, Five Open Problems in Algorithm Design and Analysis, Readings in Computational Complexity, Algorithmic Foundations of the Internet, Graph-theoretic Algorithms, Cryptography/Network Security, Approximation Algorithms in Combinatorial Optimization, Computational Complexity, Introduction to Kolmogorov Complexity, Algorithms for Polyhedra, Probabilistic Methods in Discrete Mathematics, Machine Learning: Statistical and Computational Foundations, Theoretical Foundations of Clustering, Adaptive Analysis*
- **Certificate in University Teaching**, 2008
 Centre for Teaching Excellence, University of Waterloo, Waterloo, Ontario, Canada
- **B.Sc. in Computer Engineering**, 2003
 Sharif University of Technology, Tehran, Iran
 GPA=18.69 over 20
 Supervisor: Dr. Mohammad Ghodsi
 Summa cum laude, 1st rank among graduates of Computer Engineering department, Sharif University of Technology, 2003
 Relevant Course Work: *Computational Complexity, Artificial Intelligence, Graph Theory, Theory of Machines and Languages, Data Structures and Algorithms, Computer Simulation, Computer Networks, Systems Analysis and Design, Design of Programming Languages, Operating Systems, Data bases, Numeric Analysis, Compilers, Computer Architecture, Systems Programming, Verification of Reactive Systems*
- **Secondary Graduate Certificate**, 1999
 Exceptional Talents High School(NODET), Iran
 GPA = 19.70 over 20
 Remark: Each year 200 students in the city can pass this school's entrance exam.

Awards :

1. NSERC Postdoctoral Fellowship, Natural Sciences and Engineering Research Council of Canada, 80000\$ over two years, 2011
2. MITACS Elevate Strategic Fellowship, 55000\$ per annum, 2011, **declined**
3. Outstanding Achievement in Graduate Studies award for a PhD student, University of Waterloo, Spring 2010 convocation
Remark: Three such honors were awarded that year at the Doctoral level and one at the Masters level.
4. Doctoral Thesis Completion Award, University of Waterloo, 5000\$, 2009

5. Inaugural Cheriton Scholarship, 10000\$ per annum, 2007 and 2008
Remark: I was one of the 14 students among nearly 300 graduate students who won the scholarship for the first time.
6. International Doctoral Student Award, University of Waterloo, 8700\$ per annum, 2005-2007
7. Institute for Computer Research (ICR) Doctoral Fellowship, University of Waterloo, 12000\$ per annum, 2003/2004
8. International Graduate Student Award, University of Waterloo, 4000\$ per annum, 2003 and 2004
9. Top student in aggregated average(18.70 out of 20) among all of the computer engineering students who entered Sharif University of Technology in 1999
10. Achieving the Bronze Medal in the 8th **Iranian National Olympiad of Informatics** (and entering Young Scholars Club), 1998
11. Being accepted in “**The First Iranian Computer Engineering Olympiad**” which was held among undergraduate students in the field of computer engineering in a national level, 2002
Remark: These Olympiads are held by “The Iranian Ministry Of Science, Research and Technology” in several engineering fields.
12. Beginning the undergraduate studies in **Computer Engineering Department of Sharif University of Technology**, 1999
13. 1st place in Iran in the National “AyandeSazan” scientific competition, 1996
Remark: Scientific competition of “AyandeSazan” was held among students of the same grade. I got the first place among students of the 8th grade.
14. 3rd place in Iran in the National “Dahe Fajr” scientific competition, 1995
Remark: Scientific competitions of “Dahe Fajr” were held by the “Ministry of Education and Training” among students of the same grade at several levels. I was chosen as the best student in city and province and got the third place in the national level.
15. Entering the **National Organizations for Development of Exceptional Talent(NODET)**, 1992

Publications :

1. **Reza Dorrigiv**, Martin R. Ehmsen, and Alejandro López-Ortiz. “*Parameterized analysis of paging and list update algorithms*”. *Algorithmica*, Volume 71, Issue 2, pages 330-353, 2015
2. **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*, Volume 56, Issue 1, pages 220-250, 2015

3. **Reza Dorrigiv**, Stephane Durocher, Arash Farzan, Robert Fraser, Alejandro López-Ortiz, J. Ian Munro, Alejandro Salinger, and Matthew Skala. “*The Hausdorff core problem on simple polygons*”. *Journal of Computational Geometry (JoCG)*, Volume 5, Issue 1, pages 14-40, 2014
4. Francisco Claude, **Reza Dorrigiv**, Shahin Kamali, Alejandro López-Ortiz, Pawel Pralat, Jazmin Romero, Alejandro Salinger and Diego Seco. “*Broadcasting in conflict-aware multi-channel networks*”. In *Proceedings of the 7th Workshop on Algorithms and Computation (WALCOM '13)*, pages 158-169, 2013
5. **Reza Dorrigiv**, Meng He, and Norbert Zeh. “*On the advice complexity of buffer management*”. In *Proceedings of the 23rd International Symposium on Algorithms and Computation (ISAAC '12)*, pages 136-145, 2012
6. **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*”. In *Proceedings of the 10th Workshop on Approximation and Online Algorithms (WAOA '12)*, pages 93-106, 2012
7. **Reza Dorrigiv** and Alejandro López-Ortiz. “*List update with probabilistic locality of reference*”. *Information Processing Letters*, Volume 112, Issue 13, pages 540-543, 2012
8. **Reza Dorrigiv**, Alejandro López-Ortiz, and Selim Tawfik. “*Optimal average case strategy for looking around a corner*”. In *Proceedings of the 24th Canadian Conference on Computational Geometry (CCCG '12)*, pages 277-282, 2012
9. **Reza Dorrigiv** and Alejandro López-Ortiz. “*A new perspective on list update: probabilistic locality and working set*”. In *Proceedings of the 9th Workshop on Approximation and Online Algorithms (WAOA '11)*, pages 150-163, 2011
10. Diego Arroyuelo, Francisco Claude, **Reza Dorrigiv**, Stephane Durocher, Meng He, Alejandro López-Ortiz, J. Ian Munro, Patrick K. Nicholson, Alejandro Salinger, and Matthew Skala. “*Untangled monotonic chains and adaptive range search*”. *Theoretical Computer Science (special issue of selected papers from ISAAC 2009)*, Volume 412, Issue 32, pages 4200-4211, 2011
11. **Reza Dorrigiv**, Alejandro López-Ortiz, and J. Ian Munro. “*On the relative dominance of paging algorithms*”. *Theoretical Computer Science*, Volume 410, Issues 38-40, pages 3694-3701, 2009
12. Francisco Claude, Gautam K. Das, **Reza Dorrigiv**, Stephane Durocher, Robert Fraser, Alejandro López-Ortiz, Bradford G. Nickerson, and Alejandro Salinger. “*An improved line-separable algorithm for discrete unit disc cover*”. *Discrete Mathematics, Algorithms and Applications (special issue of selected papers from ISAAC 2009)*, 2(1), pages 77-87, 2010
13. **Reza Dorrigiv**, Martin R. Ehmsen, and Alejandro López-Ortiz. “*Parameterized analysis of paging and list update algorithms*”. In *Proceedings of the 7th Workshop on Approximation and Online Algorithms (WAOA '09)*, pages 104-115, 2009
14. **Reza Dorrigiv** and Alejandro López-Ortiz. “*On developing new models, with paging as a case study*”. *ACM SIGACT (Special Interest Group on Automata and Computability Theory) News*, 40 (4): 98-123, 2009
15. Diego Arroyuelo, Francisco Claude, **Reza Dorrigiv**, Stephane Durocher, Meng He, Alejandro López-Ortiz, J. Ian Munro, Patrick K. Nicholson, Alejandro Salinger, and Matthew Skala. “*Untangled monotonic chains and adaptive range search*”. In *Proceedings of the 20th International Symposium on Algorithms and Computation (ISAAC '09)*, pages 203-212, 2009
16. Francisco Claude, **Reza Dorrigiv**, Stephane Durocher, Robert Fraser, Alejandro López-Ortiz, and Alejandro Salinger. “*Practical discrete unit disk cover using an exact line-separable algorithm*”. In *Proceedings of the 20th International Symposium on Algorithms and Computation (ISAAC '09)*, pages 45-54, 2009

17. **Reza Dorrigiv**, Stephane Durocher, Arash Farzan, Robert Fraser, Alejandro López-Ortiz, J. Ian Munro, Alejandro Salinger, and Matthew Skala. “*Finding a Hausdorff core of a polygon: On convex polygon containment with bounded Hausdorff distance*”. In Proceedings of the 11th Algorithms and Data Structures Symposium (WADS '09), pages 218-229, 2009
18. **Reza Dorrigiv**, Alejandro López-Ortiz, and J. Ian Munro. “*An application of self-organizing data structures to compression*”. In Proceedings of the 8th International Symposium on Experimental Algorithms (SEA '09), pages 137-148, 2009
19. **Reza Dorrigiv** and Alejandro López-Ortiz. “*Adaptive searching in one and two dimensions*”. In Proceedings of the 20th Canadian Conference on Computational Geometry (CCCG '08), pages 215-218, 2008
20. Spyros Angelopoulos, **Reza Dorrigiv**, and Alejandro López-Ortiz, “*List update with locality of reference*”. In Proceedings of the 8th Latin American Theoretical Informatics Symposium (LATIN '08), pages 399-410, 2008
21. **Reza Dorrigiv**, Alejandro López-Ortiz, and J. Ian Munro. “*List update algorithms for data compression*”. In Proceedings of the 2008 Data Compression Conference (DCC '08), page 512, 2008
22. **Reza Dorrigiv**, Alejandro López-Ortiz, and Alejandro Salinger. “*Optimal speedup on a low-degree multi-core parallel architecture (LoPRAM)*”. In Proceedings of the 20th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA '08), pages 185–187, 2008
23. **Reza Dorrigiv** and Alejandro López-Ortiz. “*On certain new models for paging with locality of reference*”. In Proceedings of the 2nd Workshop on Algorithms and Computation (WALCOM '08), pages 200-209, 2008
24. **Reza Dorrigiv** and Alejandro López-Ortiz. “*Closing the gap between theory and practice: New measures for on-line algorithm analysis*”. In Proceedings of the 2nd Workshop on Algorithms and Computation (WALCOM '08), pages 13-24, 2008
25. Spyros Angelopoulos, **Reza Dorrigiv**, and Alejandro López-Ortiz. “*On the separation and equivalence of paging strategies*”. In Proceedings of the 18th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA '07), pages 229–237, 2007
26. Peyman Afshani, Ehsan Chiniforooshan, **Reza Dorrigiv**, Arash Farzan, Mehdi Mirzazadeh, Narges Simjour, and Hamid Zarrabi-Zadeh. “*On the complexity of finding an unknown cut via vertex queries*”. In Proceedings of the 13th Annual International Conference on Computing and Combinatorics (COCOON '07), pages 459–469, 2007
27. **Reza Dorrigiv**, Alejandro López-Ortiz, and Pawel Pralat, “*Search algorithms for unstructured peer-to-peer networks*”. In Proceedings of the 32nd Annual IEEE Conference on Local Computer Networks (LCN '07), pages 343-352, 2007
28. **Reza Dorrigiv**, Alejandro López-Ortiz, and J. Ian Munro. “*On the relative dominance of paging algorithms*”. In Proceedings of the 18th International Symposium on Algorithms and Computation (ISAAC '07), pages 488–499, 2007
29. **Reza Dorrigiv** and Alejandro López-Ortiz. “*A survey of performance measures for on-line algorithms*”. ACM SIGACT (Special Interest Group on Automata and Computability Theory) News, 36 (3): 67–81, 2005
30. Reza Dorrigiv. “*Operations and invariant properties*”. Roshde Amuzeshe Riazi Journal, Fall 2002. (in Persian)

Teaching Experience :

- Instructor for “CS 341: Algorithms” (both sections) at school of Computer Science, university of Waterloo, Spring 2011
- Instructor for “CS 466/666: Advanced Algorithms” at school of Computer Science, university of Waterloo, Spring 2010
- Instructor for “CS 240: Data Structure & Data Management” at school of Computer Science, university of Waterloo, Spring 2010
- Instructor for “CS 240: Data Structure & Data Management” at school of Computer Science, university of Waterloo, Winter 2010
- Instructor for “CS 341: Algorithms” at school of Computer Science, university of Waterloo, Winter 2008
- I completed the **Certificate in University Teaching (CUT)** program provided by Centre for Teaching Excellence at university of Waterloo (see http://www.cte.uwaterloo.ca/graduate_programs/CUT/index.html for more information) in December 2008
- I completed the **Teaching Development Seminar Series** for postdoctoral fellows provided by Centre for Teaching Excellence at university of Waterloo (see http://www.cte.uwaterloo.ca/post_doc_programs/index.html for more information) in March 2011
- Instructional Apprentice (IA) at school of Computer Science, university of Waterloo:
 - “CS 234: Data Types and Structures”, Fall 2007
 - “CS 240: Data Structures and Data Management”, Spring 2007
- Teaching Assistant at school of Computer Science, university of Waterloo:
 - “CS 341: Algorithms”, Winter 2007 and Winter 2006
 - “CS 234: Data Types and Structures”, Fall 2006
 - “CS 240: Data Structures and Data Management”, Spring 2006 and Fall 2005
 - “CS 135: Designing Functional Programs”, Fall 2005
 - “CS 134: Principles of Computer Science”, Spring 2005
 - “CS 241: Foundations of Sequential Programs”, Winter 2005, Fall 2004, and Spring 2004
 - “CS 246: Software Abstraction and Specification”, Spring 2004
 - “CS 132: Principles of Program Design”, Winter 2004
 - “CS 131: Introduction to Computer Programming”, Fall 2003
- Teaching Assistant at department of Computer Engineering, Sharif University of Technology:
 - “Foundations of Computer Science 1”, Fall 2001
 - “Foundations of Computer Science 2”, Spring 2002
 - “Theory of Machines and Languages”, Fall 2002 and Spring 2003

Service :

- Organizer of algorithms and complexity seminars, School of computer Science, University of Waterloo, since Fall 2004
- Member of local organizing committee for the The 9th Latin American Theoretical Informatics Symposium (LATIN '10)
- Webmaster for algorithms and complexity group Webpage, School of computer Science, University of Waterloo
- Webmaster for the The 9th Latin American Theoretical Informatics Symposium (LATIN '10)
- Member of local organizing committee for the 9th Workshop on Algorithms and Data Structures (WADS '05)
- Member of local organizing committee for the 2005 Workshop on Combinatorial and Algorithmic Aspects of Networking (CAAN '05)
- Volunteer for CS4U@Waterloo (A program for high school students)
- Referee for:
 - 21st European Symposium on Algorithms (ESA), 2013
 - 40th International Colloquium on Automata, Languages and Programming (ICALP), 2013
 - 24th Annual Symposium on Combinatorial Pattern Matching (CPM), 2013
 - 20th European Symposium on Algorithms (ESA), 2012
 - 10th Workshop on Approximation and Online Algorithms (WAOA), 2012
 - 6th Workshop on Algorithms and Computation (WALCOM), 2012
 - 9th Workshop on Approximation and Online Algorithms (WAOA), 2011a, 2011b
 - 21st International Symposium on Algorithms and Computation (ISAAC), 2010a, 2010b
 - 8th Workshop on Approximation and Online Algorithms (WAOA), 2010
 - Journal of Experimental Algorithmics, 2010
 - 1st Symposium on Innovations in Computer Science (ICS), 2010
 - 4th Workshop on Algorithms and Computation (WALCOM), 2010
 - International Journal of Computer Mathematics, 2009
 - 8th International Symposium on Experimental Algorithms (SEA), 2009
 - 35th International Colloquium on Automata, Languages and Programming (ICALP), 2008a, 2008b
 - 19th Annual Symposium on Combinatorial Pattern Matching (CPM), 2008
 - 2008 Data Compression Conference (DCC), 2008
 - 8th Latin American Theoretical Informatics Symposium (Latin), 2008a, 2008b, 2008c
 - 18th ACM-SIAM Symposium on Discrete Algorithms (SODA), 2007a, 2007b
 - 27th Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2007
 - 33rd International Colloquium on Automata, Languages and Programming (ICALP), 2006a, 2006b
 - Canadian Conference on Artificial Intelligence, 2006
 - 10th Scandinavian Workshop on Algorithm Theory (SWAT), 2006
 - 8th Workshop on Algorithm Engineering and Experiments (ALENEX), 2006a, 2006b

References :

- Daniel Waddington (d.waddington@samsung.com)
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- Joseph Cheriyan (jcheriyan@uwaterloo.ca)
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Department of Combinatorics and Optimization, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada, N2L 3G1
- **Teaching:** Svitlana Taraban-Gordon (staraban@uwaterloo.ca)
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