Seminar Speaker: Dr. Philip Kaminsky, University of California, Berkeley

Time and Location: Wednesday, April 18 from 12:20 to 1:10, Freeman Auditorium

Title: Centralized and Decentralized Warehouse Logistics Collaboration

Abstract: An emerging paradigm for horizontal logistics collaboration in the grocery industry centers on large third-party warehouses, sometimes known as mixing and consolidation centers, that multiple suppliers use as warehouses or mixing centers, and from which multiple retailers order mixed-product truckloads. Anecdotal evidence suggests that these warehouses lower transportation costs by fully utilizing outbound transportation, and increase service level by increasing the frequency of deliveries to retailers. These warehouses are typically operated in a decentralized fashion, where individual suppliers decide when to make deliveries to the warehouse, and retailers order from the inventory in the warehouse, so that limited effort is made to coordinate the orders of different retailers with the deliveries of different suppliers. In this paper, we use a series of simple, stylized models to explore the impact of this decentralized approach to operating this system. We first extend the classic continuous-time deterministic one-warehouse-multi-retailer model to a (centralized) multi-supplier setting. Because even this simplified model is challenging to optimize, we develop and analyze a power-of-two heuristic for this model. Next, we consider several decentralized versions of this model, in which each supplier and retailer focuses on minimizing his or her own operating costs, and again develops a set of effective approaches for this decentralized, retailer-led setting. Finally, we characterize the “cost of anarchy” in this system – the loss due to decentralized operation. In a computational study, we explore the computational ratio of the cost of decentralized and centralized operations for a variety of examples, and the system characteristics that impact this ratio.

Bio: Phil Kaminsky is Chancellor's Professor and Chair of the Industrial Engineering and Operations Research Department at the University of California, Berkeley, where he also serves as co-director of the Center for Entrepreneurship and Technology, and director of the Initiative for Research in Biopharmaceutical Operations. He received his PhD in Industrial Engineering and Management Science from Northwestern University. Prior to that, he worked in production engineering and control at Merck and Co. His current research focuses on the analysis and development of robust and efficient tools and techniques for design, operation, and risk management in logistics systems and supply chains, with a particular recent focus on the pharmaceutical and transportation industries. He is a co-author of “Managing the Supply Chain: the definitive guide for the business professional" and "Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies." He consults in the areas of production planning, logistics, and supply chain management.