Christopher Thomas Ryan (January 17, 2017)

CONTACT INFORMATION

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RESEARCH INTERESTS

theory of optimization, algorithmic game theory, contract theory, digital economy, health care

EMPLOYMENT

University of Chicago, Chicago, IL, USA

Associate Professor of Operations Management
July 2016 – present.
Assistant Professor of Operations Management
July 2010 – July 2015.

EDUCATION

University of British Columbia (UBC), Vancouver, British Columbia, Canada

Ph.D., Sauder School of Business, June 2010

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

B.A. (honors), Mathematics, May 2005

RESEARCH PAPERS

Published

A. Basu, K. Martin, C.T. Ryan, and G. Wang (2017). Mixed integer representability, disjunctions and elimination. Accepted in in *IPCO conference: Integer Programming and Combinatorial Optimization*.

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, pp 451–485.

K. Martin, C.T. Ryan and M. Stern (2016). The Slater conundrum: Duality and pricing in infinite dimensional optimization. *SIAM Journal of Optimization*. Volume 26, Issue 1, pages 111–138.

Y. Ding, D. Ge, S. He and C.T. Ryan (2015). A non-asymptotic approach to analyzing kidney exchange graphs. *Proceedings of the 16th ACM conference on Economics and Computation*.

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.

A. Basu, K. Martin, and C.T. Ryan (2013). On the sufficiency of finite support duals in semi-infinite linear programs. Volume 42, Issue 1, January 2014. *Operations Research Letters*. Volume 42, Issue 1, pages 16–20.

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.

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.

C.T. Ryan, A. X. Jiang and K. Leyton-Brown (2010). Computing pure strategy Nash equilibria in compact symmetric games. *Proceedings of the 11th ACM Conference in Electronic Commerce*, pages 63–72.

Working papers

R. Ke and C.T. Ryan (2015). A general solution method for moral hazard problems. Revise and resubmit at *Theoretical Economics*.

Y. Ding, D. Ge, S. He and C.T. Ryan (2015). A non-asymptotic approach to analyzing kidney exchange graphs. Second round of revisions at *Operations Research*. (Preliminary version accepted at EC'15)

R. Ke and C.T. Ryan (2015). Monotonicity of optimal contracts without the first order approach. *Submitted*.

M. Nagarajan, C.T. Ryan, and L. Sheng (2016). Incentivized actions in freemium games: policies and implications. *Submitted*.

M. Köppe, M. Queyranne and C.T. Ryan (2013). Implementability of ordinal preferences.

Ongoing research projects

C.T. Ryan, R.L. Smith, and M. Epelman. A simplex method for uncapacitated infinite network flow problems.

C.T. Ryan, R.L. Smith, and A. Ghate. An abstract simplex method for countably infinite linear programs.

X. Chen, S. He, B. Jiang, C.T. Ryan, and T. Zhang. Distribution-free robust optimization with shape constraints.

R. Ke and C.T. Ryan. Infinite-dimensional duality and moral hazard: Characterization and continuity of optimal contracts.

R. Ke and C.T. Ryan. A penalty function approach to necessary optimality conditions in bilevel optimization.

C.T. Lam, C.T. Ryan and M.X. Wu. Managing competition in freemium games: The downside of "pay" in the land of the "free". (formerly titled: Optimal release of premium features: balancing growth and monetization in freemium apps)

C.T. Ryan and Y. Tang. Managing interactions between free and pay users of freemium software.

C.T. Lam and C.T. Ryan and S. He. Managing the size and growth of a social network: Exclusivity and habit formation.

Teaching Experience

University of Chicago

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

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

University of British Columbia

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

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

Lecturer **Jan-April 2009**
Optimization Theory and Applications (COMM 616). (12 classroom hours)
Topics in discrete optimization: Computational complexity, shortest path algorithms, cutting planes.

Lecturer **Sep 2008**
Mathematics refresher: Master of Management in Operations Research program. (9 classroom hours)

Presentations

Invited seminars

2016: University of Kansas, University of Washington, University of Waterloo, University of Toronto, University of British Columbia

2015: Chinese University of Hong Kong, University of Alberta

2014: New York University, University of California-Irvine, Northwestern University, University of Michigan-Ann Arbor, Georgia Tech, Carnegie Mellon University, Shanghai University of Finance and Economics, Massachusetts Institute of Technology, Haverford College, University of Indiana-Bloomington, University of Minnesota, University of British Columbia-Okanagan

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

2010: University of Southern California, University of Chicago, New York University, Massachusetts Institute of Technology

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

2005: University of British Columbia (Mathematics)

Invited conference presentations

2016: International Conference on Continuous Optimization (ICCOPT) (invited)

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), International Conference on Operations Research and Enterprise Systems

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: AMS Fall Western Section Meeting

Organized Sessions

"Infinite dimensional optimization: Theory and applications" at SIAM Conference on Optimization in San Diego, May 2014 (2 sessions, organized with Matt Stern).

"Bilevel and multiobjective optimization" at the International Symposium on Mathematical Prgramming (ISMP 2009) in Chicago, August 2009.

Tutorials/Workshops

"The Art of Research". INFORMS PhD Student Colloquium, October 2015.

"The Art of Research". Chinese University of Hong Kong, Department of Economics, June 2015.

"The Art of (Operations Management) Research". Shanghai University of Finance and Economics, March 2015.

"Infinite dimensional optimization". Shanghai University of Finance and Economics, July 2014.

"Optimization in topological vector spaces". Chinese Academy of Science, Institute of Computational Mathematics and Scientific/Engineering Computing, July 2012.

"Linear programming for computer scientists". Game Theory and Decision Theory mini-course, University of British Columbia, Department of Computer Science, March – April 2009.

"Integer points in Polyhedra". Discrete mathematics mini-course, University of British Columbia, Department of Mathematics, April – May 2008.

Other research experience

University of British Columbia

Research Assistant **May - Aug, 2005**

Developed Maple package for enumerating symmetric functions.
Supervisor: Stephanie Van Willigenburg (UBC Mathematics)

NSERC Undergraduate Student Research Award **May - Aug, 2004**
Implemented algorithms for enumerating forbidden configurations (extremal set theory).
Supervisor: Richard Anstee (UBC Mathematics)

Pacific Agricultural Research Centre (Agriculture Canada), Summerland, British Columbia

Research Assistant **May-Aug, 1999-2003**
Set-up and maintenance of field experiments, collection and analysis of data.

Honors and Awards

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.

Service

Ad-hoc reviewer
Operations Research, Management Science, Mathematical Programming, SIAM Journal of Optimization, INFORMS Journal of Computing, European Journal of Operational Research, International Journal of Game Theory, Operations Research Letters, Journal of Combinatorial Optimization, Workshop in Networks and Economics (WINE), Optimization Letters

NSF panelist (2015)

Committee member (PhD advising, at Chicago Booth unless indicated otherwise)
Vishal Ahuja, Xiao Wu, Angelo Mancini, Matt Stern, Lifei Sheng (UBC)

Academic mentor to undergraduate students (all students from Shanghai University of Finance and Economics, Fudan University, or Shanghai Jiaotong University)
Runshan Fu (PhD student at CMU in MIS), Zhenyu Zhang Meng (PhD student at Michigan Ross in OM), Jiding Zhang (PhD student at Wharton in OM), Teng Zhang, Wenjia Ba, Tongxin Zhou, Xiong Yi, Shixi Hu

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