Vishal Gupta

http://faculty.marshall.usc.edu/Vishal-Gupta/

CONTACT INFORMATION	Marshall School of Business 3670 Trousdale Parkway, BR 401 G Los Angeles, CA 90089	guptavis@usc.edu Google Scholar YouTube

RESEARCH INTERESTS

Data-driven optimization in settings with scarce data or high-dimensional uncertainty. Applications in prescriptive analytics, pricing, and causal inference.

EMPLOYMENT

Marshall School of Business, Los Angeles, CA
Associate Professor (w. tenure) of Data Sciences and Operations — **2021 - Present**
Assistant Professor of Data Sciences and Operations — 2014 - 2021

Analytics Operations Engineering, Inc., Boston, MA — **Summer 2011**
Summer Associate

Barclays Capital, New York, NY — **2005 - 2009**
New York Head of Commodities Tactical Modeling — 2008 - 2009
Manager, Quantitative Analytics Commodities Modeling Group — 2007 - 2008
Analyst, Quantitative Analytics Commodities Modeling Group — 2005 - 2007

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA — **2009 - 2014**
Ph.D. in Operations Research
- Thesis: Data-Driven Models for Uncertainty and Behavior
- Advisor: Prof. Dimitris Bertsimas

University of Cambridge, Cambridge, England — **2004 - 2005**
Part III Mathematics Tripos
- Graduated with "Distinction"
- Essay: Hedging Financial Derivatives as a Differential Game

Yale University, New Haven, CT — **2000 - 2004**
B.A. in Mathematics and Philosophy
- Graduated with Honors, Magna Cum Laude
- Phi Beta Kappa

HONORS / AWARDS

Deans Award for Research Excellence — **2020**
Awarded to two faculty members at USC Marshall whose research meets the highest aspirations of the Marshall School and USC. Criteria for award include an exceptional publishing record, recognized scholarship outside the university, and significant research impact across their respective fields.

Management Science Meritorious Service Award — **2018, 2019, 2020**
Awarded to a select group of reviewers for consistently writing "timely, unbiased, and thoughtful" referee reports.

Pierskalla Best Paper Competition Finalist — **2018**
Awarded by the Health Applications Society of INFORMS for the paper

"Maximizing Intervention Effectiveness" (*with B.R. Han, S.H. Kim and H. Paek)*. INFORMS selects 3-5 finalists each year to recognize research excellence in the field of health care management science.

Service Science Best Paper Competition Finalist   **2018**
Awarded by the INFORMS Service Science Section for the
paper "Value of Personalized Pricing" (*with A. Elmachtoub and M. Hamilton)*.
8 finalists are chosen each year to recognize outstanding papers in theory,
methodologies, and applications of service science.

POMS CHOM Best Paper Competition Finalist   **2018**
Awarded by the College of Healthcare Operations Management (CHOM)
for the paper "Maximizing Intervention Effectiveness" (*with B.R. Han,
S.H. Kim and H. Paek)*. CHOM selects 3-5 finalists each year to honor
outstanding papers in the field of healthcare operations management.

Evan C. Thompson Teaching and Learning Innovation Award   **2016**
Awarded for curriculum redesign of *BUAD 425: Data-Analysis for
Decision-Making*. Awarded to one Marshall faculty member per year for
developing innovative course materials, implementing new learning
pedagogies and demonstrating commitment to students' learning and success.

George Nicholson Student Paper Competition Finalist   **2013**
Awarded for the paper "Data-Driven Robust Optimization," *(with D.
Bertsimas and N. Kallus)*. The George Nicholson Prize Committee selects
approximately 8 papers each year to identify and honor outstanding papers
in the field of operations research written by students.

Best Student Paper Prize, MIT Operations Research Center   **2013**
Awarded for the paper "Robust SAA," *(with D. Bertsimas and N. Kallus)*.
Awarded to one student-authored paper each year in the MIT ORC PhD
Program, recognizing outstanding achievement in operations research.

MIT Teaching Certificate   **2013**
Issued at the completion of a semester-long, intensive course on best-practices
for teaching in higher education.

Honorable Mention, Hubway Data Visualization Challenge   **2013**
Open challenge to create a visualization for data comprising a half-million
rides on Boston's Bike-Share network *(with H. Barrigan and A. Calmon)*.

Best Student Presentation, INFORMS Financial Services Section   **2012**
Awarded for "Fitting Investor Risk Preferences to Data."

Nominated for Excellence in Teaching Award   **2012**
Awarded for teaching assistant role in the MBA Core Course "Data, Models
and Decisions" at MIT Sloan. Selected by MBA students.

Charles M. Vest Presidential Fellowship for Doctoral Studies   **2009 - 2010**
Awarded to three first-year graduate students at MIT across all fields
to support their doctoral work.

Paul Mellon Fellowship for Graduate Research   **2005**
Awarded to one graduating Yale senior to support two years of study at the
University of Cambridge, UK, in the discipline of their choice.

Timothy Dwight Masters Cup   **2004**
Awarded each year to a graduating senior who exemplifies high academic
rank, scholarly achievement, and the values of Timothy Dwight College at
Yale.

GRANTS   **CAREER: Incorporating Idiosyncratic Effects in**   (Pending)
                Decision-Making under Uncertainty through   Amount: $570,979
                Data-Pooling
                Role: Sole Principal Investigator

                Optimization in the Small Data Regime   **2017 - 2021**
                Role: Sole Principal Investigator   Amount: $221,592
                NSF Grant CMMI-1661732

                Small Data Linear Optimization   **2017 - Present**
                Role: Principal Investigator   Amount: $25,000
                Outlier Research Grant
                Institute for Outlier Research in Business (iORB), USC

PUBLICATIONS   Asterisk (*) indicates a student co-author.
                All authorship is alphabetical unless otherwise indicated.

    1. "Data-Pooling in Stochastic Optimization," with N. Kallus.
        Management Science (to appear), accepted 2020.

    2. "Value of Personalized Pricing," with A. Elmachtoub and M. Hamilton*.
        Finalist in the 2018 INFORMS Service Science Best Paper Competition.
        Accepted to 15th Conference on Web and Internet Economics (WINE), 2019.
        Management Science (to appear), accepted 2020.

    3. "Small-Data, Large-Scale Linear Optimization with Uncertain Objectives," with P.
        Rusmevichientong.
        Management Science (to appear), accepted 2019.

    4. "Maximizing Intervention Effectiveness," with B.R. Han*, S.H. Kim, and H. Paek.
        Finalist in the 2018 Pierskalla Best Paper Competition.
        Finalist in the 2018 POMS College of Healthcare Operations (CHOM) Best Paper
        Competition.
        Management Science (to appear), accepted 2019.

    5. "Near-Optimal Bayesian Ambiguity Sets for Distributionally Robust
        Optimization." (Single Author Work).
        Management Science, Vol. 65, No. 9, pp. 4242-4260, 2019.

6. "Robust Sample Average Approximation," with D. Bertsimas and N. Kallus.
   Awarded 2013 Best Student Paper MIT Operations Research Center.
   Mathematical Programming, Vol. 171, pp. 217-282, 2018.

7. "Data-Driven Robust Optimization**,"** with D. Bertsimas and N. Kallus.
   Finalist in the 2013 George Nicholson Student Paper Competition.
   Mathematical Programming, Vol. 167, pp. 235-292, 2018.

8. "A Comparison of Monte Carlo Tree Search and Mathematical Optimization for Large Scale Dynamic Resource Allocation," with D. Bertsimas, D. Griffith, M. Kochenderfer, and V. Mišić.
   European Journal of Operations Research, Vol. 263, No. 2*,* pp. 664-678, 2017.

9. "A Course on Advanced Software Tools for Operations Research and Analytics," with I. Dunning, A. King, J. Kung, M. Lubin and J. Silberholz.
   INFORMS Transaction on Education, Vol. 15, No. 2, pp. 169-179, 2015.

10. "Data-Driven Estimation in Equilibrium using Inverse Optimization," with D. Bertsimas and I. Ch. Paschalidis.
    Mathematical Programming, Vol. 153, pp. 595-633, 2015.

11. "Inverse Optimization: A New Perspective on the Black-Litterman Model," with D. Bertsimas and I. Ch. Paschalidis.
    Operations Research, Vol. 60, No. 6, pp. 1398-1403, 2012.

UNDER REVIEW

12. "Real-Time, Data-Driven COVID-19 Screening at the Greek Border: Implementation and Case-Study," with H. Bastani, K. Drakopoulos, J. Vlachogiannis, C. Hadjicristodoulou, P. Lagiou, G. Magiorkinis, D. Paraskevis, S. Tsiodras.
    Authors H. Bastani, K. Drakopoulos and V. Gupta contributed equally to the work.
    Open-Source Software: https://github.com/vgupta1/EvaTargetedCovid19Testing

WORK IN PROGRESS

13. "Learning Policy Performance in the Small-Data, Large-Scale Optimization Regime," with M. Huang and P. Rusmevichientong.

14. "Optimal Plug-In Policies for Contextual Stochastic Optimization," with N. Kallus.

15. "Learning Heterogeneous Preferences through Data-Pooling," with V. Mišić.

16. "Incorporating Idiosyncratic Effects in Contextual Stochastic Optimization," with N. Kallus.

INVITED BOOK CHAPTERS

17. "The Small-Data Optimization Regime and Inventory Management." (Single Author Work).
    Joint Learning and Optimization in Operations Management.
    Editors: Xi Chen, Stefanus Jasin, and Cong Shi.

INVITED TALKS
An asterisk (*) by a presentation below indicates that it was given by a student co-author.

"Real-Time, Targeted Covid-19 Screening at the Greek Border"
- **INFORMS Annual Meeting**, (11/2020)
- **Dean's Dialogue Webinar Series, USC Marshall,** (11/2020)
    - *https://vimeo.com/479149925*
- Guest Lecture, "IEOR 4650: Business Analytics," **Columbia University,** New York, NY (Scheduled: Nov. 2020). (Class targets Masters and PhD students)

"Decision-Making under Data Scarcity"
- Assistant Professor Research Day, **USC Marshall,** Los Angeles CA (12/2020)
- Operations Management Seminar, **USC Marshall,** Los Angeles CA (10/2020)

"*Learning Policy Performance in the Small-Data, Large-Scale Regime"*
- **INFORMS Annual Meeting**, (11/2020)*

"Data-Pooling in Stochastic Optimization"
- **INFORMS Annual Meeting**, Phoenix, AZ (11/2018)
- Joint Industrial Engineering and Operations Research and Decision, Risk and Operations Departmental Seminar, **Columbia University**, NY, New York (12/2018)
- Models and Algorithms for Sequential Decision-Making Problems Under Uncertainty Workshop, **Banff International Research Station**, Banff, Canada (1/2019)
- Southern California OR/OM Day, **UC Irvine,** Irvine, CA, (5/2019)
- Operations and Information Technology Departmental Seminar, **Stanford Graduate School of Business,** Palo Alto, CA (5/2019)
- 6th International Conference on Continuous Optimization (**ICCOPT**), Berlin, Germany (8/2019).
- Industrial and Systems Engineering Departmental Seminar, **University of Southern California,** Los Angeles, CA (9/2019)
- DSO Graduate Research Forum, **USC Marshall**, Los Angeles, CA (9/2019)
- Operations Management Departmental Seminar, **Booth School of Business at University of Chicago,** Chicago, IL (9/2019)
- **INFORMS Annual Meeting, Seattle**, WA (10/2019)
- Desautels Faculty of Management Departmental Seminar, **McGill University,** Montreal, CA (10/2019)
- Decisions, Operations and Technology Management Seminar, **UCLA Anderson School of Management,** Los Angeles, CA (11/2019)
- Guest Lecture, "IEOR 8100 Prescriptive Analytics," **Columbia University,** New York, NY (11/2019) (Class targets PhD Students)
- Technology and Operations Departmental Seminar, **University of Michigan Ross School of Business**, Ann Arbor, MI (12/2019)

"*Discrete Optimization in the Small-Data, Large-Scale Regime via Decomposition"*
- **INFORMS Annual Meeting**, Seattle, WA (10/2019)*

"*Probability Guarantees in Data-Driven Robust Optimization*"
- Guest Lecture, ISyE Reading Group, **USC Viterbi**, Los Angeles, CA (10/2019)

"Operations Research and Analytics Education" (panel speaker)
- 65th Operations Research Center Reunion, **Massachusetts Institute of Technology (MIT)**, Cambridge, MA (11/2018)

"*Optimization in the Small-Data, Large-Scale Regime*"
- 5th International Conference on Continuous Optimization (**ICCOPT**), Tokyo, Japan (8/2016). *Invited Session Chair for "Recent Advances in Data-Driven Optimization."*
- **INFORMS Annual Meeting**, Nashville, TN (11/2016)
- **INFORMS Annual Meeting**, Houston, TX (10/2017)
- DSO Graduate Research Forum, **USC Marshall**, Los Angeles, CA (12/2017)
- Operations and Logistics Division Seminar, **UBC Sauder School of Business**, Vancouver, Canada (1/2018)
- Technology and Operations Management Group Seminar, **INSEAD**, Paris, France (4/2018)
- Decision Sciences Group, **Duke Fuqua School of Business**, Durham, NC (5/2018)
- 23rd International Symposium on Mathematical Programming **(ISMP)**, Bordeaux, France (7/2018)
- 29th European Conference on Operations Research **(EURO)**, Valencia Spain (7/2018)
- Management Sciences and Operations Department Seminar, **Imperial College School of Business,** London, UK (7/2018)

"*Calibrating Uncertainty Sets in the Small-Data, Large-Scale Regime*"
- Distributionally Robust Optimization Workshop, **Banff International Research Station**, Banff, Canada (3/2018)

"*Maximizing Intervention Effectiveness*"
- **INFORMS Annual Meeting**, Nashville, TN (11/2016)*
- **MSOM** Conference, Chapel Hill, NC (6/2017)*
- **INFORMS Annual Meeting**, Houston, TX (11/2017)*
- **POMS Best Healthcare Paper Competition,** Houston, TX (5/2018)*
- **MSOM Healthcare SIG**, Dallas TX (7/2018)*
- International Conference on Stochastic Optimization **(ICSP),** Trondheim, Norway (7/2019). *Co-Chair of Mini-symposium: Doing Good with Good RO.*

"*Value of Personalized Pricing*"
- **INFORMS Annual Meeting**, Houston, TX (11/2017)*
- **POMS Annual Meeting,** Houston, TX (5/2018)*
- **INFORMS Revenue Management and Pricing (RMP) Conference,** Toronto CA (6/2018)*

"*Data-Driven Distributionally Robust Optimization*"
- Electrical Engineering Group, **USC Viterbi**, Los Angeles, CA (1/2016)

"Near-Optimal Bayesian Ambiguity Sets in Distributionally Robust Optimization"
- **INFORMS Annual Meeting**, San Francisco, CA (11/2014)
- Southern California OM/OR Conference, **UCLA** (5/2015)
- British-French-German **(BFG)** Conference on Optimization, London, UK (6/2015)
- 22nd International Symposium on Mathematical Programming (**ISMP**), Pittsburgh, PA (7/2015)
- **INFORMS Annual Meeting**, Philadelphia, PA (11/2015)

"Modeling Uncertainty in Optimization"
- DSO Graduate Research Forum, **USC Marshall**, Los Angeles, CA (2/2015)

"Data-Driven Robust Optimization"
- Conference on **Computational Management Science (CMS)**, Montreal, Canada (5/2013). *Invited Session Chair for "Robust Optimization II"*
- **MSOM Conference**, Paris, France (7/2013)
- **INFORMS Annual Meeting**, Minneapolis, MN (10/2013)
- Operations Management Seminar, **MIT Sloan School of Management**, Cambridge, MA (11/2013)
- **London Business School (LBS)**, London, UK (1/2014)
- **NYU Stern School of Business**, New York, NY (1/2014)
- **USC Marshall School of Business**, Los Angeles, CA (2/2014)
- **McCombs Business School** at University of Texas at Austin, Austin, TX (2/2014)
- Industrial and Operations Engineering at **University of Michigan**, Ann Arbor, MI (2/2014)
- **Carnegie Mellon University**, Pittsburgh, PA (2/2014)

"Inverse Optimization Approaches to Estimation"
- **21st International Symposium on Mathematical Programming (ISMP)**, Berlin, Germany (6/2012)
- **INFORMS Annual Meeting**, Phoenix, AZ (10/2012). *Invited Session Chair for "Optimization under Uncertainty."*

"Constructing Investor Risk Preferences from Data"
- **INFORMS Annual Meeting**, Phoenix, AZ (10/2012)
- **INFORMS Annual Meeting**, Minneapolis, MN (10/2013)

"Inverse Optimization: A New Perspective on the Black-Litterman Model"
- **INFORMS Annual Meeting**, Charlotte, NC (11/2011)

TEACHING   **BUAD 493: Marshall Honors Research Seminar**   **2021**
            Analytics and Operations Management
            Undergraduate
            USC Marshall School of Business
            Instructor, Course Development
            Two semester seminar to advise business honors students on conducting independent research in data science and operations that will ultimately culminate in their undergraduate thesis.

DSO 699: Foundations of Stochastic Modeling for Prescriptive Analytics and Operations Management   **2021**
PhD and Graduate Students
USC Marshall School of Business
Instructor, Course Development
New, core class in the Operations Management PhD Program. Covers fundamental results in probability theory, concentration of measure, convergence theorems with applications in data-driven operations management and prescriptive analytics.

DSO 699: Workshop on Expositional Writing in Mathematics   **2021**
PhD and Graduate Students
USC Marshall School of Business
Instructor, Course Development
New, core class in the Operations Management PhD Program. Course helps students focus on best-practices when writing mathematics, particularly for peer-reviewed journals. Special emphasis on how to structure proofs, clearly explain methods and justify assumptions. Additional emphasis on explaining contributions, literature reviews, and visualizations and graphs in written documents.

DSO 670: Data-Driven Optimization: Theory, Methods and Current Themes   **2020**
PhD and Graduate Students
USC Marshall School of Business
Instructor
This is a Ph.D. seminar course covering recent papers.

BUAD 311 Introduction to Operations Management   **2015, 2019 - 2020**
Undergraduate Core
USC Marshall School of Business
Instructor

BUAD 425 Data-Analysis for Decision Making   **2016, 2017**
Undergraduate Core
USC Marshall School of Business
Instructor, Course Coordinator
Redesigned course with new emphasis on critical thinking and decision-making. Authored cases, created online videos, and developed new curriculum content.

15.S60 Software Tools for Operations Research   **2013, 2014**
Ph.D., MBA and Executive MBA Elective
MIT Sloan School of Management
Instructor
Designed new course with primary role in curriculum development. Oversaw course logistics and lectured on select topics in convex optimization.

15.S05 Risk Management   **2012, 2013**
Executive MBA Program Elective
MIT Sloan School of Management
Teaching Assistant
Assisted with curriculum development, course logistics and advising students on term projects.

15.060 Data, Models, and Decisions   **2012**
MBA Core
MIT Sloan School of Management
Teaching Assistant
Lead weekly recitation and office hours, co-authored exams, and graded case-studies and problem sets.

15.081J Introduction to Mathematical Programming   **2011**
Ph.D. Core
MIT Sloan School of Management
Teaching Assistant
Lead weekly recitation and office hours, lectured select topics, designed exams and problem sets.

PHD MENTORSHIP
- Advisor
    o Michael Huang, USC Marshall (2017 - Present)
    o Julia Balukonis, USC Marshall (2020 - Present)

- Co-Author
    o Yunfan Zhao, Columbia IEOR (2020 - Present)
    o Brian Rongqing Han, USC Marshall, (2016 - 2019)
       First Placement: Tenure-Track Assistant Professor at University of Illinois at Urbana-Champaign (**UIUC**), Gies School of Business
    o Michael Hamilton, Columbia IEOR (2016 - 2019)
       First Placement: Tenure-Track Assistant Professor at University of Pittsburgh, Katz Graduate School of Business

- Qualifying Examination Committee
    o Shobhit Jain, USC Marshall Operations Management (2018)
    o Bradley Rava, USC Marshall Statistics (2019)

- Dissertation Committee
    o Junyi Liu, USC ISyE (2019)
    o Michael Hamilton, Columbia IEOR (2019)
    o Brian Rongqing Han, USC Marshall (2020)

UNDERGRADUATE MENTORSHIP
- Xueqi Wang   **2016 - 2017**
    o Went on to Duke Biostatistics PhD Program
- Qin "Henry" He   **2019 – 2020**
    o Rising senior in Applied Mathematics/Economics at USC

OTHER PROJECTS   **Data-Driven Uncertainty Sets (DDUS)**   **2014 - 2015**
Software Developer
- Created open-source library in Julia implementing a variety of data-driven methods for robust optimization (available via GitHub)
- Used by graduate classes at MIT, Columbia and universities.

Sloan Educational Services (SES), Cambridge, MA   **2010 - 2014**
Consultant
- Liaised with educational services to design custom suite of software tools to streamline internal processes.
- Open-source tools developed in course of project:
  - *ClassE* - A tool for fair and efficient scheduling/timetabling of classes. This tool has (to my knowledge) been used to schedule classes at MIT Sloan since Spring 2012.
  - *StudyBuddies* - A tool to partition students in the Sloan Fellows Program into learning cohorts. Cohorts should be diversified in terms of gender, nationality, work experience and age.

UNIVERSITY
SERVICE

DSO OM Group PhD Coordinator   **2020 - Present**
Manages the entire OM PhD program including admissions, screening and qualifying exams, on-going mentoring of students. Also leads OM PhD Committee and periodically assesses curriculum changes to PhD.

BUAD 311 Core Course Coordinator   **2020**
Coordinated all BUAD 311 instructors to ensure curriculum consistency across sessions. Special focus on unifying course logistics in the face of the COVID-19 Pandemic and unexpected shift to online learning.

DSO OM Group Tenure-Track Hiring Committee   **2019 - 2020**
Co-Chair
Led hiring committee, pre-interviewed candidates, and coordinated logistics with faculty and candidates for fly-outs and on-campus interviews.

DSO-Marketing Seminar Coordinator   **2018 - Present**
Coordinated a bi-semester, brown-bag seminar with DSO and Marketing faculty to promote cross-group research collaboration.

DSO OM Group PhD Committee   **2017 - 2020**
Helped design curriculum requirements for PhD program. Wrote the optimization screening exam each year. Served on PhD admissions committee, including reviewing applications and interviewing candidates.

DSO Seminar Series Coordinator   **2014 - 2019**
Invited visiting faculty to present research in departmental seminar. Coordinated all logistical aspects of visits and curated yearly speaker series.

BUAD 425 Core Course Coordinator   **2017**
Liaised with Undergraduate Vice-Dean's Office and other core course coordinators to ensure Marshall meets IACSB accreditation standards and develop interdisciplinary approaches to achieving Marshall's Learning Objectives.

Co-Organizer of 2017 So-Cal OR/OM Day   **2017**
Organized a one-day, single-track conference with approximately 40 attendees from USC, UCLA Anderson, UC Riverside, and UC Irvine showcasing junior faculty and PhD research in operations research and operations management.

Vishal Gupta

ACADEMIC SERVICE	**Associate Editor – *Management Science*** **2019 - Present** Big Data Analytics Section

Associate Editor – Manufacturing & Services Operations   **2021-Present**
Management (MSOM)

INFORMS 2021 Annual Conference Organizing Committee   **2020 - Present**
Contributed Sessions Planning Committee: Data-Driven Methods in Optimization. Solicit, organize and schedule research presentations to be presented at the 2021 conference in Anaheim, CA (October 2021).

INFORMS Best Case Competition Judge   **2020 - 2021**
Assists in reviewing submissions and selecting winner. Competition seeks instructional cases focusing on real-world applications of operations research and operations management.

Journal Reviewer/Referee
Operations Research, Management Science, Management Science and Operations Management, Production and Operations Management, OR Letters, SIAM Journal on Control and Optimization, SIAM Review, INFORMS Journal on Computing, INFORMS Journal on Optimization, IISE Transactions, Optimization Letters

Conference Program Committee/Reviewer
- NIPS (2016)
- AAAI (2020)
- AISTATS (2020)

National Science Foundation (NSF) Panel Reviewer
- CMMI / OE Program (2017)

LANGUAGES	English (native), Spanish (conversational), Hindi (beginner)
COMPUTING	Julia, R, Python, C++, VBA, Gurobi/CPLEX, JuMP
CITIZENSHIP	USA
REFERENCES	Available upon request