Boris Leonardo **Almonacid Gutiérrez**

Contact

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Publons : `http://publons.com/a/1543677/`

Education

2015–2018	**PhD** in Computer Engineering	Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

Emphasis in combinatorial optimization, evolutionary algorithms, metaheuristics, swarm intelligent.

Thesis: Andean Condor Algorithm: A metaheuristic inspired by nature to solve cell formation problems.

Internship: Research Internship in MiniZinc Group, University of Melbourne, Melbourne, Australia, September to December 2017.

2015–2016	**Master** in Computer Science	Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile
2012–2013	**Master** in Engineering Informatics	Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile
2013	**Diploma** in Management Control	Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile
2006-2011	**Degree** in Engineering Informatics	Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

Interests

Fields of Interest
- Computer Science
- Optimization problems, Industrial problems.
- Evolutionary Algorithms, Metaheuristics, Swarm Intelligent, Stochastic Algorithms, Constraint programming.
- Global Change problems, Natural Reserve problems, Biodiversity problems.
- Digital Art, Infographics.

Member
- Animal Behavior Society.
- British Ecological Society.
- Association for Constraint Programming.

Voluntary Positions
- eLife Ambassadors 2018.
- Fighare Ambassador Program 2018.

Skills

- Language: Java SE, C/C++, LaTeX.
- Programming Tools: RStudio, IntelliJ Idea, Source Tree (git).
- Design Tools: Affinity Designer, Affinity Photo, draw.io.
- Editorial Tools: Overleaf, authorea.com.

Scientific Activities

Research Awards

2016	**Developing Nations Research Awards**	Animal Behavior Society 2016

Research: Predict flight patterns of the Andean Condor (Vultur gryphus).
Url: www.animalbehaviorsociety.org/NEWSLETTERS/61-2/awardees.php.

Research projects

2016-2018   **Principal investigator**
Project name: Selection of a biodiversity conservation area.

2017-2018   **Principal investigator**
Project name: Metaheuristic algorithms with cellular automatas in discrete worlds.

2016-2018   **Principal investigator**
Project name: Behaviour patterns of the Andean Condor.

Peer Review Activities

2016-2019   **Scientific Committee**

- IWINAC 2019 - International Work-Conference on the Interplay between Natural and Artificial Computation
- CISTI 2016, 2017, 2018, and 2019 - Iberian Conference on Information Systems and Technologies.

2015-2016   **Evaluator of research projects**

- Animal Behavior Society 2015 and 2016.

2016-2019   **Journal Referee**

- Current Science, April 2019.
- Journal of Engineering and Technological Sciences, Institut Teknologi Bandung, 2019.
- Scientific Programming, Hindawi, 2018.
- Current Journal of Applied Science and Technology, Science Domain International, 2018.
- Mathematical Problems in Engineering, Hindawi, 2017.
- British Journal of Mathematics & Computer Science, Science Domain International, 2017.
- Computers & Operations Research, Elsevier, 2017.
- Computational Intelligence, Willey.
- Journal of Scientific Research and Reports, Science Domain International, 2016.

2015-2016   **Conference Referee**

- ICEIS 2016 - 18th International Conference on Enterprise Information Systems.
- CLEI 2016 - 35th International Conference of the Chilean Computer Science Society.
- ICEIS 2016 - 18th International Conference on Enterprise Information Systems.
- ELA-ES 2015 - The Second Latin-American School on Software Engineering.

Publications

Article in Peer-Reviewed Journal

[1] Boris Almonacid, Fabián Aspée, and Francisco Yimes. "Autonomous Population Regulation Using a Multi-Agent System in a Prey–Predator Model That Integrates Cellular Automata and the African Buffalo Optimization Metaheuristic". In: Algorithms 12.3 (2019), p. 59.

[2] Boris Almonacid and Ricardo Soto. "Andean Condor Algorithm for cell formation problems". In: Natural Computing (2018), pp. 1–31.

[3] Boris Almonacid, Juan Reyes-Hagemann, Juan Campos-Nazer, and Jorge Ramos-Aguilar. "Selecting a biodiversity conservation area with a limited budget using the binary African buffalo optimisation algorithm". In: IET Software 12.2 (2017), pp. 96–111.

[4] Boris Almonacid, Fabián Aspée, Ricardo Soto, Broderick Crawford, and Jacqueline Lama. "Solving the manufacturing cell design problem using the modified binary firefly algorithm and the egyptian vulture optimisation algorithm". In: IET Software 11.3 (2016), pp. 105–115.

[5] Ricardo Soto, Broderick Crawford, Boris Almonacid, and Fernando Paredes. "Efficient parallel sorting for migrating birds optimization when solving machine-part cell formation problems". In: Scientific Programming 2016 (2016), p. 21.

International Peer-Reviewed Conferences/Proceedings

[1] Boris Almonacid. "Simulation of a Dynamic Prey-Predator Spatial Model Based on Cellular Automata Using the Behavior of the Metaheuristic African Buffalo Optimization". In: International Work-Conference on the Interplay Between Natural and Artificial Computation. Springer, Cham. 2017, pp. 170–180.

[2] Boris Almonacid, Ricardo Soto, and Broderick Crawford. "Comparing three simple ways of generating neighboring solutions when solving the cell formation problem using two versions of migrating birds optimization". In: 2017 17th International Conference on Computational Science and Its Applications (ICCSA). IEEE. 2017, pp. 1–9.

[3] Ricardo Soto, Broderick Crawford, Rodrigo Olivares, Héctor Ortega, and Boris Almonacid. "An Imperialist Competitive Algorithm to Solve the Manufacturing Cell Design Problem". In: Proceedings of the Computational Methods in Systems and Software. Springer, Cham. 2017, pp. 102–113.

[4] Ricardo Soto, Broderick Crawford, Leandro Vásquez, Roberto Zulantay, Ana Jaime, Maykol Ramirez, and Boris Almonacid. "Solving the Manufacturing Cell Design Problem using Artificial Bee Colony with Adaptive Population". In: Rus, Vasile and Markov, Zdravko – FLAIRS-30 Poster Abstracts – The Thirtieth International Flairs Conference. 2017, p. 1.

[5] Ricardo Soto, Broderick Crawford, Leandro Vásquez, Roberto Zulantay, Ana Jaime, Maykol Ramírez, and Boris Almonacid. "Solving the Manufacturing Cell Design Problem Using the Artificial Bee Colony Algorithm". In: International Workshop on Multi-disciplinary Trends in Artificial Intelligence. Springer, Cham. 2017, pp. 473–484.

[6] Ricardo Soto, Broderick Crawford, and Boris Almonacid. "Efficient leader exchange for migrating birds optimization when solving machine-part cell formation problems". In: 2016 11th Iberian Conference on Information Systems and Technologies (CISTI). IEEE. 2016, pp. 1–7.

[7] Ricardo Soto, Broderick Crawford, Boris Almonacid, Stefanie Niklander, and Eduardo Olguín. "Optimization for UI Design via Metaheuristics". In: International Conference on Human-Computer Interaction. Springer, Cham. 2016, pp. 150–154.

[8] Ricardo Soto, Broderick Crawford, César Carrasco, Boris Almonacid, Victor Reyes, Ignacio Araya, Sanjay Misra, and Eduardo Olguín. "Solving manufacturing cell design problems by using a dolphin echolocation algorithm". In: international conference on computational science and its applications. Springer, Cham. 2016, pp. 77–86.

[9] Ricardo Soto, Broderick Crawford, Ana Jaime, Maykol Ramírez, Boris Almonacid, Leandro Vásquez, and Roberto Zulantay. "Solving the Manufacturing Cell Design Problem Using the Cuckoo Search". In: 2016 Fifteenth Mexican International Conference on Artificial Intelligence (MICAI). IEEE. 2016, pp. 123–129.

[10] Ricardo Soto, Broderick Crawford, Jacqueline Lama, and Boris Almonacid. "A firefly algorithm to solve the manufacturing cell design problem". In: 2016 11th Iberian Conference on Information Systems and Technologies (CISTI). IEEE. 2016, pp. 1−7.

[11] Ricardo Soto, Broderick Crawford, Rodrigo Olivares, Michele De Conti, Ronald Rubio, Boris Almonacid, and Stefanie Niklander. "Resolving the manufacturing cell design problem using the flower pollination algorithm". In: International Workshop on Multi-disciplinary Trends in Artificial Intelligence. Springer, Cham. 2016, pp. 184−195.

[12] Ricardo Soto, Broderick Crawford, Carolina Zec, Andrés Alarcón, and Boris Almonacid. "A bat algorithm to solve the manufacturing cell design problem". In: 2016 11th Iberian Conference on Information Systems and Technologies (CISTI). IEEE. 2016, pp. 1−7.

[13] Ricardo Soto, Broderick Crawford, Boris Almonacid, and Fernando Paredes. "A migrating birds optimization algorithm for machine-part cell formation problems". In: Mexican International Conference on Artificial Intelligence. Springer, Cham. 2015, pp. 270−281.

[14] Ricardo Sotoyz, Broderick Crawford, Boris Almonacid, Fernando Paredes, and Ernesto Loyola. "Machine-part cell formation problems with constraint programming". In: 2015 34th International Conference of the Chilean Computer Science Society (SCCC). IEEE. 2015, pp. 1−4.

[15] Ricardo Soto, Broderick Crawford, Boris Almonacid, Franklin Johnson, and Eduardo Olguín. "Solving Open-Pit Long-Term Production Planning Problems with constraint programming a performance evaluation". In: 2014 9th International Conference on Software Engineering and Applications (ICSOFT-EA). IEEE. 2014, pp. 70−77.

In Peer-Review

[1] Boris Almonacid. "Resolving the optimal selection of a natural reserve using the particle swarm optimisation by applying transfer functions". 2019.

Preprints

[1] Boris Almonacid. Resolve the cell formation problem in a set of three manufacturing cells. Apr. 2019. DOI: 10.7287/peerj.preprints.27692v1. URL: https://doi.org/10.7287/peerj.preprints.27692v1.

[2] Boris L Almonacid. Preliminary experiments with the Andean Condor Algorithm to solve problems of Continuous Domains. Apr. 2019. DOI: 10.7287/peerj.preprints.27678v1. URL: https://doi.org/10.7287/peerj.preprints.27678v1.

[3] Boris Almonacid. Resolving the optimal selection of a natural reserve using the particle swarm optimisation by applying transfer functions. May 2018. DOI: 10.7287/peerj.preprints.26941v2. URL: https://doi.org/10.7287/peerj.preprints.26941v2.

Academic Experience

2015–2017 **Co-Advisor** Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

Duties and responsibilities: Support in the supervision of undergraduate students in the projects of evolutionary algorithms, both in the conceptual part, as in the technical part.

List of thesis projects:
- Research: Using African Buffalo Optimization for solving cell formation problems.
  Student: Alberto Felipe Cabrera Morales.
- Research: Using Wolf Search Algorithm for solving cell formation problems.
  Student: Patricio Antonio Fonseca López.
- Research: Using Egyptian Vulture for solving cell formation problems.
  Student: Fabian Andrés Aspée Encina.
- Research: Using Flower Pollination Algorithm for solving cell formation problems.
  Students: Michele Marco De Conti Rivara and Ronald Andrés Rubio Hurtado.
- Research: Using Cuckoo Search for solving cell formation problems.
  Students: Ana Elizabeth Jaime Bernal and Maykol Andrés Ramírez González.
- Research: Using Artificial Bee Colony for solving cell formation problems.
  Students: Leandro Alexander Vásquez Mora and Roberto Zulantay Arias.
- Research: Using Big Bang–Big Crunch for solving cell formation problems.
  Student: Edgardo Andres Zelada Segovia.

Achievements:
- It has been possible to carry out a scientific article and four conference articles based on the results of the research projects

2008 **Teaching Assistant** Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

Carry out activities to support undergraduate teachers for the different activities that take place in the courses.

Duties and responsibilities:
- Teaching Assistant of Logic Programming course, 2008.
- Teaching Assistant of Logic Programming course, Students exchange program, 2008.
- Teaching Assistant of Computer Architecture course, 2008.

Professional Experience

2012–2014   **Software Engineer South America, in Maptek**   Viña del Mar, Chile

Duties and responsibilities:
- Work with Project Team leaders of Australia, USA and Chile in Technical Services to implement product enhancements in geological, spatial design, execution and measurement details of a mining operation and the business outcomes and profitability of our customers.
- Provide estimates and schedules for the development of improvements and correction of defects.
- Perform analysis, design, and estimates for various requirements for different International Customers to be included in the Mining Software.
- Implement new technologies and architecture in C++ language specified by the team.

Achievements:
- More than 20 mid-range improvements and more than 150 defects resolved.
- Develop basic documentation to be used by the different technical writers of the Mining Software.

2011–2012   **Engineer Trainee, Solem S.A**   Viña del Mar, Chile

Duties and responsibilities:
- Software analyst in the project "Civil Registry and Identification Service SRCeI - Identification System, Identity and Travel Documents", Chile-France, 2011.
- Software analyst in the project "MetroBus - System of mass mobilization of passengers in the metropolitan area of Panama", Chile-Panama, 2010.

Achievements:
- Formalization of software designs in critical delivery times.
- Formalization of a procedure to deliver Software components to the Customer.

2009–2013   **Other Projects**

- Design and website development of recipes for celiac condition (`www.hogarceliaco.com`), 2013.
- Design, development, migration of data to Wordpress and administration of the website of the School of Computer Engineering (`http://inf.ucv.cl`), Pontifical Catholic University of Valparaíso, Chile, 2010.
- Development of a spatial-geographic system of sports routes in Google Maps, 2009.
- Development of a system of entry of crimes into geo-referential maps, 2009.

Courses and Certifications

April to May, 2018	**Information Design and Data**	University of the Arts London

A visualization course for Science Communication

October 2017 **Basic Modeling for Discrete Optimization** The University of Melbourne & The Chinese University of Hong Kong, Online

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https://www.coursera.org/account/accomplishments/certificate/
VRWZFJT89462
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Oct. - Nov. 2015 **Introduction to Biosphere Reserves** The Regional Office of Sciences for Latin America and the Caribbean of UNESCO and the University for International Cooperation

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http://www.unesco.org/new/es/media-services/single-view/news/online_
open_course_introduction_to_biosphere_reserves_sus/
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January 2013 **C++ Language** Federico Santa María Technical University, Valparaíso, Chile

License CC-INF-1205009-1

April 2013 **First aid course** Work Safety Institute (IST, Instituto de Seguridad del Trabajo), Chile

Basic first aid workshop

May 2013 **Fire prevention** Work Safety Institute (IST, Instituto de Seguridad del Trabajo), Chile

Fire prevention and use of portable fire extinguishers

March 2012 **Suitable for high altitude labor jobs (ELA)** Work Safety Institute (IST, Instituto de Seguridad del Trabajo), Chile

Certifications PRO N° 03.31.009773/2012

Awards

2011-2018 **Honors** Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

- Summa Cum Laude, PhD in Computer Science, 2018.
- Summa Cum Laude, Master in Computer Science, 2016.
- Summa Cum Laude, Master in Engineering Informatics, 2013.
- Third place in ranking of graduates, Master in Engineering Informatics , 2013.
- Third place in ranking of graduates, Engineering Informatics, 2011.

2006-2017 **Scholarship and Fellowships**

- Research Internship Grant by Phd (h.c) Sonia Alvarez, 2017.
- Partial Research Internship Grant by Computer Engineering School 2017, Pontificia Universidad Católica de Valparaíso, Chile.
- VRIEA Grant 2016-2017, Pontificia Universidad Católica de Valparaíso, Chile.
- PhD Scholarship 2015, Pontificia Universidad Católica de Valparaíso, Chile.
- Master Scholarship 2011-2012, Pontificia Universidad Católica de Valparaíso, Chile.
- Bicentennial Partial Scholarship 2006-2009, Government of Chile.

References

- **Juan Campos Nazer**
  - Research in Atacama University, Chile, Geologist. Email: juan.campos@uda.cl
- **Cristian Rusu**
  - Research in Pontifical Catholic University of Valparaíso, Chile. Doctor of Science Engineering. Email: cristian.rusu@pucv.cl
- **Jorge Ramos Aguilar**
  - Biologist, Mention Natural Resources and Environment, Santiago, Chile. Email: jsramos@uc.cl