Yuan Zhou

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Academic Appointments

Aug. 2017–	Assistant Professor (tenure-track), Department of Mathematics, University of Kentucky

Education

2012–2017	University of California, Davis, USA Ph.D. in Applied Mathematics Advisor: Matthias Köppe
2008–2012	École Centrale Paris, France Master's degree in Engineering Major: Applied Mathematics, Minor: Finance and Strategy
2011–2012	Université Paris-Dauphine, France Master of Science, Applied Mathematics: Actuarial Science Member of L'institut des Actuaires français
2006–2008	Lycée Hoche, Classe préparatoire MPSI-MP*, Versailles, France Specialized in Mathematics, Physics and Informatics
2003–2006	High School Affiliated to Fudan University, Shanghai, China

Academic Honors

May 2016	Honorable Mention in the 2016 Mixed Integer Programming Workshop poster competition
Oct. 2005	First prize in the Chinese National Mathematical Olympiad
2003, 2004, 2005	First prize in the Chinese National Olympiad in Informatics
Aug. 2004	Bronze medal in China Girls Mathematical Olympiad

Funded Projects

2019–2020 "2019 Mixed Integer Programming Workshop", PI: Yuan Zhou, Office of Naval Research, Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science and Technology; start date: 08/01/2019, end-date: 07/31/2020; awarded $6,000.

Scientific Publications

Published Papers and Papers Accepted for Publication

[1] Sattar Vakili, Qing Zhao, and Yuan Zhou, *Time-varying stochastic multi-armed bandit problems*, Proceedings of the 48th IEEE Asilomar Conference on Signals, Systems, and Computers, November 2014, pp. 2103–2107, https://doi.org/10.1109/ACSSC.2014.7094845.

[2] Matthias Köppe and Yuan Zhou, *An electronic compendium of extreme functions for the Gomory–Johnson infinite group problem*, Operations Research Letters **43** (2015), no. 4, 438–444, https://doi.org/10.1016/j.orl.2015.06.004.

[3] Matthias Köppe and Yuan Zhou, *Toward computer-assisted discovery and automated proofs of cutting plane theorems*, Combinatorial Optimization: 4th International Symposium, ISCO 2016, Vietri sul Mare, Italy, May 16–18, 2016, Revised Selected Papers (Raffaele Cerulli, Satoru Fujishige, and A. Ridha Mahjoub, eds.), Springer International Publishing, Cham, 2016, pp. 332–344, https://doi.org/10.1007/978-3-319-45587-7_29, ISBN 978-3-319-45587-7.

[4] Chun Yu Hong, Matthias Köppe, and Yuan Zhou, *Software for cut-generating functions in the Gomory–Johnson model and beyond*, Mathematical Software – ICMS 2016: 5th International Conference, Berlin, Germany, July 11–14, 2016, Proceedings (Gert-Martin Greuel, Thorsten Koch, Peter Paule, and Andrew Sommese, eds.), Springer International Publishing, 2016, pp. 284–291, https://doi.org/10.1007/978-3-319-42432-3_35, ISBN 978-3-319-42432-3.

[5] Matthias Köppe and Yuan Zhou, *New computer-based search strategies for extreme functions of the Gomory–Johnson infinite group problem*, Mathematical Programming Computation **9** (2017), no. 3, 419–469, https://doi.org/10.1007/s12532-016-0115-9.

[6] Matthias Köppe and Yuan Zhou, *On the notions of facets, weak facets, and extreme functions of the Gomory–Johnson infinite group problem*, Integer Programming and Combinatorial Optimization: 19th International Conference, IPCO 2017, Waterloo, ON, Canada, June 26–28, 2017, Proceedings (Friedrich Eisenbrand and Jochen Koenemann, eds.), Springer International Publishing, Cham, 2017, pp. 330–342, https://doi.org/10.1007/978-3-319-59250-3_27, ISBN 978-3-319-59250-3.

[7] Chun Yu Hong, Matthias Köppe, and Yuan Zhou, *Equivariant perturbation in Gomory and Johnson's infinite group problem (V). Software for the continuous and discontinuous 1-row case*, Optimization Methods and Software **33** (2018), no. 3, 475–498, https://doi.org/10.1080/10556788.2017.1366486.

[8] Matthias Köppe and Yuan Zhou, *Equivariant perturbation in Gomory and Johnson's infinite group problem. VI. The curious case of two-sided discontinuous minimal valid functions*, Discrete Optimization **30** (2018), 51–72, https://doi.org/10.1016/j.disopt.2018.05.003.

[9] Robert Hildebrand, Matthias Köppe, and Yuan Zhou, *On perturbation spaces of minimal valid functions: Inverse semigroup theory and equivariant decomposition theorem*, Integer Programming and Combinatorial Optimization. IPCO 2019 (A. Lodi and V. Nagarajan, eds.), Lecture Notes in Computer Science, vol. 11480, Springer, Cham, 2019, https://doi.org/10.1007/978-3-030-17953-3_19, ISBN 978-3-030-17952-6.

[10] Matthias Köppe and Yuan Zhou, *Facets, weak facets, and extreme functions of the Gomory–Johnson infinite group problem*, to appear in Mathematical Programming, 25+32 pages, 2020, arXiv:1911.06199.

Submitted Papers

[11] Robert Hildebrand, Matthias Köppe, and Yuan Zhou, *Equivariant perturbation in Gomory and Johnson's infinite group problem. VII. Inverse semigroup theory, closures, decomposition of perturbations*, submitted, 61 pages, 2018, arXiv:1811.06189.

[12] Matthias Köppe and Yuan Zhou, *All cyclic group facets inject*, 2019, arXiv:1807.09758, submitted to Mathematics of Operations Research.

Mathematical Software

[13] Chun Yu Hong, Matthias Köppe, and Yuan Zhou, *SageMath program for computation and experimentation with the* 1*-dimensional Gomory–Johnson infinite group problem*, 2014–2019, available from https://github.com/mkoeppe/cutgeneratingfunctionology.

[14] Yuan Zhou, *Contributions to SageMath in the form of 12 peer-reviewed change tickets, #25095, #15729, #21608, #20126, #18838, #18763, #18764, #18732, #16907, #18685, #18286, #17714*.

[15] Peijun Xiao, Zeyi Wang, Yuan Zhou, and Matthias Köppe, *sage-numerical-interactive-mip: Interactive mixed integer linear programming solver. version 0.2*, 2020, `https://doi.org/10.5281/ZENODO.3627400`.

Papers in preparation

[16] Matthias Köppe and Yuan Zhou, *Computer-assisted discovery and automated proofs of cutting plane theorems in the Gomory–Johnson and superadditive lifting models*, manuscript, 2016, 23 pages.

[17] Robert Hildebrand, Matthias Köppe, and Yuan Zhou, *Equivariant perturbation in Gomory and Johnson's infinite group problem. VIII. Grid-free extremality test—general algorithm and implementation*, manuscript, 2019.

Teaching Experience

2019/2020	*MA427G Financial Mathematics*
	MA416G Introduction to Optimization
	MA415G Combinatorics and Graph Theory
2018/2019	*MA714 Topics in Discrete Math: Discrete and Mixed-Integer Optimization*
	MA416G Introduction to Optimization
	MA417G Decision Making Under Uncertainty
2017/2018	*MA416G Introduction to Optimization*
	MA417G Decision Making Under Uncertainty
	MA320 Introductory Probability
2016/2017	*Combinatorics* (instructor, Associate in Mathematics)
	Calculus: Differential Calculus (lead teaching assistant)
	Linear Algebra (lead teaching assistant)
	Mathematics and Computers (teaching assistant)
	Mathematics for Data Analytics & Decision Making (teaching assistant)
2015/2016	*Calculus: Partial Derivatives and Series* (teaching assistant)
2014/2015	*Mathematical Optimization* (teaching assistant)
2013/2014	*Linear Algebra* (teaching assistant)
2012/2013	*Number Theory* (teaching assistant)
	Linear Algebra (teaching assistant)

Advising and Mentoring

Spring/Summer 2020	Philip Meersman Undergraduate individual study
Summer 2018	Benton Girdler J.C Eaves Summer Research Award
Winter/Spring 2017	Peijun Xiao, Shuidie Yao Undergraduate research (co-advised with Matthias Köppe)
Summer 2015–2016	Zeyi Wang, Peijun Xiao Undergraduate research (co-advised with Matthias Köppe)
Winter/Spring 2015	Masumi Sugiyama Undergraduate research (co-advised with Matthias Köppe)

Refereeing Activities

I have acted as a referee for the following journals:

Mathematical Programming Series A and B

Mathematics of Operations Research

SIAM Journal on Optimization

and the following conferences:

Mixed Integer Programming Workshop

Integer Programming and Combinatorial Optimization Conference

Professional Service

2019-2020	Co-chair of the program committe for MIP 2020 feat. DANniversary
2018-2019	Member of the program committee for MIP 2019
Oct. 26, 2016	Organizer of the *Sage Day* at UC Davis Mathematics
Spring 2014	Calculus room coordinator at UC Davis Mathematics

Scientific Activities

Conference Talks

Oct. 23, 2019 *Shorter automatic extremality proofs for cut-generating functions*, INFORMS Annual Meeting, Seattle, WA, USA

May 23, 2019 *On perturbation spaces of minimal valid functions: Inverse semigroup theory and equivariant decomposition theorem*, IPCO Conference, Ann Arbor, MI, USA

Jan. 6, 2019 *cutgeneratingfunctionology: Python software for multi-row general purpose cuts for MILPs*, INFORMS Computing Society Conference, Knoxville, TN, USA

July 3, 2018 *All finite group complexity injects*, International Symposium on Mathematical Programming, Bordeaux, France

Aug. 4, 2017 *Practical semialgebraic geometry for computer-assisted proofs*, SIAM Conference on Applied Algebraic Geometry, Atlanta, GA, USA

Apr. 8–9, 2017 *Parameter space analysis for algebraic Python programs in SageMath*, Women in Sage Math at AWM Research Symposium, Los Angeles, CA, USA

Jan. 15, 2017 *Toward computer-assisted discovery and automated proofs of cutting plane theorems*, INFORMS Computing Society Conference, Austin, TX, USA

Nov. 15, 2016 *Computer-assisted discovery and automated proofs of cutting plane theorems*, INFORMS Annual Meeting, Nashville, TN, USA

July 11, 2016 *Parameter space analysis for algebraic Python programs in SageMath*, International Congress on Mathematical Software, Berlin, Germany

July 13, 2015 *Extreme functions for the Gomory–Johnson infinite group problem*, International Symposium on Mathematical Programming, Pittsburgh, PA, USA

Seminar Talks

Mar. 5, 2020 *Semialgebraic parametric analysis and automatic theorem proving for cut-generating functions*, ISE invited seminar series, Virginia Tech, VA, USA

Oct. 17, 2019 *Parameter space analysis and automatic theorem proving in SageMath*, Applied Math Seminar, University of Kentucky, KY, USA

Nov. 12, 2018 *Integer optimization, cutting planes, and approximation theory*, Discrete CATS Seminar, University of Kentucky, KY, USA

June 8, 2018 — *Cut-generating functions in the Gomory–Johnson model*, Discrete Optimization Seminar, EPFL, Switzerland

July 8, 2016 — *Extreme functions for the Gomory–Johnson infinite group problem*, Seminar of the Institute of Mathematical Optimization, University of Magdeburg, Germany

July 5, 2016 — *Toward computer-assisted discovery and automated proofs of cutting plane theorems*, Applied Geometry and Discrete Mathematics Research Seminar, TU Munich, Germany

Dec. 18, 2014, May 15, July 6, 2015 — *Extreme functions for the Gomory–Johnson infinite group problem*, Optimization Seminar, University of California, Davis, CA, USA

Academic visits

Oct. 15–19, 2018 — IMA COIN-OR Workshop, University of Minnesota, USA

June 1–30, 2018 — Discrete Optimization Group, EPFL, Switzerland

Apr. 3–8, 2018 — SageMath Coding Sprint on Optimization and Polyhedral Geometry, IMA, University of Minnesota, USA

Feb. 19–26, 2017 — Zuse Institute Berlin, Germany

Poster Presentations

June 19, 2017, June 26, 2017 — *Two-sided discontinuous cut-generating functions in the Gomory–Johnson model*, MIP workshop 2017, Montréal, Canada; and IPCO 2017, Waterloo, Canada

May 23, 2016 — *Toward computer-assisted discovery and automated proofs of cutting plane theorems*, MIP workshop 2016, Coral Gables, FL, USA

Feb. 27, 2016 — *Software and computer-based search for extreme functions of the Gomory–Johnson infinite group problem*, Annual Math. Association of America Golden Meeting, Davis, CA, USA

June 1, 2015 — *Software and computer-based search for extreme functions of the Gomory–Johnson infinite group problem*, MIP workshop 2015, Chicago, IL, USA

Outreach

Nov. 2019 — Volunteer, Julia Robinson Mathematics Festival

Courses Taken

Summer Schools

June 20–July 1, 2016	Mixed Integer Nonlinear Programming: Theory, algorithms and applications, IMUS–MSRI Summer Graduate School, Seville, Spain
July 4–12, 2015	Summer School on Polyhedral Combinatorics, Carnegie Mellon University, Pittsburgh, PA, USA

Graduate Level Coursework

UC Davis	Analysis (3 quarters), Applied Mathematics (3 quarters), Probability Theory (3 quarters), Optimization (3 quarters), Numerical Methods, Matrix Computations, Analysis of Algorithms, Estimation and Detection of Signals in Noise
École Centrale Paris	Financial Mathematics (various courses), Numerical Methods for Finance, Advanced Statistics (various courses), Advanced Database Systems, Life Insurance, Non-life Insurance, Reinsurance, etc.
Univ. Paris-Dauphine	Actuarial Risk Theory, Asset Liability Management, Model Calibration in Finance and Actuarial Science, Economics of Risk and Insurance, Accounting, Introduction to Insurance (various courses), Introduction to Solvency II Directive, etc.

Work Experience

Apr. 2012–Aug. 2012	Actuarial Intern at AXA France, in Life Insurance – Individual Protection Products team. Project: *Impact of medical underwriting in individual protection insurance*. Supervisor: Céline Finas
Oct. 2011–Mar. 2012	Risk Management Analyst Intern at BNP Paribas, in Group Risk Management – Investments and Markets team. Project: *Economical scenario modeling*. Supervisor: Thomas Haudecoeur
Mar. 2011–Aug. 2011	IT Consulting Intern at ANEO, in software development team. Project: *Speed up trading*. Supervisor: Nicolas Dufaur
Sep. 2010–Mar. 2011	Risk Management Analyst Intern at Amadeus France, in Payment Product Definition team. Project: *Credit card risk management study – Fraud screening*. Supervisor: Cyril Bele
June 2009–July 2009	Summer Blue Collar Intern at PSA Peugeot Citroën, on the engine assembly line. Supervisor: Yoann Delzongle

Personal

Citizenship	China
Languages	Chinese (native), English (fluent), French (fluent), Japanese (basic)