

## Christopher Thomas Ryan (April 14, 2021)

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RESEARCH INTERESTS Infinite-dimensional optimization  
Game theory and theoretical economics  
Discrete optimization  
Operations management  
Video games

### EMPLOYMENT **University of British Columbia**

Assistant Professor  
September 2019 –.

### **University of Chicago**

Associate Professor of Operations Management  
July 2016 – August 2019.  
Assistant Professor of Operations Management  
July 2010 – July 2016.

### **Colibri Learning Foundation (colibrilearning.org)**

Curriculum development and discussion leadership training (volunteer positions)  
2005 – present.

### EDUCATION **University of British Columbia**

Ph.D., Sauder School of Business, 2010

- Dissertation Topic: “Computing solution concepts in games with integer decisions”
- Advisor: Maurice Queyranne

B.A. (honors), Mathematics, 2005

### **University of Guelph**

B. A. (honors), Sociology and Economics, (transferred to UBC in September 2002)

RESEARCH PAPERS (the labels that follow, e.g., (J-3) refer to the projects below.)

*Infinite-dimensional optimization:* (J-4), (J-11), (J-12), (J-13), (J-14), (J-15), (R-2), (W-6), (W-4)

*Discrete optimization:* (J-6), (J-7), (J-16), (J-17), (W-6)

*Optimization theory (other):* (J-5), (W-5)

*Game theory and theoretical economics:* (J-6), (J-8), (J-9), (J-16), (J-17), (C-1), (W-5), (S-2), (R-1)

*Operations management:* (J-3), (R-3), (W-2), (W-3)

Video games: (J-2), (S-1), (W-1)

### Published or forthcoming journal publications

- (J-1) Y. Feng, R. Caldentey, and C.T. Ryan. Learning customer preferences from personalized assortments. To appear in *Operations Research*.
- (J-2) L. Sheng, M. Nagarajan, C.T. Ryan, Y. Cheng and C. Tong. Incentivized actions in freemium games. To appear in *Manufacturing & Service Operations Management*.
- (J-3) T. Dai, R. Ke, and C.T. Ryan. Incentive design for marketing-operations multitasking. To appear in *Management Science*.
- (J-4) C.T. Ryan and R.L. Smith. Dual-based methods for solving infinite-horizon nonstationary deterministic dynamic programs. To appear in *Mathematical Programming*.
- (J-5) X. Chen, S. He, B. Jiang, C.T. Ryan, and T. Zhang (2021). The discrete moment problem with nonconvex shape constraints. *Operations Research*, Volume 69, Issue 1, pages 279-296.
- (J-6) A. Basu, C.T. Ryan, and S. Sankaranarayanan (2021). Mixed-integer bilevel representability. *Mathematical Programming*, Issue 185, Pages 163-197.
- (J-7) A. Basu, K. Martin, C.T. Ryan, and G. Wang (2019). Mixed-Integer Linear Representability, Disjunctions, and Chvátal Functions—Modeling Implications. *Mathematics of Operations Research*, Volume 44, Issue 4, Pages 1145–1509.
- (J-8) R. Ke and C.T. Ryan (2018). A general solution method for moral hazard problems. *Theoretical Economics*, Volume 13, Issue 3, Pages 1425–1481.
- (J-9) R. Ke and C.T. Ryan (2018). Monotonicity of optimal contracts without the first order approach. *Operations Research*, Volume 66, Issue 4, Pages 1101-1118.
- (J-10) Y. Ding, D. Ge, S. He and C.T. Ryan (2018). A non-asymptotic approach to analyzing kidney exchange graphs. *Operations Research*, Volume, Issue 4, Pages 918-935.
- (J-11) C.T. Ryan, R.L. Smith, and M. Epelman (2018). A simplex method for uncapacitated pure-supply infinite network flow problems. *SIAM Journal on Optimization*, Volume 28, Issue 3, Pages 2022-2048.
- (J-12) A. Basu, K. Martin and C.T. Ryan (2017). Strong duality and sensitivity analysis in semi-infinite linear programming. *Mathematical Programming*, Volume 26, Issue 1, Pages 451–485.
- (J-13) K. Martin, C.T. Ryan and M. Stern (2016). The Slater conundrum: Duality and pricing in infinite dimensional optimization. *SIAM Journal on Optimization*, Volume 26, Issue 1, Pages 111–138.
- (J-14) A. Basu, K. Martin, and C.T. Ryan (2014). Projection: A unified approach to semi-infinite linear programs and duality in convex programming. *Mathematics of Operations Research*. Volume 40, Issue 11, Pages 146–170.
- (J-15) A. Basu, K. Martin, and C.T. Ryan (2013). On the sufficiency of finite support duals in semi-infinite linear programs. *Operations Research Letters*, Volume 42, Issue 1, pages 16–20.
- (J-16) M. Köppe, C.T. Ryan, and M. Queyranne (2011). Rational generating functions and integer programming games. *Operations Research*, Volume 59, Number 1, Pages 1445–1460.
- (J-17) M. Köppe, M. Queyranne and C.T. Ryan (2010). Parametric integer programming algorithm for bilevel mixed integer programs. *Journal of Optimization Theory and Applications*, Volume 146, Number 1, Pages 137–150.

### Published peer-reviewed conference proceedings

- (C-1) C.T. Ryan, A. X. Jiang and K. Leyton-Brown (2010). Computing pure strategy Nash equilibria in compact symmetric games. *Proceedings of the 2010 ACM-EC conference: Electronic Commerce*, Pages 75–85.

#### **Under revision**

- (R-1) Y.K. Che, J. Kim, F. Kojima, and C.T. Ryan. Characterizing Pareto Optima: Sequential Utilitarian Welfare Maximization. Revise and Resubmit *Econometrica*.
- (R-2) A. Ghate, C.T. Ryan, and R.L. Smith. A simplex method for countably-infinite linear programs. Minor revision at *SIAM Journal on Optimization*.
- (R-3) H.-S. Ahn, C.T. Ryan, J. Uichanco, and M. Zhang. On the performance of certainty equivalent pricing. Major revision at *Management Science*

#### **Submitted papers**

- (S-1) C.T. Ryan, L. Sheng, and X. Zhao. Selling enhanced attempts.
- (S-2) S. Kiatsupaibul, G. Pedrielli, C.T. Ryan, R.L. Smith, and Z.B. Zabinsky. Monte Carlo fictitious play for finding a Nash equilibrium of an identical interest game.

#### **Work in progress**

- (W-1) O. Hanguir, W. Ma, and C.T. Ryan. Designing optimal loadouts.
- (W-2) H.-S. Ahn, C.T. Ryan, J. Uichanco, and M. Zhang. Valuing influence.
- (W-3) J. Han, C.T. Ryan, and M. Zhang. Capacity planning under costly forecasting.
- (W-4) A. Ghate and R.L. Smith. Primal-dual algorithm for infinite-horizon nonstationary Markov decision processes.
- (W-5) R. Ke and C.T. Ryan. A penalty function approach to necessary optimality conditions in bilevel optimization.
- (W-6) M.A. Epelman, C.T. Ryan, and R.L. Smith. Minimum spanning trees in infinite graphs.

#### **GRANTS, HONORS AND AWARDS**

Sauder School of Business, Junior Faculty Research Award, 2020

Sauder School of Business Exploratory Research Grant, 2020-2022

Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant, 2020-2025

Faculty Excellence Award for teaching in the Evening and Weekend MBA program, 2018

Natural Sciences and Engineering Research Council of Canada (NSERC) Postgraduate Scholarship, 2005-2009

Shelby L. Brumelle Memorial Scholarship, 2008-2009

E. D. MacPhee Memorial Fellowship, 2005-2009

NSERC Undergraduate Student Research Award, 2004

Chancellor's Entrance Scholarship, University of British Columbia, 2002-2005

Canada Post Corporation Scholarship, 1998-2001

Board of Governor's Scholarship, University of Guelph, 1998-2001

Governor General Bronze Medal, 1998. Top graduating student from Penticton Secondary School.

## PRESENTATIONS

### Invited seminars

2021: Arizona State University, UBC (Institute for Applied Mathematics), Shanghai Jiao Tong University (scheduled)

2020: CMU Tepper, UBC (Vancouver School of Economics), UBC (Sauder)

2019: Washington University in Saint Louis, UT Austin, University of Florida, Chinese Academy of Science, Central University of Finance and Economics, Beijing Normal University, Rice, Columbia (joint IEOR-DRO)

2018: University of Toronto (Rotman), Johns Hopkins (Carey), Harvard Business School, Chinese Academy of Science (Institute for Computational Mathematics), Hong Kong Baptist University (Economics), Minzu University, University of Wisconsin-Madison (Business School and Industrial Engineering), Duke Fuqua, University of Michigan (Ross and IOE), UCLA (Anderson), MIT (IDSS), University of Virginia (Darden), Cornell (Johnson), Wake Forest (Business School), University of British Columbia (Sauder), University of Alberta (Business School)

2017: University of Southern California (ISE), University of British Columbia (Sauder), Simon Fraser University (Mathematics), University of Chicago (Booth)

2016: University of Kansas, University of Washington (IE), University of Waterloo (Management Sciences), University of Toronto (IE), University of British Columbia

2015: Chinese University of Hong Kong (Economics), University of Alberta

2014: New York University, University of California-Irvine, Northwestern University, University of Michigan-Ann Arbor (IOE), Georgia Tech (ISyE), CMU Tepper, Shanghai University of Finance and Economics, Massachusetts Institute of Technology, Haverford College (Mathematics), University of Indiana-Bloomington (Telecommunications), University of Minnesota (ISyE), University of British Columbia-Okanagan (Mathematics)

2012: University of British Columbia, Universidad de Chile, Chinese Academy of Science

2010: University of Southern California, University of Chicago, New York University, MIT

2009: Chinese Academy of Science, Peking University, University of California-Davis

2008: University of British Columbia, Simon Fraser University, University of Washington, University of Magdeburg

### Invited conference presentations

2019: POMS (scheduled), INFORMS Annual Meeting (scheduled)

2018: INFORMS Optimization, POMS, International Symposium of Mathematical Programming (ISMP), INFORMS Annual Meeting

2017: SIAM Conference on Optimization (SIOPT), INFORMS Annual Meeting

2016: International Conference on Continuous Optimization (ICCOPT), INFORMS Annual Meeting

2015: INFORMS Annual Meeting, International Symposium of Mathematical Programming (ISMP)

2014: INFORMS Annual Meeting, Manufacturing and Services Operations Management (MSOM), SIAM Conference on Optimization (SIOPT)

2012: INFORMS Annual Meeting, ISMP

2010: Behavioral and Quantitative Game Theory, INFORMS Annual Meeting

2009: ISMP, American Mathematical Society (AMS) Spring Western Section Meeting, San Francisco, 25–26 April 2009.

2008: American Mathematical Society (AMS) Fall Western Section Meeting

TEACHING  
EXPERIENCE

**University of British Columbia**

*Instructor* **Sep-Oct 2020**  
Operations (BASC 550). PMBA (professional MBA) required course.

*Instructor* **Jan-Mar 2020, Sep-Oct 2020**  
Optimization theory and applications (COMM 616). PhD course.

*Instructor* **Oct-Dec 2019, Mar-April 2021**  
Operations (BASC 550). MBA required course.

*Instructor* **Oct-Dec 2019, 2020**  
Supply chain management (BASC 523) MM dual degree required course.

*Instructor* **May-June 2009**  
Logistics and Operations Management (COMM 399). Undergraduate.

*Instructor* **Jan - Apr, 2008**  
Applications of Statistics in Business (COMM 291). Undergraduate.

**University of Chicago**

*Instructor* **Jan-Mar, Sep-Dec 2017, Apr-June 2019**  
Managing Service Operations (BUS 40110) MBA program.  
• Developed case materials in collaboration with multiple companies for course projects in the course, including with former Booth students with startups.

*Instructor* **Mar-June 2011, 2012, 2013, 2015 Sep-Dec, 2013, 2015**  
Operations Management: Business Process Fundamentals (BUS 40000) MBA program.

*Instructor* **Mar-Apr 2016**  
Combinatorial Optimization (BUS 40610) PhD program.

*Instructor* **Jan-Mar 2012, Apr-June 2014, 2019**  
Optimization in Topological Vector Spaces (BUS 36904 Special Topics in Management Science).

PhD program.

## CASE STUDIES

### **In development**

ezza Nails (with Kim Marsh and Lindsey Joseph)

Advocate Children's Sleep Network (with Darius Loghmanee, Matthew Balog, and Noah Hamilton)

VOCEL: Early Childhood Education in Chicago (with Kelly Powers and Victoria Lansdown)

The Minte: Hotel-Style Housekeeping (with Kat Wilson and Melanie Jackson)

BrewBike (with Randy Paris and Hariharan Mahadevan)

Kumwe Harvest: Social enterprise in Rwanda (with Cyril Khamsi and Alex Sanderson)

Susgrainable (with Jeffrey Ma)

## SERVICE

### *Editorial positions*

Associate editor at *Operations Research Letters*

Associate editor at *Management Science*

### *Program Committees*

ACM Conference on Economics and Computation 2018 (ACM-EC'18)

### *Ad-hoc reviewer*

Operations Research, Management Science, Manufacturing & Service Operations Management, Production and Operations Management, Mathematics of Operations Research, Econometrica, Games and Economic Behavior, Mathematical Programming, SIAM Journal on Optimization, INFORMS Journal of Computing, European Journal of Operational Research, International Journal of Game Theory, Networks, Journal of Mathematical Economics, Operations Research Letters, Economics Letters, Journal of Combinatorial Optimization, Workshop in Networks and Economics (WINE), Optimization Letters, Healthcare Management Science

*NSF panelist* (2015)

*NSERC Discovery Grant reviewer* (2017, 2018)

### *PhD students (advisor/co-advisor role)*

Jiangze Han (UBC)

### *PhD committee member*

Vishal Ahuja (Booth), Xiao Wu (Booth), Angelo Mancini (Booth), Matt Stern (Booth), Lifei Sheng (UBC), Yifan Feng (Booth), Mengzhenyu Zhang (UMichigan Ross), Lisa Hillas (Booth)

### *Academic mentor to undergraduate students (all students from Shanghai University of Finance and Economics, Fudan University, or Shanghai Jiaotong University)*

Runshan Fu (current PhD student at CMU in MIS), Mengzhenyu Zhang (current PhD student at Michigan Ross in OM), Jiding Zhang (current PhD student at Wharton in OM), Teng Zhang (current PhD student at Stanford MS&E), Wenjia Ba (current PhD student at Stanford GSB in OM), Tongxin Zhou (current PhD student at University of Washington in MIS), and Ren Yi (current PhD student at Columbia University in IEOR)

*Conference organization*

Mixed Integer Programming Workshop (local committee, hosted at Gleacher Center, University of Chicago, 2015)