Rodrigo Cánovas

Experience

October 2015 - Currently
Postdoctoral Researcher, Lab. of Computer Science, Robotics and Microelectronics of Montpellier (LIRMM) and The Institute of Computational Biology (IBC).
My current research work consists of conceiving and developing novel algorithms for analysing sequence data coming from High Throughput Sequencing technologies. This includes exploring and improving existing tools while at the same time proposing alternative methods and ideas.

Dec 2010 - Mar 2011
Research Assistant, University of Leuven-KU Leuven.
During this short research stay we developed a tool in C++ that offers a new solution to the problem of identifying DNA patterns in a given set of DNA strings - better know as the *motif finding problem*.

2006 - 2010
Tutor and Lab Demonstrator, *Introduction to Hardware*, University of Chile.
This course was focused on the design of digital circuits, and the architecture of modern computers. I was in charge of teaching students how to design, plan, and construct circuits which were tested later during experimental sessions, with the purpose of learning and understanding the hardware elements of a computer.

Mar 2008 - Jul 2008
Software Development in C#, EVERIS, Santiago/Chile.
Everis is a multinational consulting firm providing business and strategy solutions, application development, maintenance, and outsourcing services. I was part of a team in charge of developing a program to collect and analyze information of the company. My main role was to implement the algorithms needed to compute the statistical data.

Mar 2007 - Dec 2007
Tutor and Lab Demonstrator, *Fundamentals of Computer Science*, University of Chile.
This course was an introduction to the topic of computational complexity including finite automata, regular expressions, context-free grammars, Turing machines, etc. Students were required to complete assignments to explore the efficiency and differences of various computational problems.

Dec 2006 - Feb 2007
Software Development in C, SYNOPSYS CHILE LTDA, Santiago/Chile.
Synopsys provides products and services that accelerate innovation in the global electronics market. My work consisted of developing a program to help the analysis and debugging of programs used to create hardware chip structures.

Jul 2005 - Oct 2005
Software Development in Perl, NIC Chile, Santiago/Chile.
NIC Chile is the organization responsible for administering the registration of Internet domain names in Chile (.CL). The software that I developed consisted of detecting and presenting statistical information about rebound emails send from the organization to their users.

Education

2011–2015
Ph.D. - **Engineering**, The University of Melbourne.

Thesis Title
Practical Compression for Multi-Alignment Genomic Files

Supervisors
Professor Alistair Moffat & Professor Andrew Turpin

Description
This work explores how succinct data structures are used to compress genomic files, and proves the feasibility of random access to the compressed genetic data without requiring full decompression of large data files. The algorithms explored are implemented on a Linux platform using C++, and are to be distributed under an open source license.

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https://github.com/rcanovas

2008–2010 **MSc - Computer Science**, University of Chile.

Thesis Title *Compressed Data Structures for Suffix Trees*

Supervisors Professor Gonzalo Navarro

Description In this thesis we presented a new practical compressed suffix tree implementation, which supports various operations over the compressed stored tree without the need of fully decompressing the stored data. This work opened the door to a number of practical suffix tree applications, particularly relevant to Bioinformatics.

2007–2010 **Engineering in Computer Science**, University of Chile.

2002–2007 **Bachelor of Engineering (Computer Science)**, University of Chile.

Miscellaneous

Jan 2013 - Apr 2014 **Volleyball Coach**, *The University of Melbourne*.
I coached one of the Victoria state-league female teams as well as the social volleyball training, for the Renegades Volleyball Club at the University of Melbourne.

2003-2005 **Volunteer Work**, Chile.
Actively participated as a worker and an organizer in different parts of the country. This included construction, teaching, and providing job training to sectors of the country where help was needed.

Interests

- Design and Analysis of Algorithms
- Bioinformatics
- Data Structures and Compression
- Genomic Data Analysis

Publications

Rodrigo Cánovas, and Eric Rivals. "Full Compressed Affix Tree Representations", To appear in Proc. DCC'17, 2017

Rodrigo Cánovas, Alistair Moffat, and Andrew Turpin. "CSAM: Compressed SAM Format", Bioinformatics, btw543, 2016.

Bastien Cazaux, Rodrigo Cánovas, and Eric Rivals. "Shortest DNA Cyclic Cover in Compressed Space", In Proc. DCC'16, pages 536–545, 2016.

Miguel Martínez-Prieto, Nieves Brisaboa, Rodrigo Cánovas, Francisco Claude, Gonzalo Navarro. "Practical compressed string dictionaries", Information Systems 56, 73–108, 2016.

Rodrigo Cánovas, Alistair Moffat, and Andrew Turpin. "Lossy compression of quality scores in genomic data", Bioinformatics, btu183, 2014.

Andres Abeliuk, Rodrigo Cánovas, and Gonzalo Navarro. "Practical Compressed Suffix Trees", Algorithms 6(2):319–351, 2013.

Rodrigo Cánovas and Alistair Moffat. "Practical Compression for Multi-Alignment Genomic Files", In Proc. 36th ACSC, pages 51–60, 2013.

Miguel Martínez-Prieto, Javier Fernández, and Rodrigo Cánovas. "Compression of RDF dictionaries", SAC 2012: 340–347, 2012.

Miguel Martínez-Prieto, Javier Fernández, and Rodrigo Cánovas. "Querying RDF dictionaries in compressed space", ACM SIGAPP Applied Computing Review 12(2):64–77, 2012.

Nieves Brisaboa, Rodrigo Cánovas, Francisco Claude, Miguel Martínez-Prieto, and Gonzalo Navarro. "Compressed String Dictionaries", In Proc. SEA'11, pages 136–147. LNCS 6630, 2011.

Rodrigo Cánovas and Gonzalo Navarro. "Practical Compressed Suffix Trees", In Proc. SEA'10, pages 94–105. LNCS 6049, 2010.

Diego Arroyuelo, Rodrigo Cánovas, Gonzalo Navarro, and Kunihiko Sadakane. "Succinct Trees in Practice", In Proc. ALENEX'10, pages 84–97, 2010.

Conferences, Seminars, Workshops and Research Stays

2017 Organiser of 2017 Annual Research Symposium of the Institut de Biologie Computationnelle

2016 Seminar on Computation over Compressed Structured Data, Dagstuhl, Germany.

2016 Summer school on Bioinformatics Data Structure, Helsinky, Finland.

2016 Workshop on Data Structures in Bioinformatics, Bielfeld, Germany.

2016 Data Compression Conference, DCC 2016, Cliff Lodge, Snowbird, UT, USA.

2014 Poster Presentation at the 2014 Computing and Information Systems Doctoral Colloquium Melbourne, Australia.

2013 Poster Presentation at the 2013 Computing and Information Systems Doctoral Colloquium Melbourne, Australia.

2013 Thirty-Sixth Australasian Computer Science Conference (ACSC 2013), Adelaide, Australia.

2010 String Processing and Information Retrieval, SPIRE 2010 and the 5th Workshop on Compression, Text, and Algorithms Los Cabos, Mexico.

2010 Experimental Algorithms, SEA 2010 Ischia Island, Napoli, Italy.

2010 Research stay at RMIT, invited by Simmon Puglissi (Melbourne, Australia).

2010 Algorithm Engineering and Experimentation, ALENEX 2010 and the ACM-SIAM Symposium on Discrete Algorithms, Austin, Texas.

2009 Poster Presentation in Workshop ICDB (Institute for Cell Dynamics and Biotechnology), Marbella, Chile.

2009 String Processing and Information Retrieval, SPIRE 2009 and the 4th Workshop on Compression, Text, and Algorithms, Saariselka, Finland.

2009 IV Escuela de Verano en Matemáticas Discretas, Valparaíso, Chile.

2008 Poster Presentation in Workshop ICDB, Marbella, Chile.

2008 III Escuela de Verano en Mateméticas Discretas, Valparaíso, Chile.

Computer skills

Basic R, Perl, Prolog, PHP, MySql, JavaScript

Intermediate Java, Python, Linux (user/administrator level), Microsoft Windows (user level)

Advanced C/C++/C++11, LaTeX

Languages

Spanish **Native**

English **Advanced**

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