



# Jhonatan de Souza Oliveira

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GitHub  
<https://github.com/jhonatanoliveira>

## SUMMARY

Ph.D. student in Computer Science researching probabilistic graphical models and generative deep learning models. Has several academic publications including a recent paper at the top tier conference AAAI 2019. Research projects involving theoretical development and implementation of machine learning models including Sum-Product networks, generative adversarial networks (GANs), Bayesian network, and Markov networks. Bachelor in Electrical Engineering with experience in robotics, parallel and numerical programming, and general artificial intelligence algorithms.

Extensive programming experience with Python, C++, and Java, as well as some experience with Matlab and OCaml.

Professional web development experience in javascript (Node.js, Angular, Meteor.js), PHP (CakePHP, Zend), Python (Django, Flask), and Java (Struts2), including mobile development with Cordova and NativeScript / React Native.

## EDUCATION

### University of Regina, Canada

Ph.D. in Computer Science — 2015-present

### University of Regina, Canada

M.Sc. in Computer Science — 2015-2016

### Universidade Federal de Viçosa, Brazil

Bachelor in Electrical Engineering — 2009-2014

## PUBLICATIONS

### Papers in Refereed Journals

- C.J. Butz, J.S. Oliveira, A. dos Santos, and A.L. Madsen, An Empirical Study of Bayesian Network Inference with Simple Propagation, International Journal of Approximate Reasoning, Vol. 92, 198-211, 2018.
- C.J. Butz, A. dos Santos, J.S. Oliveira, and C. Gonzales, An Empirical Study of Testing Independencies in Bayesian Networks using rp-Separation, International Journal of Approximate Reasoning, Vol. 92, 270-278, 2018.
- C.J. Butz, A. dos Santos, J.S. Oliveira, and C. Gonzales. On a Simple Method for Testing Independencies in Bayesian Networks, Computational Intelligence, Vol. 34, No. 3, 789-801, 2018.
- C.J. Butz, J.S. Oliveira and A. dos Santos, On Darwinian Networks, Computational Intelligence, Vol. 33, No. 4, 629-655, 2017.
- C.J. Butz, J.S. Oliveira, and A.L. Madsen, Bayesian Network Inference using Marginal Trees, International Journal of Approximate Reasoning, Vol. 68, 127-152, 2016.

### Refereed Conference Papers

- C.J. Butz, J.S. Oliveira, A. dos Santos, A.L. Teixeira, Deep Convolutional Sum-Product Networks, Thirty-Third AAAI Conference on Artificial Intelligence (AAAI), accepted, 2019.
- C.J. Butz, J.S. Oliveira, A. dos Santos, A.L. Teixeira, P. Poupart, A. Kalra, An Empirical Study of Methods for SPN Learning and Inference, Ninth International Conference on Probabilistic Graphical Models (PGM), 49-60, 2018.
- A.L. Madsen, C.J. Butz, J.S. Oliveira, A. dos Santos, Simple Propagation with Arc-Reversal in Bayesian Networks, Ninth International

- Conference on Probabilistic Graphical Models (PGM), 260--271, 2018.
- C.J. Butz, A. dos Santos, J.S. Oliveira, and J. Stavrinos, Efficient Examination of Soil Bacteria using Probabilistic Graphical Models, Thirty-first International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems, 315--326, 2018.
  - C.J. Butz, J.S. Oliveira, and A.E. dos Santos, On Learning the Structure of Sum-Product Networks, IEEE Symposium Series on Computational Intelligence, 2997--3004, 2017.
  - A. dos Santos, C.J. Butz, and J.S. Oliveira, On Converting Sum-Product Networks into Bayesian Networks, Thirtieth Canadian Conference on Artificial Intelligence (AI), 329--334, 2017.
  - J.S. Oliveira, C.J. Butz, and A. dos Santos, Resolving Inconsistencies of Scope Interpretations in Sum-Product Networks, Thirtieth Canadian Conference on Artificial Intelligence (AI), 303--315, 2017.
  - C.J. Butz, A. dos Santos, and J.S. Oliveira, On Finding Relevant Variables in Discrete Bayesian Network Inference, Thirtieth International Florida Artificial Intelligence Research Society Conference (FLAIRS), 730--735, 2017.
  - C.J. Butz, A.E. dos Santos, J.S. Oliveira, Relevant Path Separation: A Faster Method for Testing Independencies in Bayesian Networks, Eighth International Conference on Probabilistic Graphical Models (PGM), 74 -- 85, 2016.
  - C.J. Butz, J.S. Oliveira, A.E. dos Santos, and A.L. Madsen, On Bayesian Network Inference with Simple Propagation, Eighth International Conference on Probabilistic Graphical Models (PGM), 62 -- 73, 2016.
  - C.J. Butz, A. dos Santos, J.S. Oliveira, and C. Gonzales, A Simple Method for Testing Independencies in Bayesian Networks, Twenty-ninth Canadian Conference on Artificial Intelligence (AI), 213--223, 2016.
  - A.L. Madsen, C.J. Butz, J.S. Oliveira, A. dos Santos, On Tree Structures used by Simple Propagation for Bayesian Networks Inference, Twenty-ninth Canadian Conference on Artificial Intelligence (AI), 207--212, 2016.
  - C.J. Butz, J.S. Oliveira, A. dos Santos, and A.L. Madsen, Bayesian Network Inference with Simple Propagation, Twenty-ninth International Florida Artificial Intelligence Research Society Conference (FLAIRS), 650 -- 655, 2016.
  - C.J. Butz, A. dos Santos, J.S. Oliveira, and C. Gonzales, Testing Independencies in Bayesian Networks with i-Separation, Twenty-ninth International Florida Artificial Intelligence Research Society Conference (FLAIRS), 644 -- 649, 2016.
  - C.J. Butz, J.S. Oliveira and A. dos Santos, Darwinian Networks, Twenty-eighth Canadian Conference on Artificial Intelligence (AI), 16--29, 2015.
  - A.L. Madsen and C.J. Butz, Exploiting Semantics in Bayesian Network Inference Using Lazy Propagation, Twenty-eighth Canadian Conference on Artificial Intelligence (AI), 3--15, 2015.
  - C.J. Butz, J.S. Oliveira and A. dos Santos, Determining Good Elimination Orderings with Darwinian Networks, Twenty-eighth International Florida Artificial Intelligence Research Society Conference (FLAIRS), 600 -- 603, 2015.
  - C.J. Butz, J.S. Oliveira and A.L. Madsen, Bayesian Network Inference Using Marginal Trees, Seventh European Workshop on Probabilistic Graphical Models (PGM), 81--96, 2014.

## ACADEMIC EXPERIENCE

### Teaching Assistant, University of Regina

Regina, SK, Canada — 01/2015 - 04/2014, 09/2015 - 12/2015, 01/2016 - 04/2016, 05/2016 - 08/2016, 09/2016 - 12/2016, 01/2017 - 04/2017, 05/2017 - 08/2017, 09/2017 - 12/2017, 01/2018 - 04/2017, 05/2018 - 08/2018

Teaching assistant of the introductory programming class CS110 and web development class CS215. First, marked assignments and tests. Currently, works as lab instructor for multiple class sections of CS215.

**Accomplishments:** As member of a large team of lab instructors, I could learn how to maintain consistent teaching for the benefit of the group. I could also exercise my teaching skills in multiple lab sections per week.

### Master Student, University of Regina

Regina, SK, Canada — 01/2015 - 08/2016

At the research lab, he is the main programmer developing small systems for experimental results in research papers. These experiments are used for benchmark tests and are implemented in a variety of programming languages.

**Accomplishments:** In our research lab, I implement small Artificial Intelligence systems that compares our theory against state-of-the art techniques. I have coded experiments involving Bayesian networks, graph and probability theory, and Sum-Product networks. Sometimes I have to implement everything from scratch, other times I use available open source libraries. I have used different programming languages in projects, including OCaml, C++, Python and R. As a side project, I worked in a javascript library, built using the Meteor framework, for a visual representation of Darwinian networks with SVG.

### Member of the Autonomous Robot Soccer Team BDP, Universidade Federal de Viçosa

Viçosa, MG, Brazil — 01/2010 - 12/2014

During undergrad, called to be one of the founders of the autonomous robot soccer team at the Universidade Federal de Viçosa. Lead developer of the first versions of the system used on the robots. Experience with robotic theory and their implementations.

**Accomplishments:** As a research team, we could learn and apply artificial intelligence techniques, besides dealing with the electronic development, since we were a team formed by Electrical Engineers students. As the lead developer, I was responsible to design and help on the implementation of a C++ system with intensive use of networking and parallelism.

### Research Placement, University of Regina

Regina, SK, Canada — 07/2013 - 12/2013

As part of the exchange program Science Without Borders, chose to do research in artificial intelligence with emphasis on Bayesian networks. Development of new ideas led to a novel framework called Darwinian networks.

**Accomplishments:** A great initiation for my research skills. I could work with my supervisor Dr. Cory Butz on exciting challenges in Inference and modeling with Bayesian networks. Our work led to few publications and still today we are publishing new research achievements on probabilistic graphical models. More recently, we are working with Sum Product Networks, a deep network.

## PROFESSIONAL EXPERIENCE

### Senior Software Engineer, Gign

Regina, SK, Canada — 08/2018 - present

Manage a small developer team in a startup company developing a mobile app focusing on the music/video streaming market. Duties involves designing technical documentation, automated tests, project deployment, reviewing and supervising developers.

**Accomplishments:** Working in a startup has been a great learning opportunity. My leadership position requires time management, decision making, and formal presentations. I help the company to decide on future technologies and attend to meetings with current/prospect investors. In a daily basis, I work with many cloud tools/services, including cloud computing, video/audio streaming, code versioning, among others.

### Software Engineer Intern, Sydle

Viçosa, MG, Brazil — 01/2011 - 12/2011

Member of a medium size software development company. Development of big systems used by multinational industries. More specifically, worked in a product for management of energy contracts.

**Accomplishments:** One of my best professional experiences: I could learn software development methodology with Scrum, extensive experience developing with Java, version controlling with a big developer team with different channels of release (development, testing, and production ready). Above all, I could be part of a very fun, dynamic and exciting environment.

### Web Developer, Centro de Educação à Distância - Universidade Federal de Viçosa

Viçosa, MG, Brazil — 07/2010 - 12/2010

Developer of web applications for internal demand at the Universidade Federal de Viçosa. The applications were used in research and local industries. The stack was made of Apache, PHP, MySQL, and jQuery.

**Accomplishments:** Being member of a small development team helped me to learn version controlling, good design patterns like MVC and ORM, besides good practices when coding with a team.

**Sample URLs:** <http://darwinianetworks.com> , <http://www2.cs.uregina.ca/~desouzjh> , <http://www.medicovirtual.com.br>

### Linux Network Administrator Intern, Universidade Federal de Viçosa

Viçosa, MG, Brazil — 07/2009 - 12/2009

Set up and maintain small size network computers for students. We used two basic setups: one with DHCP protocol and another one with Linux Terminal Server Project (LTSP).

**Accomplishments:** Comfortable using a variety Gnu Linux distributions or any unix environment, since I was a Linux user for more than 6 years.

## AWARDS & SCHOLARSHIPS

- 2016 Fall - Graduate Studies Research Fellowship (GRF) - \$22,623.38 CAD per year for 4 years.
- 2016 Winter - Graduate Studies Scholarship (GSS) - \$6,000 CAD
- 2015 Fall - Scholarly Award - \$3,000 CAD
- 2015 Spring/Summer - GSS - \$6,000 CAD
- 2015 Winter - Scholarly Award - \$6,000 CAD
- 2013 - Science Without Borders scholarship from the Brazilian government, an exchange student scholarship to study during one year at the University of Regina, Canada. - \$65,023.41 BRL (~ 22,500 CAD)

## VOLUNTEER

- 2nd Electrical Engineering Symposium (2013), Viçosa, Brazil
- 26th Canadian Conference on Electrical and Computer Engineering (2013), Regina, SK, Canada.
- 26th Canadian Conference on Artificial Intelligence (2013), Regina, SK, Canada.

## COURSERA

- Convolutional Neural Networks, deeplearning.ai, December 2017, Certificate:  
<https://www.coursera.org/account/accomplishments/certificate/MX965WE5BCPA>
- Structuring Machine Learning Projects, deeplearning.ai, October 2017, Certificate:  
<https://www.coursera.org/account/accomplishments/certificate/CY7FH4WP37Z7>
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, deeplearning.ai, October 2017, Certificate:  
<https://www.coursera.org/account/accomplishments/certificate/4DPFU2SJUGFH>
- Neural Networks and Deep Learning, deeplearning.ai, September 2017, Certificate:  
<https://www.coursera.org/account/accomplishments/certificate/2Q8977CRUM3D>
- Probabilistic Graphical Models 1: Representation, Stanford University, May 2017, Certificate:  
<https://www.coursera.org/account/accomplishments/certificate/TM7KHT24EBQV>
- Build a Modern Computer from First Principles: From Nand to Tetris (Project-Centered Course), Hebrew University of Jerusalem, August 2016, Certificate:  
<https://www.coursera.org/account/accomplishments/certificate/R4BWE5XK593G>
- Machine Learning, Coursera, Stanford University, June 2014, Certificate:  
[https://jhonatanoliveira.github.io/files/Coursera\\_Certificate\\_v1-972224147177.pdf](https://jhonatanoliveira.github.io/files/Coursera_Certificate_v1-972224147177.pdf)