

# ALEJANDRO SALINGER

## Address:

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## EDUCATION

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- 05/2006–present University of Waterloo, David R. Cheriton School of Computer Science  
**Ph.D. in Computer Science**, Algorithms and Complexity.  
Supervisors: Profs. Ian Munro and Alejandro López-Ortiz. CGPA 92 %
- 03/1999–12/2004 University of Chile, Faculty of Physical and Mathematical Sciences,  
School of Engineering and Sciences  
**Engineering in Computer Science** (Chilean professional title), April 2005  
Maximum Distinction (summa cum laude), CGPA 6.7  
(absolute scale 1.0 to 7.0)
- B.S. Computer Science (Licenciature)**, August 2004  
Maximum Distinction (summa cum laude), CGPA 6.1  
(absolute scale 1.0 to 7.0)
- 09/2003–03/2004 University of California, San Diego  
**Education Abroad Program, Department of Computer Science and  
Engineering**, GPA 3.95 out of 4.00

## RESEARCH INTERESTS

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**Algorithms and Complexity:** Parallel computation, on-line algorithms, intersection algorithms for information retrieval, text indexing, data structures for spatial data, computational geometry.

## HONORS AND AWARDS

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- 2011 **Travel Support** for DIMACS Workshop on Competitive Algorithms for Packet Scheduling, Buffering and Routing in the Internet.
- 2011 **ACM Student Travel Grant** for SPAA'11.
- 2007–2009, **Cheriton Scholarship**, School of Computer Science, University of Waterloo, awarded to the School's very top graduate students.
- 2009–2010 **Marcos Orrego Puelma** award, granted by the Institute of Engineers of Chile to the best student graduated each year from the School Engineering and Sciences of the University of Chile.
- 2006 **University of Waterloo Graduate Entrance Scholarship**.
- 2005 Ranked **1<sup>st</sup>** out of the 545 students in the School of Engineering and Sciences that entered in 1999, University of Chile.

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2002–2004	Ranked <b>1<sup>st</sup></b> in the Department of Computer Science, University of Chile.
1999–2002, 2004	<b>Honors List</b> , School of Engineering and Sciences (top 6%).
2003	<b>Provost's Honors</b> , University of California, San Diego.
1999	<b>Academic Excellence Scholarship</b> awarded by University of Chile for entering the School of Engineering and Sciences in the <b>3<sup>rd</sup></b> place out of 545.
1998	Ranked <b>1<sup>st</sup></b> in nationwide university entrance examination, Mathematics.

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## PUBLICATIONS

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### Book Chapters

1. Ricardo Baeza-Yates and Alejandro Salinger  
**Fast Intersection Algorithms for Sorted Sequences** (extended version of 14)  
*Algorithms and Applications 2010*: 45-61, 2010.

### Journals

2. Diego Arroyuelo, Francisco Claude, Reza Dorrigiv, Stephane Durocher, Meng He, Alejandro López-Ortiz, J. Ian Munro, Patrick Nicholson, Alejandro Salinger, and Matthew Skala.  
**Untangled Monotonic Chains and Adaptive Range Search.**  
*Theoretical Computer Science (TCS)* 412(32):4200 - 4211, 2011.
3. 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 Disk Cover**  
*Discrete Mathematics, Algorithms and Applications (DMAA)* 2(1):77-87, 2010.
4. Jérémy Barbay, Alex López-Ortiz, Tyler Lu, and Alejandro Salinger  
**An Experimental Investigation of Set Intersection Algorithms for Text Searching**  
*Journal of Experimental Algorithmics (JEA)*, 14: 3.7--3.24, 2009.
5. Szymon Grabowski, Gonzalo Navarro, Rafal Przywarski, Alejandro Salinger, and Veli Mäkinen  
**A Simple Alphabet-Independent FM-Index** (extended version of 15)  
*International Journal of Foundations of Computer Science (IJFCS)*, 17(6):1365-1384, 2006.
6. Maxime Crochemore, Costas Iliopoulos, Gonzalo Navarro, Yoan Pinzon and Alejandro Salinger  
**Bit-parallel ( $\delta, \gamma$ )-Matching Suffix Automata**  
*Journal of Discrete Algorithms (JDA)* 3(2-4):198-214, 2005, Elsevier.

### Conferences

7. Alejandro López-Ortiz and Alejandro Salinger.  
**Paging for Multi-Core Shared Caches**  
 In *Proc. of the 3rd Innovations in Theoretical Computer Science (ITCS)*, Cambridge, MA, USA, January 8-10, 2012.
8. Alejandro López-Ortiz and Alejandro Salinger  
**Paging for Multicore Processors**

In *Proc. of the 23rd Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pp. 137-138, San Jose, CA, USA, June 4-6, 2011

9. 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 *Proc. 20th International Symposium on Algorithms and Computation (ISAAC)*, LNCS 5878, pp. 45-54, Honolulu, Hawaii, USA, December 2009.
10. Diego Arroyuelo, Francisco Claude, Reza Dorrigiv, Stephane Durocher, Meng He, Alejandro López-Ortiz, J. Ian Munro, Patrick Nicholson, Alejandro Salinger, and Matthew Skala  
**Untangled Monotonic Chains and Adaptive Range Search**  
In *Proc. 20th International Symposium on Algorithms and Computation (ISAAC)*, LNCS 5878, pp. 203-212, Honolulu, Hawaii, USA, December 2009.
11. 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 *Proc. of Algorithms and Data Structures, 11th International Symposium (WADS)*, pp 218-229, Banff, Canada, August 2009.
12. Reza Dorrigiv, Alejandro López-Ortiz, and Alejandro Salinger  
**Optimal Speedup on a Low-Degree Multi-Core Parallel Architecture (LoPRAM)**  
In *Proc. of the 20th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pp 185-187, Munich, Germany, June 2008.
13. Rafal Przywarski, Szymon Grabowski, Gonzalo Navarro, and Alejandro Salinger  
**FM-KZ: An Even Simpler Alphabet-Independent FM-Index**  
In *Proc. Prague Stringology Conference (PSC)*, pp 226-240, 2006.
14. Ricardo Baeza-Yates and Alejandro Salinger  
**Experimental Analysis of a Fast Intersection Algorithm for Sorted Sequences**  
In *Proc. String Processing and Information Retrieval (SPIRE)*, Springer LNCS 3772, pp 13-24, Buenos Aires, Argentina, November 2005.
15. Szymon Grabowski, Veli Mäkinen, Gonzalo Navarro, and Alejandro Salinger  
**A Simple Alphabet-Independent FM-Index**  
In *Proc. Prague Stringology Conference (PSC)*, pp 230-244, 2005.

## Posters

16. Alejandro López-Ortiz and Alejandro Salinger  
**Paging for Multicore (CMP) Caches**  
*Cheriton Research Symposium*, Waterloo, Ontario, Canada, September 2010.
17. Reza Dorrigiv, Alejandro López-Ortiz, Alejandro Salinger  
**Optimal Speedup on a Low-Degree Multi-Core Parallel Architecture (LoPRAM)**  
*Cheriton Research Symposium*, Waterloo, Ontario, Canada, September 2008.
18. Robert Fraser, Alejandro Salinger, Reza Dorrigiv, Joseph D. Horton, and Alejandro López-Ortiz  
**Defensive Strategies for a Soccer Goalkeeper with a Single Adversary**

*18th Annual Canadian Conference on Intelligent Systems*, Windsor, Ontario, Canada, May 2008.

## Technical Reports

19. Alejandro López-Ortiz and Alejandro Salinger  
**Paging for Multicore Processors**  
(extended version of 8) Technical Report *CS-2011-12*, David R. Cheriton School of Computer Science, University of Waterloo, 2011.
20. Alejandro López-Ortiz and Alejandro Salinger  
**Paging for Multicore (CMP) Caches**  
Technical Report *CS-2010-15*, David R. Cheriton School of Computer Science, University of Waterloo, 2010.
21. Jérémy Barbay, Alex López-Ortiz, Tyler Lu, and Alejandro Salinger  
**Faster Set Intersection Algorithms for Text Searching**  
Technical Report *CS-2007-13*, David R. Cheriton School of Computer Science, University of Waterloo, 2007.
22. Reza Dorrigiv, Alejandro López-Ortiz, and Alejandro Salinger  
**Optimal Speedup on a Low-Degree Multi-Core Parallel Architecture (LoPRAM)**  
(extended version of 12) Technical Report *CS-2007-48*, David R. Cheriton School of Computer Science, University of Waterloo, 2007.

## Undergraduate Engineering Thesis

23. Alejandro Salinger  
**An Alphabet-Independent Compressed Index**  
Undergraduate thesis, University of Chile, School of Engineering and Sciences, Department of Computer Science, 2005. Supervised by Gonzalo Navarro (in Spanish).

## TALKS

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- Short vs. Extended Answer Questions in Computer Science Exams. Opportunities and New Directions: Sharing Practices and Research on Teaching and Learning, Waterloo, Canada, 2012.
- Paging for Multi-Core Shared Caches. 3rd Innovations in Theoretical Computer Science, Cambridge, Massachusetts, USA, 2012.
- Paging for Multi-Core Shared Caches. Institute of Theoretical Informatics, Karlsruhe Institute of Technology, Karlsruhe, Germany, 2011.
- Paging for Multicore Processors. 23rd Annual ACM Symposium on Parallel Algorithms and Architectures, San Jose, CA, USA, 2011.
- Paging for Multicore Processors. Graduate Student Research Conference, University of Waterloo, Waterloo, Canada, 2011.
- Theoretical Modeling of Multicore Computation. DIMACS Workshop on Parallelism: A 2020 Vision, Piscataway, New Jersey, USA, 2011.
- Practical Discrete Unit Disk Cover Using an Exact Line-Separable Algorithm. Discrete Mathematics Seminar. Department of Mathematical Engineering, University of Chile, Santiago, Chile, 2010.
- Parallel Computation in Multicore Architectures, 22nd International Olympiad in Informatics, Waterloo, Ontario, Canada, 2010.

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- Practical Discrete Unit Disk Cover Using an Exact Line-Separable Algorithm. Workshop on Optimal Data Structures for Efficient Organization and Retrieval of Massive Spatial Data, Fredericton, New Brunswick, Canada, 2010.
  - Optimal Speedup on a Low-Degree Multi-Core Parallel Architecture (LoPRAM). Workshop on Theory & Many-Cores (T&MC), College Park, Maryland, USA, 2009.
  - Design and Analysis of Algorithms for Multicore Architectures. Max-Planck-Institut für Informatik, Saarbrücken, Germany, 2009.
  - Design and Analysis of Algorithms for Multicore Architectures. Algorithms and Complexity Seminar, David R. Cheriton School of Computer Science, University of Waterloo, Waterloo, Canada, 2008.
  - Optimal Speedup on a Low-Degree Multi-Core Parallel Architecture (LoPRAM). 20th Annual ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), Munich, Germany, 2008.
  - Optimal Speedup on a Low-Degree Multi-Core Parallel Architecture (LoPRAM). SHARCNET Symposium on GPU and CELL computing, Waterloo, Canada, 2008.
  - Design and Analysis of Algorithms for Multicore Architectures. Department of Computer Science, University of Chile, Santiago, Chile, 2008.
  - Experimental Analysis of a Fast Intersection Algorithm for Sorted Sequences. Algorithms and Complexity Seminar, David R. Cheriton School of Computer Science, University of Waterloo, Waterloo, Canada, 2006.

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## RESEARCH EXPERIENCE

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- 05/2006–present    **David R. School of Computer Science, University of Waterloo, Waterloo, Canada**  
*Research Assistant*, Profs. Ian Munro and Alejandro López-Ortiz.
- Parallel Computation, Intersection Algorithms for Information Retrieval, Data Structures for Spatial Data.
- 03/2007            **Caesarea Edmond Benjamin de Rothschild Foundation Institute for Interdisciplinary Applications of Computer Science (CRI), University of Haifa, Haifa, Israel**  
*Visiting Researcher*
- Parallel Computation, Paging Algorithms.
- 03/2004–04/2005    **Dept. of Computer Science, University of Chile, Santiago, Chile**  
*Undergraduate Research Assistant*, Prof. Gonzalo Navarro.
- Compressed Text Indices.
- 03/2004–08/2004    **Dept. of Computer Science, University of Chile, Santiago, Chile**  
*Undergraduate Research Assistant*, Prof. Ricardo Baeza-Yates.
- Intersection Algorithms for Information Retrieval.
- 03/2003–08/2003    **Dept. of Computer Science, University of Chile, Santiago, Chile**  
*Undergraduate Research Assistant*, Prof. Gonzalo Navarro.
- Approximate Text Searching.

## PROGRAM COMMITTEE MEMBER

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- XXIII Encuentro Chileno de Computación (ECC 2011)
- XXXVII Conferencia Latinoamericana de Informática (CLEI 2011)

## REFEREE WORK

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- 10<sup>th</sup> Latin American Theoretical Informatics Symposium (LATIN 2012)
- 9<sup>th</sup> Workshop on Approximation and Online Algorithms (WAOA 2011)
- Workshop for Women in Machine Learning (WiML 2010)
- String Processing and Information Retrieval Symposium (SPIRE 2010)
- 8<sup>th</sup> Workshop on Approximation and Online Algorithms (WAOA 2010)
- Fifth Canadian Student Conference on Biomedical Computing (CSCBCE 2010)
- 9th Latin American Theoretical Informatics Symposium (LATIN 2010)
- Workshop on Algorithms and Computation (WALCOM 2010)
- 17th International Conference on Advanced Computing and Communications (ADCOM 2009)
- IEEE Transactions on Fuzzy Systems
- Algorithms and Data Structures Symposium (WADS 2009)
- 8th International Symposium on Experimental Algorithms (SEA 2009)
- 35th International Colloquium on Automata, Languages and Programming (ICALP 2008)
- 8th Latin American Theoretical Informatics Symposium (LATIN 2008)
- Workshop on Algorithm Engineering and Experiments (ALENEX 2007)

## WORK EXPERIENCE

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12/2005–04/2006 **Blue Company, Santiago, Chile**

***Software developer***

- Development of a web-based weblog publishing tool ([www.bligoo.com](http://www.bligoo.com)).
- Experience in software design and programming with J2EE.

04/2005–09/2005 **Deloitte, Santiago, Chile**

***Consultant, Processes & IT Consulting***

- Reengineering project for the public owned Audit authority in Chile.
- Analysis and design of software systems to support the processes.
- Experience in requirement analysis, software design, and UML tools.

03/2004–07/2004 **GS1 Chile, National Chamber of Commerce, Santiago, Chile.**

***Project manager*** (as part of a software project course)

- Design and development of a web system for the company.
- Project leadership, time and resources management experience.

03/2002–09/2003 **IT Development Area, University of Chile, Santiago, Chile.**

***Software developer***

- Development of web applications for the academic processes of the University.
- Practical experience in process design, requirement analysis, software design, data modeling and implementation.

## TEACHING EXPERIENCE

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### Certificate in University Teaching

Center for Teaching Excellence, University of Waterloo (2012).

### Guest Lectures

- **Algorithms (CS341)**, University of Waterloo.
- **Topics in Data Structures (CS840)**, University of Waterloo.
- **Data Structures and Data Management (CS240)**, University of Waterloo.
- **Fundamentals of Computer Science (CC30B)**, University of Chile.
- **Introduction to Computer Science (CC10A)**, University of Chile.

### Teaching Assistantships

#### *University of Waterloo:*

IA: Instructional Apprentice, TA: Teaching Assistant

- **Elementary Algorithm Design and Data Abstraction** (IA: Fall 2009, Winter 2010, Winter 2011)
- **Data Structures and Data Management** (IA: Winter 2009, Spring 2009; TA: Fall 2008)
- **Designing Functional Programs** (IA: Spring 2008)
- **Principles of Computer Science** (IA: Winter 2007, Spring 2007, Fall 2007, Winter 2008; TA: Spring 2006)
- **Applications Software Engineering** (TA: Fall 2006)

#### *University of Chile:*

- **Fundamentals of Computer Science** (teaching tutorials: Spring 2004)
- **Algorithms and Data Structures** (teaching tutorials: Fall 2004)
- **Introduction to Computer Science** (teaching tutorials and marking: Fall 2002, Spring 2002, Fall 2003, Fall 2004)
- **Algebra** (teaching tutorials: Fall 2002; marking: Fall 2001)
- **Calculus** (marking: Fall 2001)

## ADMINISTRATIVE SERVICE

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- **Vice President** (2010-2011)  
Computer Science Graduate Student Association, University of Waterloo
- **Logistics Coordinator**  
Fifth Canadian Student Conference on Biomedical Computing (CSCBCE 2010)
- **Local Organizer**  
9th Latin American Theoretical Informatics Symposium (LATIN 2010)
- **Graduate Student Representative** (2009-2010)  
School Advisory Committee on Appointments, David R. Cheriton School of Computer Science, University of Waterloo
- **Co-organizer** (2007-2010)  
Algorithms and Complexity Seminar Series, University of Waterloo
- **Global Representative for Chile** (2009-present) University of Waterloo

## OTHERS

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**Member** of the Association for Computing Machinery (ACM), ACM Special Interest Group on Algorithms and Computation Theory (SIGACT), ACM Special Interest Group on Computer Architecture (SIGARCH).

**Practical experience:** Java, C, C++, PHP, Javascript, SQL, Unix, XML, XQuery, C#, Prolog, LaTeX, UML, Matlab, Maple, JBoss, J2EE, Hibernate, Scheme, Multithreading w/ Windows MFC, OpenCL.

**Languages:** Spanish (native), English (advanced), Hebrew (intermediate), German (intermediate).

**Hobbies:** Music (guitar, piano), Sports (soccer: captain of the Computer Science grads soccer team 2007-2011, tennis).

**Other:** (1991–2001) Participation in a Scout Group: experience in group leadership, non-formal education and events organization.

## REFERENCES

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- Alejandro López-Ortiz, Professor, University of Waterloo: [alopez-o@uwaterloo.ca](mailto:alopez-o@uwaterloo.ca)
- Ian Munro, Professor, University of Waterloo: [imunro@uwaterloo.ca](mailto:imunro@uwaterloo.ca)
- Ricardo Baeza-Yates, VP, Yahoo! Research Europe and Latin America, [rbaeza@acm.org](mailto:rbaeza@acm.org)