Curriculum Vitae

Personal Information

Name	:	Manuel Cáceres
Web page	:	`https://me.ariel.computer`
Degree	:	MSc. in Computer Science
Areas of interest	:	Design and Analysis of Algorithms, String Algorithms, Advanced Data Structures, Compact Data Structures, Graph Theory, Graph Algorithms, Combinatorial Algorithms.

Studies

- (2020-Now) Doctoral Student, University of Helsinki.
- (2017-2019) MSc. in Computer Science, University of Chile.
  Thesis: "Compressed Suffix Trees for Repetitive Collections based on Block Trees".
  Advisor: Gonzalo Navarro.
- (2012-2019) Computer Science Engineering, Minor in Algorithms and Combinatorial Optimization, University of Chile.
- (2012-2016) BSc. in Computer Science, University of Chile.

Distinctions and Scholarships

- Third place in the *Contest of Master Thesis in Computer Science of Latin America* (2020).
- My doctoral studies are being funded by the ERC Starting Grant "Safe and Complete Algorithms for Bioinformatics".
- MSc. Thesis partially funded by:
  - Fondecyt Project 1-170048.
  - Basal Center for Biotechnology and Bioengineering (CeBiB), FB000001.
  - Bioinformatics and Information Retrieval Data Structures Analysis and Design - BIRDS MSCA RISE 2015 Project (H2020 EU project MSCA GA No 690941).
- (2018) Scholarship given by University of Chile, to take the 2nd semester of the MSc. in Computer Science.

- (2012-2015) Part of the Honor List of the University of Chile (belong to top 6% of students, with a minimum of 54 passed credits).
- (2011) Maximum Score in the National University Selection Test, Mathematics.

Research Experience

Publications

- Paper "Block Trees", Djamal Belazzougui, Manuel Cáceres, Travis Gagie, Pawel Gawrychowski, Juha Kärkkäinen, Gonzalo Navarro, Alberto Ordóñez, Simon J. Puglisi, and Yasuo Tabei. Accepted to the *Journal of Computer and System Sciences* (JCSS) 2021. A preliminary version can be found at `https://me.ariel.computer/files/jcss20.pdf`.
- Paper "On the parameterized complexity of the Minimum Path Cover problem in DAGs", Manuel Cáceres, Massimo Cairo, Brendan Mumey, Romeo Rizzi and Alexandru I. Tomescu. Submitted to the *Symposium on Theoretical Aspects of Computer Science* (STACS) 2021. A preliminary version can be found at `https://arxiv.org/abs/2007.07575`.
- Paper "Fast Indexes for Gapped Pattern Matching", Manuel Cáceres, Simon J. Puglisi and Bella Zhukova. Accepted to the *International Conference on Current Trends in Theory and Practice of Informatics* (SOFSEM) 2020 conference. A preliminary version can be found at `https://arxiv.org/abs/2002.12662`.
- Paper "Faster Repetition-Aware Compressed Suffix Trees based on Block Trees", Manuel Cáceres & Gonzalo Navarro. Accepted to the *String Processing and Information Retrieval* (SPIRE) 2019 conference. A preliminary version can be found at `https://arxiv.org/abs/1902.03274`.
- Master thesis "Compressed Suffix Tree for Repetitive Collections based on Block Trees", `https://users.dcc.uchile.cl/~mcaceres/MasterThesis.pdf`, to appear in `repositorio.uchile.cl`. Software built for this thesis is public available at `https://github.com/elarielcl/BT-CST`

Research Visits and Presentations

- Talk of my master thesis results in the "X Workshop CeBiB – Biotechnology, Metabolic Engineering, Bioinformatics, and Important Applications"
- Talk of my master thesis work to the research group: "Database Laboratory" of the University of A Coruña.
- Research stay (one month) at University of A Coruña granted by the BIRDS project. During the stay I worked with PhD. student Adrián

Gómez on the thesis chapter: "Compression of Repetitive Differential Arrays".

- Talk of my master thesis work to the research group: "Genome Scale Algorithmics" of the University of Helsinki.
- Research stay (two months) at University of Helsinki granted by the BIRDS project. During the stay I worked with Associate Professor Simon Puglisi and PhD. student Bella Zhukova on the problem "Variable-Length Pattern Matching".
- Poster presentation of my master thesis proposal on the "VIII Workshop CeBiB – Biotechnology, Metabolic Engineering, Bioinformatics, and Important Applications".
- Open talk of my master thesis proposal at University of Chile.

Teaching Experience

- Teaching Assistant "Design & Analysis of Algorithms", University of Helsinki (Fall 2020).
- Lecturer: "Computer Tools for Engineering & Science", University of Chile (Fall 2019, Summer 2019).
- Teaching Assistant: "Advanced Analysis of Algorithms", University of Chile (Spring 2018, Spring 2016).
- Teaching Assistant: "Design & Analysis of Algorithms", University of Chile (Fall 2018, Spring 2017, Fall 2017).
- Teaching Assistant: "Algorithms & Data Structures", University of Chile (Fall 2017, Fall 2016).
- Teaching Assistant: "Computer Tools for Engineering & Science", University of Chile (Summer 2013-2017, Spring 2015).
- Teaching Assistant: "Theory of Computation", University of Chile (Spring 2016, Fall 2016).
- Teaching Assistant: "Introduction to Programming", University of Chile (Spring 2014).
- Teaching Assistant: "Software Development for Lego Robots", University of Chile (Fall 2014).
- School Teacher: Preparation classes for the National University Selection Test, Mathematics. Colegio María Ana Mogas, Chile (2012).

Other Academic Experience

- Subreferee of RECOMB 2021.
- Subreferee of DCC 2021.
- Subreferee of WABI 2020.
- Reviewer and author of BREW 2020.
- Subreferee of ALENEX 2020.
- Subreferee of the Theoretical Computer Science (TCS) Journal.
- Subreferee of the European Symposia on Algorithms (ESA) 2018 track B.
- Implementation of the first Block Tree faithful to its theoretical proposal as part of the final project of the course "Compact Data Structure". Code is available at `https://github.com/elarielcl/BlockTrees`. An initial evaluation of this work was presented on the thesis chapter: "Block Tree Improvements".
- Implementation of the Sequitur compression algorithm as part of the final project of the course "Text Compression". Code is available at: `https://github.com/elarielcl/ArielsSequitur`. An initial evaluation of this work is available at:

  `https://users.dcc.uchile.cl/~mcaceres/ProyectoDeCompresion.pdf` [in Spanish].
- I sent corrections and helped to improve:
  - Book: "Compact data structures: A practical approach", `https://users.dcc.uchile.cl/~gnavarro/CDSbook/`
  - Notes for the course: "Design and Analysis of Algorithms", `https://users.dcc.uchile.cl/~gnavarro/apunte2.html` [in Spanish].
  - Notes for the course: "Theory of Computation", `https://users.dcc.uchile.cl/~gnavarro/apunte.html` [in Spanish].
- I made public all my classes for the courses "Design and Analysis of Algorithms"(DAA) and "Algorithms and Data Structures"(ADS) for future students and teaching assistants [in Spanish].
  - (DAA) `https://github.com/elarielcl/Logaritmos1801`
  - (DAA) `https://github.com/elarielcl/Logaritmos1702`
  - (DAA) `https://github.com/elarielcl/Logaritmos1701`
  - (ADS) `https://github.com/elarielcl/Algoritmos1701`
  - (ADS) `https://github.com/elarielcl/Algoritmos1701`

Professional Experience

- (2019) SimpliRoute work on the main web and mobile platform, "the number one software of logistic intelligence in Latin America".
- (2019) Adere.so, work on the "PostCenter" software, a digital platform to help companies attend their clients.
- (2017) B:labs, work on the construction of "The Ads Market", a web platform for selling advertising spaces.
- (2015) NicLabs, work on a previous reducer transformer of a stream of DNS packets.
- (2014) NicLabs, work on Conformity Tests of the cryptographic standard PKCS#11.

Other Interests and Activities

- Free Software. I try to make all my software publicly available and contribute to Free Software Foundations.
- Massive Online Open Courses (MOOCS). I have attended several from Coursera, EDX and OCW.
- (2017-2018) Member of the Teaching and Technical Committee in the Department of Computer Science, University of Chile. I was the student representative of the "Foundations of Computer Science" area.