Raúl Astudillo

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EDUCATION

Cornell University   *August 2016-August 2022*
Ph.D. in Operations Research and Information Engineering
    Advisor: Peter Frazier
    Minors: Computer Science and Statistics

University of Guanajuato & Center for Research in Mathematics   *August 2011-June 2016*
B.Sc. in Mathematics
    GPA: 9.7/10
    Highest GPA of the 2011-2016 class

ACADEMIC POSITIONS

California Institute of Technology   *September 2022-Present*
Postdoctoral Scholar
    Supervisor: Yisong Yue

INDUSTRY POSITIONS

Facebook
Visiting Researcher   *October 2020-March 2021*
    Supervisor: Eytan Bakshy
Research Intern   *June-September 2020*
    Supervisor: Daniel Jiang

ExxonMobil Upstream Research Company
Research Intern   *June-August 2019*
    Supervisors: Liz Curry and Xiao-Hui Wu
Research Intern   *June-August 2018*
    Supervisors: Damian Burch and Xiao-Hui Wu

RESEARCH INTERESTS

Bayesian Optimization, Preference Elicitation, Simulation Optimization, Active Learning, Uncertainty Quantification, Experimental Design, Optimal Learning, AI for Science

PUBLICATIONS

1. J. Bowden, <u>R. Astudillo</u>, C. Yeh, J. Song, Y. Chen, T. Desautels, and Y. Yue, "New insights on Bayesian optimization with deep kernel learning", *Preprint*.

2. F. Huber, S. Rojas Gonzalez, and <u>R. Astudillo</u>, "Bayesian preference elicitation for decision support in multi-objective optimization", *Submitted*.

3. J. Yang, R. Lal, J. Bowden, <u>R. Astudillo</u>, M. Hameedi, Y. Yue, and F. Arnold, "Active learning-assisted directed evolution", *Submitted*.

4. V. Mishra, <u>R. Astudillo</u>, P. Frazier, and F. Zhang, "Probably-convergent source seeking with mobile agents" (Early version presented at the NeurIPS 2023 Workshop on Adaptive Experimental Design and Active Learning in the Real World), *Submitted*.

5. <u>R. Astudillo</u>, K. Li, M. Tucker, X. Chen, A. Ames, and Y. Yue, "Preferential multi-objective Bayesian optimization" (Early version presented at the ICML 2023 Workshop on The Many Facets of Preference-Based Learning), *Submitted.*

6. C. Cheng, <u>R. Astudillo</u>, T. Desautels, and Y. Yue, "Practical Bayesian algorithm execution via posterior sampling" (Finalist in the 2024 INFORMS Undergraduate Operations Research Prize Competition), *Advances in Neural Information Processing Systems, 2024 (Forthcoming).*

7. Q. Xie, <u>R. Astudillo</u>, P. Frazier, Z. Scully, and A. Terein, "Cost-aware Bayesian optimization via the Pandora's box Gittins index" (Finalist in the 2024 INFORMS Data Mining Best Paper Competition), *Advances in Neural Information Processing Systems, 2024 (Forthcoming).*

8. B. Sha, <u>R. Astudillo</u>, and P. Frazier, "Multi-attribute optimization under preference uncertainty" (Finalist in the 2020 INFORMS Undergraduate Operations Research Prize Competition), *Winter Simulation Conference, 2024 (Forthcoming).*

9. P. Buathong, J. Wan, <u>R. Astudillo</u>, S. Daulton, M. Balandat, and P. Frazier, "Bayesian optimization of function networks with partial evaluations", *International Conference on Machine Learning, 2024.*

10. J. Jannink, <u>R. Astudillo</u>, and P. Frazier, "Insight into a two-part plant breeding scheme through Bayesian optimization of budget allocations", *Crop Science, 2023.*

11. <u>R. Astudillo</u>, Z. Lin, E. Bakshy, and P. Frazier, "qEUBO: A decision-theoretic acquisition function for preferential Bayesian optimization", *International Conference on Artificial Intelligence and Statistics, 2023.*

12. Z. Cosenza, <u>R. Astudillo</u>, P. Frazier, K. Baar, and D. Block, "Multi-information source Bayesian optimization of culture media for cellular agriculture" (Spotlight at the ICML 2022 Adaptive Experimental Design and Active Learning in the Real World Workshop), *Biotechnology and Bioengineering, 2022.*

13. Z. Lin, <u>R. Astudillo</u>, P. Frazier, and E. Bakshy, "Preference exploration for efficient Bayesian optimization with multiple outcomes", *International Conference on Artificial Intelligence and Statistics, 2022.*

14. <u>R. Astudillo</u>, and P. Frazier, "Thinking inside the box: A tutorial on grey-box Bayesian optimization", *Advanced Tutorial at the Winter Simulation Conference, 2021.*

15. <u>R. Astudillo</u>, D.R. Jiang, M. Balandat, E. Bakshy, and P. Frazier, "Multi-step budgeted Bayesian optimization with unknown evaluation costs", *Advances in Neural Information Processing Systems, 2021.*

16. <u>R. Astudillo</u> and P. Frazier, "Bayesian optimization of function networks", *Advances in Neural Information Processing Systems, 2021.*

17. S. Cakmak, <u>R. Astudillo</u>, P. Frazier and E. Zhou, "Bayesian optimization of risk measures", *Advances in Neural Information Processing Systems, 2020.*

18. <u>R. Astudillo</u> and P. Frazier, "Multi-attribute Bayesian optimization with interactive preference learning", *International Conference on Artificial Intelligence and Statistics, 2020.*

19. <u>R. Astudillo</u> and P. Frazier, "Bayesian optimization of composite functions", *International Conference on Machine Learning, 2019.*

SELECTED AWARDS

Rising Star in Data Science - UChicago and UC San Diego	*2024*
Rising Star in Management Science & Engineering - Stanford University	*2024*
Outstanding Reviewer Award - NeurIPS	*2021*
Second Prize - XXII International Mathematics Competition for University Students	*2015*
Orgullo UG Academic Excellence Award - University of Guanajuato	*2014*
Academic Excellence Fellowship - Center for Research in Mathematics	*2012-2016*

SELECTED PRESENTATIONS

1. "Composite Bayesian optimization for efficient and scalable adaptive experimentation", *Online Reading Group on Modern Adaptive Experimental Design and Active Learning in the Real World, Virtual, 2024.*

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

3. "Grey-box Bayesian optimization", *Young Researchers Workshop, Cornell University's School of Operations Research and Information Engineering, Ithaca, NY, 2021.*

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

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

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

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

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

MENTORING EXPERIENCE

Graduate Students

• Victor Amaya Carvajal - Duke University	*June 2024-Present*
• Felix Huber - University of Stuttgart	*April 2024-Present*
• Eliezer Fuentes - Cornell University	*Feb 2024-Present*
• Qian Xie - Cornell University	*August 2023-Present*
• Poompol Buathong - Cornell University	*June 2022-May 2024*

Undergraduate Students

• Eric Lee - California Institute of Technology	*Jul 2024-Present*
• Andrew Zabelo - California Institute of Technology	*March 2024-Present*
• Chu Xin (Cloris) Cheng - California Institute of Technology	*Nov 2023-Present*
• Bhavik Sha - Cornell University	*Feb 2020-October 2020*

TEACHING EXPERIENCE

Instructor

• Uncertainty Quantification (Graduate) - California Institute of Technology	*Spring 2023*

- Engineering Stochastic Processes (Undergraduate) - Cornell University   *Summer 2021*

Teaching Assistant

- Statistical Principles (Graduate) - Cornell University   *Fall 2018*
- Engineering Stochastic Processes (Undergraduate) - Cornell University   *Fall 2017*
- Basic Probability and Statistics (Undergraduate)- Cornell University   *Fall 2016*
- Measure Theory and Probability (Graduate) - Center for Research in Mathematics   *Fall 2015*
- Complex Analysis (Undergraduate) - University of Guanajuato   *Spring 2015*

ACADEMIC SERVICE

Conference Reviewing
AISTATS, ICLR, ICML, NeurIPS

Journal Reviewing
Artificial Intelligence, INFORMS Journal on Computing, Neural Computation, Operations Research, SIAM Review, Technometrics

LANGUAGES

English (proficient), Spanish (native)