

DSO 670 – Current Topics in Operations Management
Fall 2024 – Analytics and Operations for a Better World: Current Research and Themes
Friday – 1 PM-3:50 PM – 3 units

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Course Description

This is a Ph. D.-level seminar covering modern topics in socially responsible and sustainable operations. The goal is to equip students to pursue their own research in these areas. We will mostly focus on recent papers and themes in a student-led seminar-style presentation/discussion. The class will also include several guest speakers who will join us to discuss their contributions in these areas. Students will be exposed to current research and open problems in this field and related application areas.

Learning Objectives

By the end of the course, students should be able to

- Articulate the placement of research in the context of the more extensive literature on socially responsible and sustainable operations.
- Critically assess recent research papers' contributions, strengths, and weaknesses in data-driven optimization.
- Formulate their novel research questions in this domain.

Prerequisites and/or Recommended Preparation:

There are no formal prerequisites for the course, but students should be familiar with the basics of analytical modeling and empirical analysis. Students concerned about their background ability should contact the instructor to discuss their situation.

Required Materials

There is no required textbook for the course. Lecture notes and recordings will be distributed through Brightspace. Students will be required to read several current journal papers, all available freely via the USC library and posted to Brightspace.

Course Notes:

All materials for the course will be posted to the course's Brightspace site. Please check there regularly. Students interested in auditing the course should contact the instructor to discuss and be added to Brightspace.

In each lecture, an external speaker will present their research in the first half. In the second half, we will have a student presentation on the associated topic. The precise structure of the course will depend in part on how many students ultimately enroll. This will likely be finalized after the first session, and at this point, an updated syllabus will be posted to Brightspace.

The majority of the course, however, will involve student presentations of papers. (See below for expectations on presentations.) Students will have the opportunity to sign up for papers after our first session. My goal is that students present AT MOST 1-2 papers throughout the semester. Meeting this goal depends on enrollment (hence some of the uncertainty in the syllabus). All students (not just the presenter) must read and think about the papers before the seminar. The presenter will then moderate a discussion of the paper, its strengths, weaknesses, and areas for improvement.

I will distribute the precise list of papers in our first session. These papers span the following topics. This list is NOT yet final:

Partial List of Papers for Student Presentations

Environmental Responsibility

Supply Chain:

- Caro, F., Corbett, C. J., Tan, T., & Zuidwijk, R. (2013). Double counting in supply chain carbon footprinting. *Manufacturing & Service Operations Management*, 15(4), 545-558.
- Cohen, M. C., Lobel, R., & Perakis, G. (2016). The impact of demand uncertainty on consumer subsidies for green technology adoption. *Management Science*, 62(5), 1235-1258.
- Gui, L., Atasu, A., Ergun, Ö., & Toktay, L. B. (2018). Design incentives under collective extended producer responsibility: A network perspective. *Management Science*, 64(11), 5083-5104.
- Chen, L., & Lee, H. L. (2017). Sourcing under Supplier Responsibility Risk: The Effects of Certification, Audit, and Contingency Payment. *Management Science*, 63(9), 2795-2812.
- Sošić, G. (2023). Rethinking salt supply chains: cost and emissions analysis for coproduction of salt and fresh water from US seawater. *Management Science*, 69(12), 7651-7668.

Regulation:

- Wijnsma, S. C., Lauga, D. O., & Toktay, L. B. (2023). Treat, Dump, or Export? How Domestic and International Waste Management Policies Shape Waste Chain Outcomes. *Management Science*.
- Gui, L., Atasu, A., Ergun, Ö., & Toktay, L. B. (2016). Efficient implementation of collective extended producer responsibility legislation. *Management Science*, 62(4), 1098-1123.
- Jira, C., & Toffel, M. W. (2013). Engaging supply chains in climate change. *Manufacturing & Service Operations Management*, 15(4), 559-577.
- Kaps, C., Marinesi, S., & Netessine, S. (2022). When Should the Off-grid Sun Shine at Night? Optimum Renewable Generation and Energy Storage Investments. *Management Science*, forthcoming.
- Uppari, B. S., Netessine, S., Popescu, I., & Clarke, R. P. (2023). Design of Off-Grid Lighting Business Models to Serve the Poor: Field Experiments and Structural Analysis. *Management Science*, forthcoming.

Responsible Sourcing:

- Caro, F., Lane, L., & Sáez de Tejada Cuenca, A. (2021). Can brands claim ignorance? Unauthorized subcontracting in apparel supply chains. *Management Science*, 67(4), 2010-2028.
- Calmon, A. P., Graves, S. C., & Lemmens, S. (2021). Warranty matching in a consumer electronics closed-loop supply chain. *Manufacturing & Service Operations Management*, 23(5), 1314-1331.
- Chen, L., & Lee, H. L. (2017). Sourcing under Supplier Responsibility Risk: The Effects of Certification, Audit, and Contingency Payment. *Management Science*, 63(9), 2795-2812.
- Guo, R., Lee, H. L., & Swinney, R. (2016). Responsible Sourcing in Supply Chains. *Management Science*, 62(9), 2722-2744.
- Kalkanci, B., & Plambeck, E. L. (2020). Reveal the supplier list? A trade-off in capacity vs. responsibility. *Manufacturing & Service Operations Management*, 22(6), 1251-1267.

Global Health/Agricultural Supply Chains:

- Delana, K., Deo, S., Ramdas, K., Subburaman, G. B. B., & Ravilla, T. (2023). Multichannel delivery in healthcare: the impact of telemedicine centers in southern India. *Management Science*, 69(5), 2568-2586.
- Jeon, H. H., Lucarelli, C., Mazarati, J. B., Ngabo, D., & Song, H. (2022). Leapfrogging for Last-Mile Delivery in Health Care. Available at SSRN 4214918.
- Jónasson, J. O., Deo, S., & Gallien, J. (2017). Improving HIV early infant diagnosis supply chains in sub-Saharan Africa: Models and application to Mozambique. *Operations Research*, 65(6), 1479-1493.
- Gibson, E., Deo, S., Jónasson, J. O., Kachule, M., & Palamountain, K. (2023). Redesigning sample transportation in Malawi through improved data sharing and daily route optimization. *Manufacturing & Service Operations Management*.
- Alizamir, S., Irvani, F., & Mamani, H. (2019). An Analysis of Price vs. Revenue Protection: Government Subsidies in the Agriculture Industry. *Management Science*, 65(1), 32-49.
- de Zegher, J. F., Iancu, D. A., & Lee, H. L. (2019). Designing contracts and sourcing channels to create shared value. *Manufacturing & Service Operations Management*, 21(2), 271-289.
- Levi, R., Rajan, M., Singhvi, S., & Zheng, Y. (2019). Unifying Agricultural Wholesale Markets: Impact on Market Prices and Farmers' Profitability. *Proceedings of the National Academy of Sciences*, forthcoming.
- Liao, C. N., Chen, Y. J., & Tang, C. S. (2019). Information Provision Policies for Improving Farmer Welfare in Developing Countries: Heterogeneous Farmers and Market Selection. *Manufacturing & Service Operations Management*, 21(2), 254-270.

Nonprofit Operations/Public Policy:

- De Vericourt, F., & Lobo, M. S. (2009). Resource and Revenue Management in Nonprofit Operations. *Operations Research*, 57(5), 1114-1128.
- Freund, D., Lykouris, T., Paulson, E., Sturt, B., & Weng, W. (2023). Group fairness in dynamic refugee assignment. arXiv preprint arXiv:2301.10642.
- Manshadi, V., & Rodilitz, S. (2022). Online Policies for Efficient Volunteer Crowdsourcing. *Management Science*, 68(9), 6572-6590.
- Ganesh, M., Deo, S., & Devalkar, S. K. (2019). Leveraging digital technology to improve monitoring and planning in public sector supply chains: Evidence from India's food security program. Indian School of Business.
- Zhang, C., Atasu, A., & Ramachandran, K. (2022). Partial completion as a nonprofit strategy. *Manufacturing & Service Operations Management*, 24(6), 2962-2981.
- Zheng, H., Lyu, G., Ke, J., & Teo, C. P. (2022). From targeting to transfer: Design of allocation rules in cash transfer programs. *Manufacturing & Service Operations Management*, 24(6), 2901-2924.
- Aiken, E. L., Bedoya, G., Blumenstock, J. E., & Coville, A. (2023). Program targeting with machine learning and mobile phone data: Evidence from an anti-poverty intervention in Afghanistan. *Journal of Development Economics*, 161, 103016.

Operations at the Base of the Pyramid

- Jónasson, J. O., Ramdas, K., & Sungu, A. (2022). Social impact operations at the global base of the pyramid. *Production and Operations Management*, 31(12), 4364-4378.
- Ramdas, K., & Sungu, A. (2022). The Digital Lives of the Poor: Entertainment Traps and Information Isolation. *Management Science*, forthcoming.

- Kundu, A., & Ramdas, K. (2022). Timely after-sales service and technology adoption: Evidence from the off-grid solar market in Uganda. *Manufacturing & Service Operations Management*, 24(3), 1329-1348.
- Singhvi, D, Singhvi, S. and Zhang, X. (2023), A Data-driven Approach to Improve Artisans' Productivity in Distributed Supply Chains. Available at SSRN: <https://ssrn.com/abstract=4531090> or <http://dx.doi.org/10.2139/ssrn.4531090>
- Calmon, A. P., Jue-Rajasingh, D., Romero, G., & Stenson, J. (2022). Operational strategies for distributing durable goods in the base of the pyramid. *Manufacturing & Service Operations Management*, 24(4), 1887-1905.
- Gui, L., Tang, C. S., & Yin, S. (2019). Improving microretailer and consumer welfare in developing economies: Replenishment strategies and market entries. *Manufacturing & Service Operations Management*, 21(1), 231-250.
- Yu, J. J., Tang, C. S., Sodhi, M. S., & Knuckles, J. (2020). Optimal subsidies for development supply chains. *Manufacturing & service operations management*, 22(6), 1131-1147.

Other Topics:

The Consumers' Role in Sustainable Operations

- Agrawal, V. V., Atasu, A., & Van Ittersum, K. (2015). Remanufacturing, third-party competition, and consumers' perceived value of new products. *Management Science*, 61(1), 60-72.
- Buell, R. W., & Kalkanci, B. (2021). How transparency into internal and external responsibility initiatives influences consumer choice. *Management Science*, 67(2), 932-950.
- Kraft, T., Valdés, L., & Zheng, Y. (2018). Supply chain visibility and social responsibility: Investigating consumers' behaviors and motives. *Manufacturing & Service Operations Management*, 20(4), 617-636.

Grading Policies:

There will be several graded deliverables for the class:

- **Pre-Class Paper Check-Ins:** Before every class with a paper presentation, students will be required to answer a short set of questions on Brightspace about the paper. These questions are meant to assess the basic understanding of the paper to encourage students to come to class prepared. (In other words, the pre-class questions are EASY if you read the paper.). *Graded as Pass/No-Pass/Not-Complete*
- **During-Class Participation:** All students are expected to prepare at least two questions on the research topic that the external speaker will present and be ready to participate actively in the discussion.
- **Post-Class Presentation Feedback:** After each session in which a student colleague presents, students will be asked to complete constructive feedback on the presentation to help their colleague improve. Feedback is anonymous and no longer than a paragraph or two. *Graded as Pass/No-Pass/Not-Complete*
- **Paper Presentation:** Students will sign up for 1/2 papers to present throughout the semester. Building strong presentation skills is KEY to academic and professional success. Students will prepare a 1-hour seminar-style presentation on a paper on sustainable operations. A partial list of papers is included in this syllabus; feel free to ask to present a paper not included on the list. This seminar should cover the following:
 - Overview of the main contributions of the paper

- Presentation of the model and key results
- Critique of the paper and possible extensions

To prepare a successful presentation, you should closely read the paper and gain a thorough understanding of the results. This usually requires a lot of work in tracking down and understanding background sources, filling in the missing mathematical details, etc. For a typical paper, you should allocate about a week for this step. You are encouraged to approach others (including students and me) for help with following specific analyses that you find essential.

Carefully select the material you will present. The most common mistake is trying to present all the results and their proofs in the paper. This would take about a week for a typical paper - you are still likely to be in the middle of preliminary results by the time your hour is up. The trick is to present intuition and main ideas behind the proofs rather than the details. Generally, you can only present proof outlines for one or two major results, skipping the mathematical details. However, you must carefully present convincing, intuitive arguments behind the results. Otherwise, too many questions will be asked for technical clarifications, and you will get bogged down again. Try to understand where the paper fits in within the context of the results presented in the course. Give the audience a sense of the contribution of the paper.

- To help students build their presentation skills, each presenter is REQUIRED to complete a multi-step process:
 - Before their presentation, the presenting student should do a "practice run" of their talk with at least two students (at least one of whom should be from our class). After the practice run, presenters should take time to debrief with the students. What were the best parts of the presentation? What needs work? Are there specific slides or sections that are unclear? What additions should be made, or topics deleted?
The practice run and debrief should be completed on Zoom and recorded. You will need to submit the link to the Zoom recording on Brightspace as your deliverable. *Graded as Pass/No-Pass/Not-Complete*
 - After you've incorporated the feedback from the practice run, you should schedule a time to meet with me (Somya) to go through the slides of your talk and sort out any other presentation questions. Keep in mind my schedule is tight. Please plan ahead. *Graded as Pass/No-Pass/Not-Complete*
 - Present your chosen paper in class using PowerPoint or equivalent in your talk. As part of the talk, please be prepared to moderate some discussion on the paper: What does everyone see as its strengths? What is truly novel relative to the literature? What questions remain?
- Student Research Project: Students will write a short research paper (7-8 pages excluding references) due in the last class (Dec 06). In this paper, they will synthesize their learnings by modeling an operational problem of their choice. This paper should be essentially a research proposal on an interesting new problem in sustainable operations.
The paper should accomplish three goals: introduce the problem and research question, review the relevant literature, and propose a model to answer the research question identified. Specifically, the paper should include the following sections:
 - **Motivation and problem definition**: You should identify an interesting, as-yet-unsolved problem in sustainable operations. Discuss the problem's practical relevance and eco-

conomic significance, motivating its importance with real examples and data wherever possible. Articulate specific, unanswered questions about this problem that you intend to investigate in your research.

- **Literature Review:** You should comprehensively describe the existing literature on this topic, including both work that is directly related and work that is partially related (i.e., work that shares some features, but not all, with the problem you have identified). You should both summarize what previous work does and explain why that previous work does not fully address the problem you have chosen. There are no hard rules on the number of papers to review, as this will vary by topic, but somewhere in the (rather broad) range of 10-30 papers is probably sufficient in most cases.
- **Model Proposal:** Propose a way to model the problem and answer the “unanswered” questions you identified in the problem introduction. You need to formulate a preliminary model, but fully solving your model is **not** required. You might include some very preliminary analysis (like the analysis of a highly stylized “toy model”).
- References

Policy on Group Work

Group discussion is STRONGLY encouraged throughout this class with other students in the class. Throughout your PhD, your peers will always be your best resource. Use them. You may collaborate with other students on ANY of the above deliverables.

However, you MUST always write up your own assignments individually and separately. (Thus, you can talk about a paper together, or even get a peer to read through your report and give you feedback, but you must incorporate that feedback on your own.) Please also list the names of students you collaborated with on the deliverable under your name, with a brief description of their contribution (if you deem it necessary).

Grading Breakdown:

<u>Assignment</u>	<u>% of Total Grade</u>
<u>Participation/Discussion</u>	<u>10%</u>
<u>Pre-Class Paper Write-ups</u>	<u>10%</u>
<u>Post-Class Presentation Feedback</u>	<u>10%</u>
<u>Paper Presentation</u>	<u>35%</u>
<u>Research Project</u>	<u>35%</u>
<u>Total</u>	<u>100%</u>

COURSE CALENDAR

	Topics/ Daily Activities	External Speaker	In-class Speaker
Week 1 30-Aug	Introduction	-	Somya Singhvi

Week 2 6-Sep	Environmental Responsibility	TBD	Student
Week 3 13-Sep	Environmental Responsibility	TBD	Student
Week 4 20-Sep	Environmental Responsibility	TBD	Student
Week 5 27-Sep	Global Health/Agriculture	TBD	Student
Week 6 4-Oct	Global Health/Agriculture	TBD	Student
Week 7 11-Oct	No Class (Fall Break)		
Week 8 18-Oct	Global Health/Agriculture	TBD	Student
Week 9 25-Oct	Nonprofit Operations/Public Policy	TBD	Student
Week 10 1-Nov	Nonprofit Operations/Public Policy	TBD	Student
Week 11 8-Nov	Nonprofit Operations/Public Policy	TBD	Student
Week 12 15-Nov	Operations at the Base of the Pyramid	TBD	Student
Week 13 22-Nov	Operations at the Base of the Pyramid	TBD	Student
Week 14 29-Nov	Operations at the Base of the Pyramid	TBD	Student
Week 15 6-Dec	Final Presentations	-	

Please note: The date/time of the Final Exam is determined by the University. For the date and time of the final for this class, consult the USC *Schedule of Classes* at www.usc.edu/soc. Select the corresponding semester to view and click on the “Final Examinations Schedule” link on the left side of the screen.

ADDITIONAL INFORMATION

Technology Policy

Laptop and Internet usage is not permitted during academic or professional sessions unless otherwise stated by the respective professor and/or staff. Use of other personal communication devices during academic or professional sessions is considered unprofessional and is not permitted. ANY e-devices (cell phones, iPads, other texting devices, laptops, I-pods) must be completely turned off during class time. Upon request, you must comply and put your device on the table in off mode and FACE DOWN. Videotaping faculty lectures is not permitted due to copyright infringement regulations. Audiotaping may be permitted if approved by the professor. Use of any recorded or distributed material is reserved exclusively for the USC students registered in this class. Exceptions to this policy may be granted to individual students with appropriate documentation on a case-by-case basis.

Use of Recordings

Pursuant to the *USC Student Handbook* (<https://policy.usc.edu/studenthandbook/>, page 27), students may not record a university class without the express permission of the instructor and announcement to the class. In addition, students may not distribute or use notes or recordings based on USC classes or lectures without the express permission of the instructor for purposes other than personal or class-related group study by individuals registered for the class. This restriction on unauthorized use applies to all information that is distributed or displayed for use in relationship to the class. Violation of this policy may subject an individual or entity to university discipline and/or legal proceedings.

Use of AI Generators

In this course, I encourage you to use artificial intelligence (AI)-powered programs to help you with assignments that indicate the permitted use of AI. You should also be aware that AI text generation tools may present incorrect information, biased responses, and incomplete analyses; thus they are not yet prepared to produce text that meets the standards of this course. To adhere to our university values, you must cite any AI-generated material (e.g., text, images, etc.) included or referenced in your work and provide the prompts used to generate the content. Using an AI tool to generate content without proper attribution will be treated as plagiarism and reported to the Office of Academic Integrity. Please review the instructions in each assignment for more details on how and when to use AI Generators for your submissions.

Open Expression and Respect for All

An important goal of the educational experience at USC Marshall is to be exposed to and discuss diverse, thought-provoking, and sometimes controversial ideas that challenge one's beliefs. In this course we will support the values articulated in the USC Marshall "[Open Expression Statement](https://www.marshall.usc.edu/open-expression-statement)" (<https://www.marshall.usc.edu/open-expression-statement>).

USC Statement on Academic Conduct and Support Systems

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services \(OSAS\)](#) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

[*Counseling and Mental Health*](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[*988 Suicide and Crisis Lifeline*](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[*Relationship and Sexual Violence Prevention Services \(RSVP\)*](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[*Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)*](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[*Reporting Incidents of Bias or Harassment*](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[*The Office of Student Accessibility Services \(OSAS\)*](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[*USC Campus Support and Intervention*](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[*Diversity, Equity and Inclusion*](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.