

SANTIAGO R. BALSEIRO

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RESEARCH INTERESTS

Pricing & Revenue Management, Digital Markets, Online Advertising, Stochastic Modeling, Dynamic Games, Mechanism Design, Approximation Algorithms, Data-driven Optimization

EDUCATION

2008 - 2013 **Columbia University**, New York, NY

Ph.D. in **Decision, Risk, and Operations**, Graduate School of Business

Advisors: Prof. Omar Besbes and Prof. Gabriel Y. Weintraub

Dissertation: "Competition and Yield Optimization in Ad Exchanges"

2001 - 2007 **Universidad de Buenos Aires**, Argentina

Bachelor and Master degrees in **Industrial Engineering**

ACADEMIC APPOINTMENTS

Columbia University, Graduate School of Business, New York, NY

Decision, Risk, and Operations Division

07/2020 - Present Daniel W. Stanton Associate Professor of Business

01/2019 - 06/2020 Associate Professor

07/2017 - 12/2018 Assistant Professor

Duke University, Fuqua School of Business, Durham, NC

Decision Sciences Area

07/2013 - 06/2017 Assistant Professor

JOURNAL PAPERS

1. "Budget Management Strategies in Repeated Auctions," with A. Kim, M. Mahdian, and V. Mirrokni. **Operations Research** (forthcoming).
2. "Dynamic Pricing of Relocating Resources in Large Networks," with D.B. Brown and C. Chen. **Management Science** (forthcoming).
 - Revenue Management and Pricing Section Student Paper Prize, 2019 (C. Chen).

3. “Online Display Advertising Markets: A Literature Review and Future Directions,” with H. Choi, C.F. Mela, and A. Lery. **Information Systems Research** (forthcoming).
4. “Multi-stage Intermediation in Online Advertising,” with O. Candogan and H. Gurkan. **Manufacturing & Service Operations Management** (forthcoming).
5. “Dynamic Mechanism Design with Budget Constrained Buyers under Limited Commitment,” with O. Besbes and G. Weintraub. **Operations Research**, May–June 2019.
6. “Multi-Agent Mechanism Design without Money,” with H. Gurkan and P. Sun. **Operations Research**, September–October 2019.
7. “Learning in Repeated Auctions with Budgets: Regret Minimization and Equilibrium,” with Y. Gur. **Management Science**, September 2019.
- Junior Faculty Interest Group Best Paper Award, Honorable Mention, 2018.
8. “Approximations to Stochastic Dynamic Programs via Information Relaxation Duality,” with D.B. Brown. **Operations Research**, March–April 2019.
9. “Static Routing in Stochastic Scheduling: Performance Guarantees and Asymptotic Optimality,” with D.B. Brown and C. Chen. **Operations Research**, November–December 2018.
10. “Dynamic Mechanisms with Martingale Utilities,” with V. Mirrokni and R. Paes Leme. **Management Science**, November 2018.
11. “Optimal Contracts for Intermediaries in Online Advertising,” with O. Candogan. **Operations Research**, July–August 2017.
12. “Bounds on the Welfare Loss of Moral Hazard with Limited Liability,” with F. Balmaceda, J.R. Correa, and N.E. Stier-Moses. **Games & Economic Behavior**, January 2016.
13. “Repeated Auctions with Budgets in Ad Exchanges: Approximations and Design,” with O. Besbes and G. Weintraub. **Management Science**, January 2015.
- Part of thesis that was awarded the 2014 George B. Dantzig Dissertation Award.
- George Nicholson Student Paper Competition, Honorable Mention, 2014.
14. “Yield Optimization of Display Advertising with Ad Exchange,” with J. Feldman, V. Mirrokni, and S. Muthukrishnan. **Management Science**, December 2014.
- Part of thesis that was awarded the 2014 George B. Dantzig Dissertation Award.
15. “An Ant Colony Algorithm hybridized with insertion heuristics for the Time Dependent Vehicle Routing Problem with Time Windows,” with I. Loiseau and J. Ramonet. **Computers & Operations Research**, 2011.

REFEREED CONFERENCE PROCEEDINGS

1. “Dual Mirror Descent for Online Allocation Problems,” with H. Lu and V. Mirrokni. **Thirty-seventh International Conference on Machine Learning (ICML)**, 2020.
2. “Budget-Constrained Incentive Compatibility for Stationary Mechanisms,” with A. Kim, M. Mahdian, and V. Mirrokni. **21th ACM Conference on Economics and Computation (EC)**, 2020.
3. “Contextual Bandits with Cross-learning,” with N. Golrezaei, M. Mahdian, V. Mirrokni, J. Schneider. **33st Annual Conference on Neural Information Processing Systems (NeurIPS)**, 2019.
4. “Dynamic Pricing of Relocating Resources in Large Networks,” with D.B. Brown and C. Chen. **ACM International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS)**, 2019.
5. “Dynamic Double Auctions: Towards First Best,” with V. Mirrokni, R. Paes Leme and S. Zuo. **ACM-SIAM Symposium on Discrete Algorithms (SODA)**, 2019.
6. “Dynamic Revenue Sharing,” with M. Lin, V. Mirrokni, R. Paes Leme and S. Zuo. **31st Annual Conference on Neural Information Processing Systems (NIPS)**, 2017.
7. “Learning in Repeated Auctions with Budgets: Regret Minimization and Equilibrium,” with Y. Gur. **18th ACM Conference on Economics and Computation (EC)**, 2017.
8. “Budget Management Strategies in Repeated Auctions,” with A. Kim, M. Mahdian, and V. Mirrokni. **26th International World Wide Web Conference (WWW)**, 2017.
9. “Dynamic Mechanisms with Martingale Utilities,” with V. Mirrokni and R. Paes Leme. **18th ACM Conference on Economics and Computation (EC)**, 2017.
10. “Dynamic Mechanism Design with Budget Constrained Buyers under Limited Commitment,” with O. Besbes and G. Weintraub. **17th ACM Conference on Economics and Computation (EC)**, 2016.
11. “Repeated Auctions with Budgets in Ad Exchanges: Approximations and Design,” with O. Besbes and G. Weintraub. **14th ACM Conference on Economics and Computation (EC)**, 2013.
12. “Yield Optimization of Display Advertising with Ad Exchange,” with J. Feldman, V. Mirrokni, and S. Muthukrishnan. **12th ACM Conference on Economics and Computation (EC)**, 2011.
13. “Bounds on the Welfare Loss of Moral Hazard with Limited Liability,” with F. Balmaceda, J.R. Correa, and N.E. Stier-Moses. **Workshop on Internet & Network Economics (WINE)**, 2010.

WORKING PAPERS AND ONGOING WORK

- “Dual Mirror Descent for Online Allocation Problems,” with H. Lu and V. Mirrokni. Working paper.
- “Contextual Bandits with Cross-learning,” with N. Golrezaei, M. Mahdian, V. Mirrokni, J. Schneider. Working paper.
- “On the Futility of Dynamics in Robust Mechanism Design,” with A. Kim and D. Russo. Working paper.
- “Dynamic Double Auctions: Towards First Best,” with V. Mirrokni, R. Paes Leme and S. Zuo. Working paper.
- “Advertiser Learning in an Internet Ad Network,” with C.F. Mela and J.M.T. Roos. In preparation.

GRANTS AND AWARDS

- Junior Faculty Interest Group Best Paper Award, Honorable Mention, 2018
- Google Faculty Research Award, Summer 2015
- George B. Dantzig Dissertation Award, First Place, 2014
- George Nicholson Student Paper Competition, Honorable Mention, 2014
- Summer Grant; Networks, Electronic Commerce, and Telecommunications (NET) Institute; 2012
- Deming Doctoral Fellowship, Columbia University, 2011
- Google Engineering Intern Scholarship, 2010
- Full Tuition and Fellowship, Graduate School of Business, Columbia University, 2008-2013

INVITED TALKS AND CONFERENCE PRESENTATIONS

- *Dynamic Double Auctions: Towards First Best*
 - INFORMS Annual Meeting, Seattle, WA, October 2019
 - INFORMS 19th Annual Revenue Management & Pricing Section Conference, Stanford, CA, June, 2019
- *Dynamic Pricing of Relocating Resources in Large Networks*
 - Johnson School of Business, Cornell Tech, New York, NY, November 2019
 - 5th Workshop in Operations, Networks & Data Analytics, Universidad Torcuato Di Tella, Buenos Aires, Argentina, December 2019
- *Approximations to Stochastic Dynamic Programs via Information Relaxation Duality*
 - 4th Workshop in Operations, Networks & Data Analytics, Universidad Torcuato Di Tella, Buenos Aires, Argentina, December 2018

- *Budget Management Strategies in Repeated Auctions*
 - INFORMS Annual Meeting, Houston, TX, October 2017
 - 12th Workshop on the Economics of Advertising and Marketing, Columbia University, New York, NY, July 2018
- *Learning in Repeated Auctions with Budgets: Regret Minimization and Equilibrium*
 - 18th ACM Conference on Economics and Computation, Cambridge, MA, June 2017
 - 3rd Workshop in Operations, Networks & Data Analytics, Universidad Torcuato Di Tella, Buenos Aires, Argentina, December 2017
 - Columbia Business School, May 2018; Google NYC Research Seminar, June 2018; The University of Chicago Booth School of Business, Chicago, IL, May 2019
 - 18th Annual Revenue Management & Pricing Section Conference, Toronto, Canada, June 2018
- *Dynamic Mechanisms with Martingale Utilities (formerly titled “Bundling Over Time and Martingale Auctions”)*
 - Google’s Market Algorithms Workshop, New York, NY, January 2016
 - 11th Utah Winter Operations Conference, Snowbird, UT, February 2016
 - Marketplace Innovation Workshop, New York, NY, June 2016
 - INFORMS Annual Meeting, Nashville, TN, November 2016
 - 18th ACM Conference on Economics and Computation, Cambridge, MA, June 2017
 - University of North Carolina at Chapel Hill (2017), Columbia Business School (2017)
 - Mostly OM, International Workshop on Advanced Topics in Operations Management, Beijing, China, June 2018
- *Multi-stage Intermediation in Display Advertising*
 - 15th Annual Revenue Management & Pricing Section Conference, New York, NY, June 2015
 - INFORMS Annual Meeting, Philadelphia, PA, November 2015
- *Dynamic Mechanism Design with Budget Constrained Buyers under Limited Commitment*
 - INFORMS Manufacturing & Service Operations Management Conference, Seattle, WA, June 2014
 - INFORMS Annual Meeting, San Francisco, CA, November 2014
 - INFORMS Applied Probability Society, Istanbul, Turkey, July 2015
 - INFORMS Annual Meeting, Philadelphia, PA, November 2015
 - Columbia Business School (2015), Google Research Seminar Series (2015)

- 1st Workshop in Operations, Networks & Data Analytics, Universidad Torcuato Di Tella, Buenos Aires, Argentina, December 2015
- 11th Utah Winter Operations Conference, Snowbird, UT, February 2016
- *Bidding under Budget Constraints in Online Advertising: Shading versus Throttling*
 - INFORMS Annual Meeting, Minneapolis, MN, October 2013
- *Repeated Auctions with Budgets in Ad Exchanges: Approximations and Design (formerly titled “Auctions for Online Display Advertising Exchanges: Approximations and Design”)*
 - INFORMS Annual Meeting, Phoenix, AZ, 2012
 - INFORMS Manufacturing & Service Operations Management Conference, New York, NY, 2012
 - 21st International Symposium on Mathematical Programming, Berlin, Germany, 2012
 - Tuck School of Business (2012), Kellogg School of Management (2012), Singapore Management University (2012), SUTD (2012), The Wharton School (2013), NYU Stern (2013), Fuqua School of Business (2013), Yale School of Management (2013), INSEAD (2013), Universitat Pompeu Fabra (2013), IESE (2013), UC Irvine (2013), Stanford Graduate School of Business (2013), UT Austin (2013), University of Rochester (2013), UT Dallas (2013), Cornell ORIE (2013), USC Marshall School of Business (2013)
 - 45th ACM Symposium on the Theory of Computing (STOC), Stanford University, June 2013
- *Yield Optimization of Display Advertising with Ad Exchange*
 - 12th ACM Conference on Electronic Commerce, San Jose, CA, 2011
 - 11th Annual Revenue Management & Pricing Section Conference, New York, NY, 2011
 - INFORMS Annual Meeting, Charlotte, NC, 2011
- *Bounds on the Welfare Loss of Moral Hazard with Limited Liability (formerly titled “The Cost of Moral hazard and Limited Liability in the Principal-Agent Problem”)*
 - 6th Workshop on Internet & Network Economics, Stanford University, 2010
 - INFORMS Annual Meeting, Austin, TX, 2010
- *Revenue Management of Consumer Options for Sporting Events*
 - Google Seminar Series, New York, NY, 2011
 - ALIO-INFORMS Joint International Meeting, Buenos Aires, Argentina, June 2010
- *Integrated Planning Models for Capacity Planning and Call Routing in Call Center Networks with General SLAs*
 - INFORMS Annual Meeting, Austin, TX, 2010

- *An Ant Colony Algorithm hybridized with insertion heuristics for the Time Dependent Vehicle Routing Problem with Time Windows*

– LVII Annual Meeting of the Argentine Mathematical Union, Cordoba, Argentina, 2007

OUTSIDE ACTIVITIES

Columbia Business School requires faculty members to disclose any activities that might present a real or apparent conflict of interest. The list below complies with this requirement.

Google AI, New York, NY

02/2019 - Present Research Scientist

07/2016 - 07/2018 Research Advisor