

Francisco Claude

Personal Information

Address	David R. Cheriton School of Computer Science. University of Waterloo. 200 University Avenue West. Waterloo, Ontario, Canada. N2L 3G1.
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Studies

2008 -	Ph.D. Candidate (Computer Science). Advisor: Prof. J. Ian Munro. David R. Cheriton School of Computer Science. University of Waterloo. Waterloo, Canada.
2006 - 2008	M.Sc. in Computer Science. Thesis: Compressed Data Structures for Web Graphs. Advisor: Prof. Gonzalo Navarro. Computer Science Department. University of Chile. Santiago, Chile.
2002 - 2006	Bachelor in Computer Science. Computer Science Department. University of Chile. Santiago, Chile.

Areas of Interest

- Design and Analysis of Algorithms.
- Data Compression.
- Data Structures.
- Text Indexing.
- Information Retrieval.
- Computational Geometry.

Publications

Journals

- Francisco Claude, Gonzalo Navarro, Hannu Peltola, Leena Salmela, and Jorma Tarhio. *String Matching with Alphabet Sampling*. Journal of Discrete Algorithms, volume 11, pages 37–50.
- Antonio Fariña, Nieves R. Brisaboa, Gonzalo Navarro, Francisco Claude, Ángeles S. Places, and Eduardo Rodríguez. *Word-based self-indexes for natural language text*. ACM Transactions on Information Systems 30(1): 1 (2012)
- Francisco Claude and Gonzalo Navarro. *Self-Indexed Grammar-Based Compression*. Fundamenta Informaticae, volume 111, number 3, pages 313–337.
- 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, volume 412, issue 32, pages 4200–4211.

- Francisco Claude and Gonzalo Navarro. *Fast and Compact Web Graph Representations*. ACM Transactions on the Web 4(4):article 16, 2010.
- 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*. In Discrete Mathematics, Algorithms and Applications (DMAA), pages 77–87.

Book Chapters

- Francisco Claude and Gonzalo Navarro. *Extended Compact Web Graph Representations*. In Tapio Elomaa, Heikki Mannila, and Pekka Orponen (editors) Esko Ukkonen Festschrift, pages 77–91, Springer, LNCS 6060.

Conference Papers

- Francisco Claude and Gonzalo Navarro. *Improved Grammar-Based Compressed Indexes*. Proc. SPIRE 2012, pages 180–192, LNCS 7608.
- Francisco Claude and Gonzalo Navarro. *The Wavelet Matrix*. Proc. SPIRE 2012, pages 167–179, LNCS 7608.
- Francisco Claude, Patrick K. Nicholson, and Diego Seco. *Differentially Encoded Search Trees*. Proc. DCC 2012, pages 357–366.
- Francisco Claude and Susana Ladra. *Practical Representations for Social Graphs*. Proc. CIKM 2011, pages 1185–1190.
- Francisco Claude, Antonio Fariña, Miguel A. Martínez-Prieto, and Gonzalo Navarro. *Indexes for Highly Repetitive Document Collections*. Proc. CIKM 2011, pages 463–468.
- Francisco Claude, Patrick K. Nicholson, and Diego Seco. *Space Efficient Wavelet Tree Construction*. Proc. SPIRE 2011, pages 185–196, LNCS 7024.
- Nieves Brisaboa, Rodrigo Cánovas, Francisco Claude, Miguel Martínez-Prieto, and Gonzalo Navarro. *Compressed String Dictionaries* Proc. SEA, pages 136–147, LNCS 6630.
- Francisco Claude, J. Ian Munro, and Patrick K. Nicholson. *Range Queries over Untangled Chains*. Proc. SPIRE 2010, pages 82–93, LNCS 6393.
- Francisco Claude. *A Quick Introduction to Data Compression Through Learning*. Proc. 5th Canadian Student Conference on Biomedical Computing and Engineering, pages 56–60.
- Francisco Claude, Antonio Fariña, Miguel A. Martínez-Prieto, and Gonzalo Navarro. *Compressed q-gram Indexing for Highly Repetitive Biological Sequences*. Proc. IEEE BIBE 2010, pages 86–91.
- Jérémy Barbay, Francisco Claude, and Gonzalo Navarro. *Compact Rich-Functional Binary Relation Representations*. Proc. LATIN 2010, pages 172–185, LNCS 6034.
- Diego Arroyuelo, Francisco Claude, Sebastian Maneth, Veli Mäkinen, Gonzalo Navarro, Kim Nguyễn, Jouni Sirén, and Niko Välimäki. *Fast In-Memory XPath Search over Compressed Text and Tree Indexes*. Proc. ICDE 2010, pages 417–428.
- 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*. Proc. ISAAC 2009, pages 45–54, LNCS 5878.
- 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*. Proc. ISAAC 2009, pages 203–212, LNCS 5878.
- Francisco Claude and Gonzalo Navarro. *Self-Indexed Text Compression using Straight-Line Programs*. Proc. MFCS 2009, pages 235–246. LNCS 5734.
- Nelson Baloian, Francisco Claude, Roberto Konow, Sebastian Kreft. *E-Breaker: Flexible, Distributed Environment for Collaborative Authoring*. Proc. CSCWD 2009, pages 173–178.
- Francisco Claude and Gonzalo Navarro. *Practical Rank/Select Queries over Arbitrary Sequences*. Proc. SPIRE 2008, pages 176–187, LNCS 5280.
- Francisco Claude, Gonzalo Navarro, Hannu Peltola, Leena Salmela, and Jorma Tarhio. *Speeding Up Pattern Matching by Text Sampling*. Proc. SPIRE 2008, pages 87–98, LNCS 5280.

- Francisco Claude and Gonzalo Navarro. *A Fast and Compact Web Graph Representation*. Proc. SPIRE 2007, pages 105–116, LNCS 4726.
- Nelson A. Baloian, Francisco Claude, Roberto Konow, Mitsuji Matsumoto. *A Decentralized and Flexible Tool Supporting Extreme Programming Software Development*. Proc. CRIWG 2006, pages 179–186, LNCS 4154.

Theses

- Francisco Claude. Advisor: Gonzalo Navarro. *Compressed Data Structures for Web Graphs*. Technical Report, Department of Computer Science, University of Chile, TR/DCC-2008-12.

Non-refereed Papers

- Francisco Claude, Antonio Fariña and Gonzalo Navarro. *Re-Pair Compression of Inverted Lists*. In arXiv:0911.3318v1.

Awards and Scholarships

- U.S./Canada Google PhD. Fellowship in Search and Information Retrieval (2011-2012).
- David R. Cheriton Graduate Scholarship, University of Waterloo (2010-2011).
- Go-Bell Scholarship, University of Waterloo (2008-2009).
- MSc. funded by Fondecyt Grant 1-080019 (Chile) (2007-2008).
- MSc. funded by Yahoo! research Latin America (2006-2007).
- Member of the 1st Chilean team classified for the ACM-ICPC World Finals (Japan, March 2007).
- First place in Chile *2006 ACM South America Programming Contest* (Chile, November 2006).
- Second place in Chile *2005 ACM South America Programming Contest* (Chile, November 2005).
- Outstanding Student Award, School of Engineering and Sciences, University of Chile (2004-2006).

Conferences, Workshops and Research Stays

- Research stay at the University of Chile, invited by Gonzalo Navarro (Santiago, Chile, November 7, 2011 - January 6, 2012).
- ACM Conference on Information and Knowledge Management, CIKM 2011 (Glasgow, U.K., October 24-28, 2011).
- 6th Workshop on Compression, Text, and Algorithms (Pisa, Italy, October 21, 2011).
- String Processing and Information Retrieval, SPIRE 2011 (Pisa, Italy, October 17-21, 2011).
- Research stay at University of A Coruña, invited by Nieves Brisaboa (A Coruña, Spain, October 2-15, 2011).
- 5th Workshop on Compression, Text, and Algorithms (Los Cabos, Mexico, October 14, 2010).
- String Processing and Information Retrieval, SPIRE 2010 (Los Cabos, Mexico, October 11-13, 2010).
- Workshop on Optimal Data Structures for Efficient Organization and Retrieval of Massive Spatial Data (Fredericton, New Brunswick, Canada, June 10-11, 2010).
- Research stay at the University of Helsinki, invited by Veli Mäkinen (Helsinki, Finland, May 23 - June 6, 2010).
- Workshop on Algorithms and Applications 2010 (Helsinki, Finland, May 28, 2010).
- Latin American Theoretical Informatics Symposium, LATIN 2010 (Oaxaca, Mexico, April 19-23, 2010).
- Research stay at NICTA, invited by Sebastian Maneth (Sydney, Australia, December 1-14, 2009).
- Prague Stringology Conference, PSC 2009 (Prague, Czech Republic, August 31 - September 2, 2009).
- Mathematical Foundations of Computer Science, MFCS 2009 (Novy Smokovec, High Tatras, Slovakia, August 24-28, 2009).
- Research stay at NICTA, invited by Sebastian Maneth (Sydney, Australia, November 17-28, 2008).

- 3rd Workshop on Compression, Text, and Algorithms (Melbourne, Australia, November 13, 2008).
- String Processing and Information Retrieval, SPIRE 2008 (Melbourne, Australia, November 10-12, 2008).
- 3rd Summer School on Discrete Mathematics (Valparaiso, Chile, January 14-18, 2008).
- 2nd Workshop on Compression, Text, and Algorithms (Santiago, Chile, November 1, 2007).
- String Processing and Information Retrieval, SPIRE 2007 (Santiago, Chile, October 29-31, 2007).
- IFIP Theoretical Computer Science, TCS 2006 (Santiago, Chile, August 22-24, 2006).

PC Member

- 24rd Annual Symposium on Combinatorial Pattern Matching (CPM 2013)
- 19th International Symposium on String Processing and Information Retrieval (SPIRE 2012).
- XXIV Encuentro Chileno de Computación (ECC 2012).
- XXIII Encuentro Chileno de Computación (ECC 2011).
- XXXVII Conferencia Latinoamericana de Informática (CLEI 2011).

Referee Work

- Journal of Experimental Algorithms.
- Journal of Discrete Algorithms.
- International Journal of Computer Mathematics.
- Computer Science and Information Systems.
- Canadian Student Conference on Biomedical Computing and Engineering (CSCBCE 2011).
- Algorithms (MDPI).
- Canadian Student Conference on Biomedical Computing and Engineering (CSCBCE 2010).
- Journal of Computer Science and Technology.
- Information Processing Letters.

Subreferee Work

- European Symposium on Algorithms (ESA 2012).
- ACM SIGIR (SIGIR 2012).
- Latin American Theoretical Informatics Symposium (LATIN 2012).
- Symposium on Applied Computing (SAC 2012).
- String Processing and Information Retrieval (SPIRE 2011).
- ACM SIGIR (SIGIR 2011).
- Combinatorial Pattern Matching (CPM 2011).
- ACM SIGMOD/PODS (PODS 2011).
- International Conference on Language and Automata Theory and Applications (LATA 2011).
- Data Compression Conference (DCC 2011).
- Symposium on Theoretical Aspects of Computer Science (STACS 2011).
- String Processing and Information Retrieval (SPIRE 2010).
- ACM Transactions on Information Systems.
- Information Retrieval (Springer).
- Symposium on Combinatorial Pattern Matching (CPM 2010).
- Data Compression Conference (DCC 2010).
- Latin American Theoretical Informatics Symposium (LATIN 2010).
- Workshop on Algorithms and Computation (WALCOM 2010).
- String Processing and Information Retrieval (SPIRE 2009).
- Foundations of Computer Science (FOCS 2009).
- Algorithms and Data Structures Symposium (WADS 2009).
- International Symposium on Experimental Algorithms (SEA 2009).
- Current Trends in Theory and Practice of Computer Science (SOFSEM 2008).

- International World Wide Web Conference (WWW 2008).
- Workshop on Algorithm Engineering and Experiments (ALENEX 2007).

Teaching

2011

- Introduction to Computer Science 2 (Instructional Apprentice (IA), two terms, University of Waterloo, Waterloo, Canada).

2010

- Introduction to Computer Science 2 (IA, two terms, University of Waterloo, Waterloo, Canada).

2009

- Elem. Algorithm Design and Data Abstraction (IA, University of Waterloo, Waterloo, Canada).
- Introduction to Computer Science 2 (IA, University of Waterloo, Waterloo, Canada).

2008

- Introduction to Computer Science 1 (Teaching Assistant (TA), University of Waterloo, Waterloo, Canada).

2007

- Data Structures (Lecturer, two terms, Univesidad Andrés Bello, Santiago, Chile).
- Design and Analysis of Algorithms (IA, University of Chile, Santiago, Chile).

2006

- Design and Analysis of Algorithms (IA, University of Chile, Santiago, Chile).
- Fundamentals of Computer Science (IA, University of Chile, Santiago, Chile).
- Information Theory and Neural Networks (IA, University of Chile, Santiago, Chile).
- Compilers (IA, Universidad Diego Portales, Santiago, Chile).
- Introduction to Computer Programming (IA, Universidad de Los Andes, Santiago, Chile).
- Data Structures (IA, Universidad Andrés Bello, Santiago, Chile).

2005

- Fundamentals of Computer Science (IA, University of Chile, Santiago, Chile).
- Information Theory and Neural Networks (IA, University of Chile, Santiago, Chile).
- Introduction to Computer Programming (IA, University of Chile, Santiago, Chile).

2004

- Introduction to Computer Programming II (TA, University of Chile, Santiago, Chile).

Services

- Member of the Computer Science School Advisory Committee on Appointments (SACA) – representative for the graduate students, elected position.
- Local organizer 17th String Processing and Information Retrieval Symposium (SPIRE 2010) – in charge of coordinating the students volunteering to help.
- Local organizer 9th Latin American Theoretical Informatics Symposium (LATIN 2010).
- Web-master for 5th Canadian Student Conference on Biomedical Computing and Engineering (CSCBCE 2010).
- Judge in the *2007 ACM South American Programming Contest*.

Developments for the Industry

2012 - 2012	Research work on handwriting recognition. Google.
2004 - 2005	Development of a reports system for Facturalux. GyC Ltda.
2003 - 2003	Development of an on-line support system for registered clients. COMIF Ltda.
2002 - 2004	Development of several administrative systems. O.M.A. Ltda.

Languages

- Spanish: Native.
- English: Advanced (TOEFL iBT 108/120, December 2007).
- German: Intermediate (Sprachdiplom Stufe II).

Technical Skills

- Programming Languages: C, C++, Go, Java, Lisp, Python, PHP, Perl, Scheme.
- Operating Systems: Linux, Windows.
- Database Systems: PostgreSQL, MySQL, MongoDB, CouchDB.