MIT GLOBAL SCALE NETWORK

ZARAGOZA. LOGISTICS CENTER

PhD SUMMER ACADEMY 2015

July 1-10, 2015
Zaragoza Logistics Center
Zaragoza (Spain)

WELCOME TO THE PHD SUMMER ACADEMY 2015

It is with great pleasure that we invite you to attend the PhD Summer Academy 2015 at the Zaragoza Logistics Center for an intense period of learning, debating, and discovering the fundamental concepts and recent trends in supply chain management, in addition to meeting your future colleagues and having a great time in Zaragoza, Spain.

It will be the eighth summer academy to be organized at our center, and we are happy to announce that we have a group of distinguished professors from prestigious academic institutions taking part.

In addition to being introduced to different topics in the field by a group of distinguished professors, it is a great opportunity to meet doctoral students from different institutions and exchange ideas. Although we expect applicants to come from different institutions, countries and backgrounds, one thing you all have in common is excellence. You will be selected to be part of a discussion forum of outstanding scholars in the area of logistics and supply chain management.

Apply for admission! We are looking forward to meeting and working with you, and to helping you during your stay in Zaragoza. We hope that you are as excited and eager as we are here in Spain to get this knowledge exchange journey started!

Jianjun Xu, PhD
PhD Summer Academy Director
Zaragoza Logistics Center

Maria Jesus Saenz, PhD
Director
Zaragoza Logistics Center

INDEX

CALENDAR

The aim of the summer academy school is to create a strong knowledge discussion forum to boost research results and advances in supply chain management.

Get ready for intense sessions of studies and research!

			JULY			
			Wednesday	Thursday	Friday	Saturday
			1	2	3	4
10:15 13:15			Welcome lunch (13.00 h.)	Industrial Visit	Colloquium: Making a Life in the Academia	Nikolaos Trichakis
14:15 17:15			Mikko Ketokivi	Mikko Ketokivi	Mikko Ketokivi	
					Cultural Visit (20.00 h.)	

	JULY					
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	6	7	8	9	10	11
10:15 13:15	Sheldon Ross	Sheldon Ross	Manmohan Sodhi	Sheldon Ross	Manmohan Sodhi	
14:15 17:15	Nikolaos Trichakis		Nikolaos Trichakis	Manmohan Sodhi	Farewell Lunch (13:15h.)	

	Professor	From	Course	Starting Date	Ending Date	Hours
	Mikko Ketokivi	IE Business School	The Rigor and Relevance of Operations Management Research	1/07	3/07	9
	Sheldon Ross	University of South California	Simulation	6/07	9/07	9
	Nikolaos Trichakis	Harvard Business School	Robust Optimization	4/07	8/07	9
	Manmohan Sodhi	City University London	Supply Chain Risk	8/07	10/07	9

INSTRUCTORS' BIOGRAPHIES

MIKKO KETOKIVI

Mikko Ketokivi is a Professor of Operations Management and Organization Design at IE Business School in Madrid (Spain). Currently he serves as Co-Editor-in-Chief for the Journal of Operations Management. He received his Ph.D. from the University of Minnesota in 2000 and has also M.Sc. and B.Sc. degrees from Iowa State University.

His research, teaching, and consulting are best described as a combination of economics, sociology, psychology, management, philosophy and statistics. His current research focuses on organization design, strategic decision making, and general management and it has been published in journals such as Administrative Science Quarterly, Strategic Management Journal, Journal of Operations Management, Decision Sciences, Journal of Organization Design, and Production and Operations Management.

He collaborates closely with economists as a Senior Fellow at the Research Institute of the Finnish Economy and he has taught at University of Lausanne (Switzerland), University of Minnesota (U.S.), HEC School of Management Paris (France), Hanken School of Economics (Finland), University of Helsinki (Finland), Helsinki, University of Technology (Finland), Lappeenranta University of Technology (Finland), University of Eastern Finland, and University of Jyväskylä (Finland).

SHELDON ROSS

Sheldon Ross is the Epstein Chair Professor in the Epstein Department of Industrial and Systems Engineering at the University of Southern California. Before coming to USC in 2004 he had been, for many years, in the Industrial Engineering and Operations Research department at the University of California, Berkeley.

His research is in the areas of applied probability, with a focus of probabilistic analysis of systems, efficient simulation procedures, and dynamic programming. He has written many research papers and text books in these areas.

He is a fellow of INFORMS and the Institute of Mathematical Statistics. He is the founding and continuing editor of the Cambridge University Press journal Probability in the Engineering and Informational Sciences.

NIKOLAOS TRICHAKIS

Trichakis is an Assistant Professor in the Technology and Operations Management Unit at Harvard Business School. His research interests lie in healthcare and the interface of finance and operations management. He is also interested in the interplay of fairness and efficiency in resource allocation problems. Specific applications include healthcare delivery, supply chain management and contracting, dynamic pricing and revenue management, and portfolio optimization.

Professor Trichakis received his PhD in Operations Research from the Operations Research Center at MIT. He also holds MS degrees from Stanford University, Imperial College and a BS degree from Aristotle University in Greece, all in Electrical and Computer Engineering. He was the recipient of the INFORMS JFIG best paper award and finalist for the INFORMS George B. Dantzig Dissertation Award and the INFORMS Pierskalla Award.

MANMOHAN SODHI

Professor ManMohan S. Sodhi is at Cass Business School, City University London. He received his Ph.D. in management science from UCLA Anderson School in 1994. Subsequently, he taught operations management at the Ross School of Business, University of Michigan, where his research in the trucking industry was funded by the Sloan Foundation. His research interests lie in supply chain management, in particular in supply chain risk, and more recently, tying that to sustainability.

Prof. Sodhi is currently visiting Kühne Logistics University in Hamburg, and previously had a visiting position at the Indian School of Business (ISB) where he was founding Executive Director of the Munjal Institute for Global Manufacturing (May 2011-Sep 2013).

Prior to joining Cass Business School in August 2002, Professor Sodhi was Vice President at a software company based in San Jose. He has worked with clients in a variety of industries including consumer electronics, commodity and specialty chemicals, petroleum products distribution, hospitality industry procurement, and airlines.

He has published in numerous academic and practitioner journals including Operations Research, Production and Operations Management, Journal of Operations Management, Harvard Business Review, and Sloan Management Review. He is currently Deputy Editor for Production and Operations Management (POM).

PROGRAM DESCRIPTION

THE RIGOR AND RELEVANCE OF OPERATIONS MANAGEMENT RESEARCH

Professor: Mikko Ketokivi, IE Business School.

Dates: July 1, 2, 3.

The goal of this 3x3 hour seminar is to examine the construction of scientific contributions in Operations Management. To this end, we cover three distinct but related topics:

1. *Making a contribution*
2. *Case research*
3. *Relevance*

The goal is to try to understand how contributions are made, what the roles of theory and empirical analysis are, and how we ultimately establish the relevance of our research, and in the eyes of whom? Case research is picked as a topic not because it is more important than other forms of research but because it provides a fertile opportunity for discussing both contributions and relevance in a specific research context.

SESSION 1: Making a contribution

It is well-established that the main task of a scholar is to make a contribution. But it is equally well-established that what exactly this means is very elusive. The aim of this first session is to examine this question. In this first session, I will also share some of the insights on contributions in light of the editorial policy of Journal of Operations Management, which I am co-editing with Dan Guide. In preparation, read the following articles:

- Whetten, D. A. (1989). **What constitutes a theoretical contribution?** *Academy of Management Review*, 14(4), 490-495.
- Locke, K., & Golden-Biddle, K. (1997). **Constructing opportunities for contribution: Structuring intertextual coherence and "problematizing" in organizational studies**. *Academy of Management Journal,* 40(5), 1023-1062.

Take a look at by far the most-cited article ever published in the Journal of Operations Management (500 ISI citations as of January 2015):

- Frohlich, M. T., & Westbrook, R. (2001). **Arcs of integration: An international study of supply chain strategies**. *Journal of Operations Management*, 19(2), 185-200.

What do you think the main contribution of this article is (in light of the Whetten or Locke & Golden-Biddle criteria, for instance)?

SESSION 2: Case research

Case research is one of the common research designs in management research in general and operations management (OM) research in particular. The "typical" case study is a multiple case study that builds on Eisenhardt's (1989) seminal article, but there are many other approaches as well, and an OM researcher must understand which case research design fits the research question the best. The goal of this session is to examine this question in particular.

In preparation, read first three empirical case studies of the auto industry. Try to see what the similarities and the differences are.

- Choi, T. Y., & Hong, Y. (2002). **Unveiling the structure of supply networks: Case studies in Honda, Acura, and DaimlerChrysler.** *Journal of Operations Management*, 20(5), 469-493.
- Walker, G., & Weber, D. (1984). **A transaction cost approach to make-or-buy decisions**. *Administrative Science Quarterly*, 29(3), 373-391.
- Adler, P. S., Goldoftas, B., & Levine, D. I. (1999). F**lexibility versus efficiency? A case study of model changeovers in the Toyota production system**. *Organization Science*, 10(1), 43-68.

Then, read the following article that examines the heterogeneity of case research. What kinds of ideas does the article evoke? What kind of a case research design would best fit your research ideas?

- Ketokivi, M., & Choi, T. (2014). **Renaissance of case research as a scientific method**. *Journal of Operations Management*, 32(5), 232-240.

SESSION 3: Relevance

All major OM journals call for research that is relevant. But much like in the case of contribution, explicit definitions of what is relevant are hard to come by. The first question is obviously: relevant to whom? The typical answer "to the practitioner" is painfully vague and non-operational. Any researcher can find at least one manager who will think their research is relevant. Further, the crux of the challenge does not lie in establishing practical relevance. The real challenge is to engage in research that satisfies both practical and academic relevance criteria. One often encounters situations in which people think that demonstrating practical relevance constitutes a sufficient condition—it does not. To get us talking about the questions, of relevance, read first two articles on the topic. The first is from a general management research perspective, and the second, an OM view:

- Van de Ven, A. H., & Johnson, P. E. (2006). **Knowledge for theory and practice**. *Academy of Management Review*, 31(4), 802-821.
- Corbett, C., & Van Wassenhove, L. N. (1993). **The natural drift: What happened to operations research?** *Operations Research*, 41(4), 625-640.

Finally, what do you think of my (admittedly provocative) idea that perhaps practical relevance of academic research is simply wishful thinking? How would you respond?

- Ketokivi, M. (2008). **Guest Editorial: In what ways can academic research be relevant?** *Operations Management Research*, 1(2), 81-85.

PROGRAM DESCRIPTION

SIMULATION

Professor: Sheldon Ross, University of South California.

Dates: July 6, 7, 9.

An introduction to syllabus with a focus on variance reduction techniques.

- Topics to be covered:
- Random Variable Generation
- Statistical Analysis of Simulated Data
    - Variance Reduction Techniques
    - Antithetic Variables
    - Control Variables
    - Use of Conditional Expectation
    - Stratified Sampling
    - Importance Sampling
    - Conditional Bernoulli Sampling Method
    - Normalized Importance Sampling
- Markov chain Monte Carlo methods

References

- Ross, S. M., **SIMULATION**, *5fth ed., Academic Press*, 2013
- Ross, S. M., **Simulation Analysis of System Life when Component Lives are Determined by a Marked Point Process**, *Jour. of Appl. Prob., Volume 51*, 377-386, 2014.
- Ghamami, S., and S. M. Ross, **Efficient Monte Carlo Barrier Option Pricing when the Underlying Security Price follows a Jump-Discussion Process**, *The Journal of Derivatives*, 17, 45-52, 2010
- Ghamami, S., and S. M. Ross, **Improving the Asmussen-Kroese Type Simulation Estimators**, *Jour. of Appl. Probability*, 49, 4, 188-1193, 2012
- Ross, S. M., A **New Simulation Approach to Estimating Expected Values of Functions of Bernoulli Random Variables under Certain Types of Dependencies**, *IIE Transactions*, 41, 81-85, 2009

PROGRAM DESCRIPTION

ROBUST OPTIMIZATION AND ITS APPLICATIONS

Professor: Trichakis, Harvard Business School.

Dates: July 4, 6, 8.

Robust optimization (RO) is a relatively young methodology, developed mainly in the course of the last 15 years to analyze and optimize the performance of complex systems that are subject to uncertainty. The goal of this short course is to expose students to the basic RO methodology in order to illustrate how it can be used as an alternative approach for modeling uncertain phenomena. We will explore how RO leverages existing efficient optimization methods to deal with high dimensional problems subject to uncertainty, a key feature that distinguishes it from other solution approaches. Finally, we will discuss various applications of RO in the fields of operations research and operations management.

Main topics covered

- Robust Linear Optimization
- Robust Mixed Integer Optimization
- Applications of Robust Optimization in Operations Management

Readings

We will cover selected sections of the following papers/book:

- Robust Linear Optimization:
  - C. Bandi and D. Bertsimas. "Tractable stochastic analysis in high dimensions via robust optimization." Mathematical Programming, Series B, 134(1):23–70, 2012.
  - A. Ben-Tal and A. Nemirovski. "Robust solutions of uncertain linear programs." Operations Research Letters, 25(1):1–13, 1999.
  - D. Bertsimas, D. Brown, and C. Caramanis. "Theory and applications of robust optimization." SIAM Review, 53(3):464–501, 2011.
  - D. Iancu and N. Trichakis. "Pareto Efficiency in Robust Optimization." Management Science, 60(4):130–147, 2014.
- Robust Mixed Integer Optimization
  - D. Bertsimas and M. Sim. "Robust discrete optimization and network flows." Mathematical Programming, Series B, 98(1-3):49–71, 2003.
  - D. Bertsimas and M. Sim. "The price of robustness." Operations Research, 52(1):35–53, 2004.
- Applications of Robust Optimization in Operations Management
  - "Robust Optimization," by A. Ben-Tal, L. El-Ghaoui, A. Nemirovski, Princeton Series in Applied Mathematics, 2009.
  - D. Bertsimas and A. Thiele. "A robust optimization approach to inventory theory." Operations Research, 54:150–168, 2006

Prerequisites

Working knowledge of Linear Optimization, particularly Duality Theory. See for example, "Introduction to Linear Optimization" by Bertsimas and Tsitsiklis, Ch. 1-4.

PROGRAM DESCRIPTION

SUPPLY CHAIN RISK

Professor: ManMohan S. Sodhi , City University London.

Dates: July 8, 9, 10.

This part of the workshop will focus on supply chain risk and its management in three sessions:

SESSION 1: Introduction

What is supply chain risk and why should a company manage it?

We describe supply chain risk and discuss classifications. We also discuss how important is to differentiate between 'normal' and 'abnormal' risk.

Reading list

- Chopra, S., & Sodhi, M. S. (2004). **Supply-chain breakdown**. *MIT Sloan management Review*.
- Chopra, S., & Sodhi, M. S. (2014). **Reducing the Risk of Supply Chain Disruptions.** *MIT Sloan Management Review.*
- Sodhi, M. S., & Lee, S. (2007). **An analysis of sources of risk in the consumer electronics industry**. *Journal of the Operational Research Society*, 58(11), 1430-1439.
- Chopra, S., Reinhardt, G., & Mohan, U. (2007). **The importance of decoupling recurrent and disruption risks in a supply chain**. *Naval Research Logistics (NRL)*, 54(5), 544-555

SESSION 2: Current research

What is the current research in supply chain risk?

We aim to cover different types of research here: analytical, descriptive and empirical.

Reading list

- Sodhi, M. S., Son, B. G., & Tang, C. S. (2012). **Researchers' perspectives on supply chain risk management**. *Production and Operations Management*, 21(1), 1-13.
- Sodhi, M. S. (2005). **Managing demand risk in tactical supply chain planning for a global consumer electronics company**. *Production and Operations Management*, 14(1), 69-79.
- Hendricks, K. B., & Singhal, V. R. (2005). **An Empirical Analysis of the Effect of Supply Chain Disruptions on Long Run Stock Price Performance and Equity Risk of the Firm**. *Production and Operations Management*, 14(1), 35-52.

SESSION 3: Emerging topics

What are the emerging risks in the supply chain?

We discuss disasters and humanitarian assistance as a type of risk. Another risk is that of non-sustainability and social irresponsibility.

Reading list

- Sodhi, M.S. 2016. **Conceptualizing social responsibility in operations via Stakeholder Resource Based View**, *POM,* forthcoming.
- Sodhi, M.S. 2015. **Strategic humanitarian operations: A virtuous cycle of mitigation, prosperity and resilience to combat disasters**, working paper.
- Sodhi, M.S. & Tang, C.S. 2014. **Buttressing supply chains for flood relief in Asia**, *POM*, 2014.
- Tang, C. S., & Zhou, S. (2012). **Research advances in environmentally and socially sustainable operations**. *European Journal of Operational Research*, 223(3), 585-594.

Further reading:

- Sodhi M.S. and Tang, C.S. 2012. **Managing supply chain risk**, *Springer*, NY.

CERTIFICATE

The PhD Summer Academy 2015 program is administered under the MIT-Zaragoza International Logistics Program, one of the select MIT educational and research partnerships (http://www.zlc.edu.es/about-us/networks/mit-global-scale/). Upon completion of all courses to which you have enrolled, you will be awarded a certificate stating that you have completed a PhD summer course under the MIT- Zaragoza Program.

MIT ZARAGOZA
International Logistics Program

PhD Summer Academy July 2013

"My experience while attending the MIT PhD Summer Academy was simply unmatched comparative to other forms of intensive training. The diversity combined with a global perspective surrounding operations, supply chain and logistics left investigators wanting more given the program's unique ability to bring top-tiers researchers in the field to one location and teach their "niche areas" during industry-specific and distinctive sessions. Without hesitation, I would highly recommend those with an interest to apply and invest their time in this given the opportunity cost comparative of absenteeism."

Ryan N. Schmidt · PhD Summer Academy 2014
PhD, MBA, MS, CMRP Assistant Professor of Healthcare Administration (HCAD) Langdale College of Business Administration (LCOBA) Valdosta State University (GA)

"It was a great opportunity for me to improve and develop my skills into the supply chain and logistics profession. I spent a great time in the summer academy and I benefited by meeting and networking with 20 students from different countries around the world. Also, the course was intensive, useful and delivered by highly educated professors at area of supply chain, logistics and strategy and they are from different well-established global institutions. I found the course really helpful, outstanding and highly recommended".

Meshal Almofadhi · PhD Summer Academy 2014
PhD Candidate in Logistics Clusters at Aston University - United Kingdom

PhD Summer Academy 2015
MIT-Zaragoza International Logistics Program
Zaragoza Logistics Center
Edificio Nayade 5 • C/Bari, 55
50197 Zaragoza (Spain)
Tel.: + 34 976 070 148
phdacademy@zlc.edu.es
www.zlc.edu.es/phd-summer-academy

Jianjun Xu
PhD Summer Academy Director
jxu@zlc.edu.es

Clara García
PhD Summer Academy Admissions Office, registration, accommodation, visa requirements
cigarcia@zlc.edu.es

Carlos Velle
IT Department: IT support, access cards to the ZLC building and facilities
cvelle@zlc.edu.es

In collaboration with:

MIT Center for Transportation & Logistics

Universidad Zaragoza 1542

PLAZA Plataforma Logística de Zaragoza Plaza S.A.

FONDO SOCIAL EUROPEO
"Construyendo Europa desde Aragón"

iberCaja

CAJA INMACULADA

GOBIERNO DE ARAGON