Raghav Singal
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Appointment

Tuck School of Business at Dartmouth College
Assistant Professor of Business Administration 2021 -
Wei-Chung Bradford Hu T’89 Faculty Fellow (2023)
Harvey H. Bundy III T’68 Faculty Fellow (2022)

Education

Columbia University
PhD, Operations Research 2015 - 2020
Advisors: Omar Besbes, Vineet Goyal, and Garud Iyengar
Cheung-Kong Graduate School of Business Fellow

University of Toronto
BASc, Industrial Engineering 2010 - 2015
Ranked 1 (out of 100 students)

Publications

Axiomatic Effect Propagation in Structural Causal Models
Raghav Singal and George Michailidis
Journal of Machine Learning Research (forthcoming)

Model-free Approximate Bayesian Learning for Large-scale Conversion Funnel Optimization
Garud Iyengar and Raghav Singal
Production and Operations Management (forthcoming)

Reproducibility in Management Science
Fisar, Greiner, Huber, Katok, Ozkes, and the Management Science Reproducibility Collaboration
Management Science, 2024
Note: Member of the Management Science Reproducibility Collaboration

Shapley Meets Uniform: An Axiomatic Framework for Attribution in Online Advertising
Raghav Singal, Omar Besbes, Antoine Desir, Vineet Goyal, and Garud Iyengar
Management Science, 2022
Preliminary version appeared in WWW, 2019
2nd place in INFORMS Jeff McGill RMP Student Paper Award, 2019

Flow-based Attribution in Graphical Models: A Recursive Shapley Approach
Raghav Singal, George Michailidis, and Hoiyi Ng
ICML (spotlight), 2021

How to Play Fantasy Sports Strategically (and Win)
Martin Haugh and Raghav Singal
Management Science, 2021
Preliminary version was a finalist in MIT Sloan Sports Analytics Conference, 2018
A Finite Time Analysis of Temporal Difference Learning with Linear Function Approximation
Jalaj Bhandari, Daniel Russo, and Raghav Singal
*Operations Research*, 2021
Extended abstract appeared in *COLT*, 2018

A Bayesian Regression Approach to Handicapping Tennis Players Based on a Rating System
Timothy Chan and Raghav Singal
*Journal of Quantitative Analysis in Sports*, 2018

A Markov Decision Process-based Handicap System for Tennis
Timothy Chan and Raghav Singal
*Journal of Quantitative Analysis in Sports*, 2016

**Working Papers**

Workforce Scheduling with Heterogeneous Time Preferences: Effective Wages and Workers Supply
Omar Besbes, Vineet Goyal, Garud Iyengar, and Raghav Singal
Minor revision in *Manufacturing & Service Operations Management*
2nd place in *Rothkopf Junior Researcher Paper Prize*, 2022
Spotlight presentation at *RMP* and *MSOM*, 2022

Bounding Counterfactuals in Hidden Markov Models and Beyond
Martin Haugh and Raghav Singal
Preliminary version appeared in *ICML*, 2023

Churning While Experimenting: Maximizing User Engagement in Recommendation Platforms
Michael Hamilton and Raghav Singal
Finalist in *INFORMS RMP Data-driven Research Challenge*, 2021

**Teaching**

**Instructor**
Analytics, MBA core (Dartmouth), Rated 5.37/6 2021, 2022, 2023
Optimization Models and Methods, MS (Columbia), Rated 4.50/5 Spring 2019

**Co-instructor**
Introduction to Algorithms, Science Honors Program (Columbia) Fall 2018
Graph Theory by Example, Science Honors Program (Columbia) Spring 2018

**Case: Analytics in American Football: A New Frontier**
C. Daniel Guetta, Raghav Singal, and John Wolfe
*Columbia CaseWorks*, 2020
Used in the Business Analytics II elective at Columbia Business School

**Awards**

**Academic and Research**
Wei-Chung Bradford Hu T’89 Faculty Fellow (Tuck) 2023
2nd place, Rothkopf Junior Researcher Paper Prize (INFORMS Auctions and Market Design) 2022

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1 Titled “Counterfactual Analysis in Dynamic Latent State Models”
Harvey H. Bundy III T'68 Faculty Fellow (Tuck) 2022
Finalist, Data-driven Research Challenge (INFORMS Revenue Management and Pricing) 2021
2nd place, Jeff McGill Student Paper Award (INFORMS Revenue Management and Pricing) 2019
Cheung-Kong Graduate School of Business Fellowship (Columbia) 2018, 2019
Highly Commended (The Undergraduate Awards) 2015
Best Poster Award at MIE Research Symposium (University of Toronto) 2015
MIE Summer Award (University of Toronto) 2015
Dan Cornacchia/Ernst and Young Scholarship (University of Toronto) 2013
University of Toronto Excellence Award 2013

Teaching
Outstanding Teaching Assistant Award (IEOR, Columbia) 2018

Industry

Amazon, Data Scientist Intern (Supply Chain Optimization Technologies) 2020 - 2021
Adobe, Data Scientist Intern (Media and Advertising Solutions) Summer 2017
Ontario Teachers’ Pension Plan, Quantitative Research Co-op (Asset Mix and Risk) 2013 - 2014

Talks

Counterfactual Analysis in Dynamic Latent State Models
Theory Reading Group (Dartmouth CS) 2024
Operations and Management Science Workshop (Tuck) 2023

Online Matching under Heterogeneous Supply with Minimum Allocation Guarantees
RMP (London), MSOM (Montreal), Marketplace Innovation Workshop (virtual) 2023
Conference on Artificial Intelligence, Machine Learning, and Business Analytics (Harvard) 2022
Theory Reading Group (Dartmouth CS) 2022
Operations and Management Science Workshop (Tuck) 2022

Effective Wages under Workforce Scheduling with Heterogeneous Time Preferences
(Previously titled “On-demand Transportation: Driver Wages Versus Platform Profit”)
Applied & Computational Mathematics Seminar (Dartmouth Math) 2023
Theory Reading Group (Dartmouth CS) 2022
INFORMS Rothkopf Prize Session (Indianapolis) 2022
Operations and Management Science Workshop (Tuck) 2022
Financial Analyst Forum (Dartmouth) 2022
MSOM Service Management SIG (Munich), RMP Spotlight (virtual) 2022
Rapid Research Seminar (Tuck), CORS (Vancouver) 2022
INFORMS (virtual), MSOM (virtual), RMP (virtual), CORS (virtual) 2021
Data Science Day (Columbia) 2021

Flow-based Attribution in Graphical Models: A Recursive Shapley Approach
Dartmouth Interdisciplinary Network Research Group (DINR) 2022
ICML Spotlight (virtual), CORS (virtual) 2021

Model-free Approximate Bayesian Learning for Conversion Funnel Optimization
Conference on AI, ML, and Business Analytics (Harvard), CORS (Vancouver) 2022
MARBLE workshop at KDD (virtual), Marketing Science (virtual) 2021
Shapley Meets Uniform: An Axiomatic Framework for Attribution in Online Advertising
Lyft Marketplace Labs (NYC), Tuck (Dartmouth), London Business School 2020
Marshall (USC), Kellogg (Northwestern), Leeds (Boulder), Krannert (Purdue) 2020
Rotman (Toronto), Alberta School of Business, USydney Business School 2020
Darden (Virginia), Zicklin (Baruch), Smith (Queen’s), Schulich (York) 2019
INFORMS (Seattle), MSOM (Singapore), RMP (Stanford), WWW (SF) 2019
POMS (DC), CORS (Saskatoon), NYC Ops Day (Columbia), YinzOR (CMU) 2019
Data Science Day (Columbia), Condé Nast (NYC), Yahoo Research (NYC) 2019

How to Play Fantasy Sports Strategically (and Win)
Financial Analyst Forum (Dartmouth), CORS (Vancouver) 2022
TADC (LBS), INFORMS (Phoenix), POMS (DC) 2018, 2019
Data Science Day (Columbia), CORS (Halifax), SSAC (MIT) 2018

A Bayesian Regression Approach to Handicapping Tennis Players Based on a Rating System
NESSIS (Harvard), CORS (Halifax) 2017, 2018

A Markov Decision Process-based Handicap System for Tennis
UTORG (UToronto), Data Science Social (Columbia) 2015, 2016

Service

Reviewer
Management Science
Operations Research
Manufacturing & Service Operations Management
Production and Operations Management
Transportation Science

Cluster Chair
Sports and Entertainment Analytics (CORS) 2024

Session Organizer
Learning and Optimization for Revenue Management (INFORMS) 2022
Applied Learning and Optimization (CORS) 2022
Analytics in Sports and Video Games (CORS) 2022
Modeling and Analytics in On-demand Transportation (INFORMS) 2021

Judge
Public Sector OR (PSOR) Best Paper Award Competition (INFORMS) 2023
Poster Competition (INFORMS) 2022

Committee Member
ACM Conference on Economics and Computation (EC) Program Committee 2024
Honors Thesis Committee Reader (Quantitative Social Science, Dartmouth) 2023
Faculty Search Committee (Operations and Management Science, Tuck) 2022
Post-doc Search Committee (Operations and Management Science, Tuck) 2022, 2023

Press Articles and Media Mentions

Using Science to Imagine an Alternative Reality 2023
Tuck School of Business at Dartmouth
Making Sense of Attribution in Online Advertising
INSEAD Knowledge

Putting Models into Practice
Tuck School of Business at Dartmouth

Better Decisions Through Science: Analytics and Digital Operations
Tuck School of Business at Dartmouth

Tweet by Professor Judea Pearl (Turing Award Recipient)
Twitter

The Story of How Two Researchers Made a 350 Percent Return on a Single NFL Season
Imperial College Business School

Raghav Singal Comes Second in the INFORMS RMP Student Paper Award
Columbia University

Columbia Engineering Announces the First Cohort of CKGSB Doctoral Fellowship Awardees
Columbia University

Three Engineering Alumni Recognized by Global Undergraduate Awards
University of Toronto