Raul Astudillo

Contact and citizenship information

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Citizenship: Mexico

Education

2016-Present **Cornell University**, *USA*.
Ph.D. in Operations Research and Information Engineering
- Expected graduation date: May 2022
- Advisor: Peter I. Frazier
- Minors: Computer Science and Statistics

2011-2016 **University of Guanajuato**, *Mexico*.
B.S. in Mathematics. GPA: 9.7/10
- Highest GPA of the class 2011-2016

Research interests

Bayesian Optimization, Preference Elicitation, Simulation Optimization, Adaptive Experimentation, Optimal Learning

Publications and working papers

1. Z. Cosenza, R. Astudillo, P.I. Frazier, K. Baar, and D.E. Block "Multi-information source Bayesian optimization of cell culture media", *Working paper*.
2. B. Sha, R. Astudillo, and P.I. Frazier, "Mixed integer linear programming under preference uncertainty " (A preliminary version of this paper was finalist at the 2020 INFORMS Undergraduate Operations Research Prize Competition), *Working paper*.
3. Z. Lin, R. Astudillo, P.I. Frazier, and E. Bakshy, "Preference exploration for multi-attribute Bayesian optimization", *Submitted*.
4. R. Astudillo, and P.I. Frazier, "Thinking inside the box: A tutorial on grey-box Bayesian optimization", *Advanced Tutorial at the Winter Simulation Conference, 2021*.
5. R. Astudillo, D.R. Jiang, M. Balandat, P.I. Frazier, and E. Bakshy, "Multi-step budgeted Bayesian optimization with unknown evaluation costs", *Advances in Neural Information Processing Systems, 2021*.
6. R. Astudillo and P.I. Frazier, "Bayesian optimization of function networks", *Advances in Neural Information Processing Systems, 2021*.
7. S. Cakmak, R. Astudillo, P.I. Frazier and E. Zhou, "Bayesian optimization of risk measures", *Advances in Neural Information Processing Systems, 2020*.

8. R. Astudillo and P.I. Frazier, "Multi-attribute Bayesian optimization with interactive preference learning", *International Conference on Artificial Intelligence and Statistics, 2020*.
9. R. Astudillo and P.I. Frazier, "Bayesian optimization of composite functions", *International Conference on Machine Learning, 2019*.
10. R. Astudillo and P.I. Frazier, "Multi-attribute Bayesian optimization under utility uncertainty", *NIPS Workshop on Bayesian Optimization, 2017*.

Selected presentations

Dec 2021 "Thinking inside the box: A tutorial on grey-box Bayesian optimization", *Advanced Tutorial at the Winter Simulation Conference, Phoenix, AZ*.

Dec 2021 "Multi-step budgeted Bayesian optimization with unknown evaluation costs", *NeurIPS 2021, Virtual*.

Dec 2021 "Bayesian optimization of nested functions", *NeurIPS 2021, Virtual*.

Oct 2021 "Grey-box Bayesian optimization", *Young Researchers Workshop, Cornell University's School of ORIE, Ithaca, NY*.

Mar 2021 "Bayesian optimization of function networks", *SIAM Conference on Computational Science and Engineering, Virtual*.

Feb 2020 "Interactive Bayesian optimization with uncertain preferences", *Facebook Adaptive Experimentation Workshop, New York City, NY*.

Jul 2019 "Bayesian optimization of composite functions with application to computationally expensive inverse Problems", *Applied Inverse Problems Conference, Grenoble, France*.

Jun 2019 "Bayesian optimization of composite functions", *International Conference on Machine Learning, Long Beach, CA*.

May 2019 "Bayesian optimization of composite functions", *2nd Uber Science Symposium, San Francisco, CA*.

Selected graduate coursework

- Applied Stochastic Processes
- Mathematical Programming
- Bayesian Statistics and Data Analysis
- Numerical Methods for Data Science
- Bayesian Machine Learning
- Statistical Learning Theory
- Advanced Machine Learning
- Optimal Learning

Industry experience

Oct 2020 -Mar 2021 **Facebook**, *Menlo Park, CA*.
Visiting Researcher
- Developed novel non-myopic Bayesian optimization algorithms for problems with unknown evaluation costs and implemented them on Facebook's adaptive experimentation pipeline

Jun-Sep 2020 **Facebook**, *Menlo Park, CA*.
Intern
- Developed novel non-myopic Bayesian optimization algorithms for problems with unknown evaluation costs
- Mentor: Daniel R. Jiang

Jul-Aug 2019 **ExxonMobil Upstream Research Company**, *Houston, TX*.
Intern
- Developed novel Bayesian optimization algorithms for improving reservoir development planning under geological uncertainty
- Mentors: Liz Curry and Xiao-Hui Wu

Jun-Aug 2018 **ExxonMobil Upstream Research Company**, *Houston, TX*.
Intern
- Developed novel Bayesian optimization algorithms for improving reservoir development planning under geological uncertainty
- Mentors: Damian Burch and Xiao-Hui Wu

Teaching experience

Cornell University, *USA*.
Instructor

Summer 2021	Engineering Stochastic Processes	Undergraduate

Cornell University, *USA*.
Teaching Assistant

Fall 2018	Statistical Principles	Graduate
Spring 2017	Engineering Stochastic Processes	Undergraduate
Fall 2016	Basic Probability and Statistics	Undergraduate

Center for Research in Mathematics (CIMAT), *Mexico*.
Teaching Assistant

Fall 2015	Measure Theory and Probability	Graduate

University of Guanajuato, *Mexico*.
Teaching Assistant

Spring 2015	Complex Analysis	Undergraduate
Fall 2014	Elementary Number Theory	Undergraduate

Selected awards

2021 NeurIPS 2021 Outstanding Reviewer Award

2015 Second Prize - XXIII International Mathematics Competition for University Students, Blagoevgrad, Bulgaria.

2014 Third Prize - XXII International Mathematics Competition for University Students, Blagoevgrad, Bulgaria.

2014 *Orgullo UG* Academic Excellence Award - University of Guanajuato.

2012-2016 Academic Excellence Fellowship - Center for Research in Mathematics.

Computer skills

Development MATLAB, Python, R

Tools Git, LaTeX

Languages

English (proficient), Spanish (native)