

# ORGANIZING COMMITTEE

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**Shaohui Zheng      Hong Kong University of Sciences and Technology**

***Co-Chair:***

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**James Ang              National University of Singapore**

**Xiuli Chao              University of Michigan**

**Hong Chen              University of British Columbia**

**Jian Chen              Tsinghua University**

**Albert Ha              Hong Kong University of Sciences and Technology**

**Houmin Yan              Chinese University of Hong Kong**

**MEETING VENUE: Salon 3 (檀宮 III), Sanya Marriott Resort**

## **SCHEDULE**

**SATURDAY, DEC 27, 2008**

⌚ 14:00-17:00	Registration: Lobby, Huandao Beach (海底世界) Hotel
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**SUNDAY, DEC 28, 2008**

⌚ 8:00-9:00	Registration: Salon 3, Sanya Marriott Resort	
⌚ 9:00 - 9:50	Plenary Talk 1:	David Yao <b>Columbia University/ Chinese University of Hong Kong</b>
⌚ 9:50-9:55	Break	
⌚ 9:55-10:45	Plenary Talk 2:	Hong Chen <b>University of British Columbia</b>
⌚ 10:45-11:15	Coffee Break	
⌚ 11:15-12:05	Plenary Talk 3:	Xiuli Chao <b>University of Michigan</b>
⌚ 12:00-14:00	Lunch (Marriott Café)	
⌚ 14:00-15:20	Session S1	Chuen-Teck See, Melvyn Sim J.Q. Hu, Cheng Zhang, Chenbo Zhu Joel Goh, Kian Guan Lim Melvyn Sim, Weina Zhang. Jun Shan, Kaijie Zhu
⌚ 15:20-15:50	Coffee break	
⌚ 15:50-17:30	Session S2	Qing Li, Shaohui Zheng, Stuart X. Zhu Qing Li, Xiaoli Wu, Kiling Cheung He Xu, Stuart X. Zhu, Liming Liu Chunyang Tong Haifeng Wang, Houmin Yan
⌚ 18:00 -20:30	Dinner	

**MONDAY, DEC 29, 2008**

⌚ 9:00 - 9:50	Plenary Talk 4	Paul Zipkin <b>Duke University</b>
⌚ 9:50-9:55	Break	
⌚ 9:55-10:45	Plenary Talk 5	Fangruo Chen <b>Columbia University/ Shanghai Jiao Tong University</b>
⌚ 10:45-11:15	Coffee Break	
⌚ 11:15-12:05	Plenary Talk 6	Jeannette Song <b>Duke University</b>
⌚ 12:00-14:00	Lunch (Marriott Café)	
⌚ 14:00-15:20	Session M1	Yue Dai, Sean X. Zhou, Yifan Xu
		Weixin Shang, Liming Liu
		Yifan Xu, Yanming Ge
		Xiting Gong, Gangshu Cai
⌚ 15:20-15:50	Coffee Break	
⌚ 15:50-17:10	Session M2	Frank Y. Chen, Liuxin Chen, Zhan (James) Pang
		Tian Li, Hongtao Zhang
		Wei-Hua Zhou, Chung-Yee Lee
		Xiaogang Cao
⌚ 18:00 -20:30	Dinner	

**TUESDAY, DEC 30, 2008**

⌚ 9:00-17:00	Informal Discussion and Local Tour
⌚ 18:00 -20:30	Dinner

# MEETING PROGRAM

## Plenary Talk 1 :: Sunday 09:00 - 09:50

**Chair** James Ang, National University of Singapore

**Speaker** David Yao, Columbia University / Chinese University of Hong Kong

**Title** **Joint Replenishment and Re-distribution in Supply Networks: Structural Properties and Asymptotic Optimality**

**Abstract** Many problems faced by a wide range of firms worldwide in their supply chains share some common features that can be abstracted as follows. Periodically, or at the beginning of some selling season, the firm needs to dispatch finished goods to a set of distribution centers (DC's) or stocking locations, which, in turn, supply customer demands. Over the selling season, almost inevitably there will be some supply-demand mismatch at some stocking locations, such that a re-distribution of the inventory among the DC's is required. Hence, there are two critical decisions involved: the inventory replenishment quantities to the DC's at the beginning of the period, and any necessary transshipment of inventory among the DC's over the period to rebalance supply and demand.

With a stochastic dynamic programming problem formulation, we identify the key structural properties of the optimal policies. We also develop upper and lower bounds on the original problem, with the bounds leading to a tractable approach to the replenishment quantities and a simple reservation policy for re-distribution. Furthermore, we demonstrate that the two decisions, the initial replenishment and the in-period re-distribution, contribute to the overall value function in qualitatively different ways, with a separation of scales: the contribution of the former is in the order of the demand rate; whereas that of the latter is in the lesser, square-root order of the demand rate. This leads to an important qualitative insight: get the initial distribution right so as to minimize the need for re-distribution later on.

(Joint work with Yongbo Xiao.)

## Plenary Talk 2 :: Sunday 9:55-10:45

**Chair** Jian Chen, Tsinghua University

**Speaker** Hong Chen, University of British Columbia

**Title** **Joint Pricing and Inventory Decision in an Inventory System with General Demand Function**

**Abstract** We consider the optimal pricing and inventory replenishment decision in an inventory system where the demand is stochastic and dependent on the price. In each period, satisfied demand generates the revenue, remaining inventory incurs a holding cost, and unsatisfied demand is backlogged to the next period and incurs a backlog cost. The joint optimal pricing and inventory replenishment decision is sought to maximize the total expected discounted profit over a finite horizon. When the demand is assumed to be a concave function of price, Federgruen and Heching (1999) shows that the optimal policy is a base-stock list-price policy. As noted in their paper, the concavity assumption is rather restrictive. In fact, there are substantial empirical evidence that does not support the demand function being concave. That is why many theoretic demand functions are none concave functions. In this presentation, we explore to what extend the base-stock list-price policy is still optimal without assuming the demand function to be concave.

(Joint work with Zhan Zhang.)

### **Plenary Talk 3 :: Sunday 11:15-12:05**

**Chair** Shaohui Zheng, Hong Kong University of Science and Technology

**Speaker** Xiuli Chao, University of Michigan

**Title** **Optimal Control of Inventory Systems with Multiple Types of Remanufacturable Products**

**Abstract** We study a single-product periodic-review inventory system with multiple types of returns. The serviceable products for fulfilling stochastic customer demand can be either manufactured/ordered, or remanufactured from the returned products, and the objective is to minimize the expected total discounted cost over the planning horizon. We show that, under some circumstances but not all, the optimal policy has a simple form and can be completely characterized by a sequence of constant control parameters. However, in other scenarios, the optimal policy is quite complicated and its control parameters are state-dependent. We develop simple heuristic policies for managing the system, and numerical studies show that the heuristics are effective. This is a joint work with Sean Zhou and Zhijie Tao of Chinese University of Hong Kong

## **Session S1 :: Sunday 14:00-15:20**

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**Chair** Jie Sun, National University of Singapore

**Title** Robust Approximation to Multi-Period Inventory Management

**Author** Chuen-Teck See and Melvyn Sim (National University of Singapore)

**Abstract** We propose a robust optimization approach to address a multi-period, inventory control problem under ambiguous demands, that is, only limited information of the demand distributions such as mean, support and some measures of deviations. Our framework extends to correlated demands and is developed around a factor-based model, which has the ability to incorporate business factors as well as time series forecast effects of trend, seasonality and cyclic variations. We can obtain the parameters of the replenishment policies by solving a tractable deterministic optimization problem in the form of second order cone optimization problem (SOCP), with solution time, unlike dynamic programming approaches, is polynomial and independent on parameters such as replenishment lead time, demand variability, correlations, among others. The proposed truncated linear replenishment policy (TLRP), which is piecewise linear with respect to demand history, improves upon static and linear policies. Our computational studies also suggest that it performs better than simple heuristics derived from dynamic programming.

**Title** Inventory Systems with Correlated Demands

**Author** J.Q. Hu, Cheng Zhang and Chenbo Zhu (Fudan University)

**Abstract** In most inventory models studied in the literature it has been assumed that demands are independent of each other and can be modeled as a renewal stochastic process. However, it has been observed that in many applications demands in different periods often form a correlated stochastic process. In this work, we study an  $(s, S)$  inventory system with Markov modulated demands. Using the technique of MacLaurin series expansion, we derive two recursive algorithms to calculate the moments of the inventory level, which can then be used to evaluate various performance measures of the system. These are the first analytical results available so far for  $(s, S)$  inventory systems with general Markov modulated demands. Numerical results will be presented to validate our algorithms.

**Title** Portfolio Value-at-Risk Optimization for Asymmetric Distributed Asset Returns

**Author** Joel Goh, Kian Guan Lim, Melvyn Sim and Weina Zhang (National University of Singapore)

**Abstract** We minimize the Value-at-Risk (VaR) of a portfolio of assets which have unknown distributions. We explicitly model asymmetries in returns by partitioning the returns into positive and negative half-spaces and measuring first and second moments of the partitioned returns. We introduce a new concept of Partitioned VaR (PVaR), which is a robust measure of risk which incorporates asymmetry. We report computational experiments on both simulated and real

data which show that the optimal portfolio under PVaR performs better than classical risk measures when the underlying data possess asymmetry.

- Title** **Inventory Management in China: An Empirical Study**
- Author** Jun Shan and Kaijie Zhu (Hong Kong University of Science and Technology)
- Abstract** While China is gradually becoming the global manufacturing hub, people believe that the competitiveness of Chinese firms comes mainly from low labor and material costs, because the logo of "Made in China" oftentimes represents cheap products with low quality and renders an impression of inferior management by the firms that manufacture the products. In this paper, we analyze the operational performance of firms in China via studying their inventory management. Specifically, we apply an empirical method to investigate the inventories of 1253 public firms. We find that on average the inventories reduce at an annual rate of 3.3% and the firm-level data is well consistent with several hypotheses derived from classical inventory models. Therefore, our results indicate that inventory management at the Chinese firms has been improved noticeably and that the external impression of low operational performance may not truly represent the status quo of the industries in China.

## **Session S2 :: Sunday 15:50-17:30**

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- Chair** **Linyan Sun, Xi'an Jiao Tong University**
- Title** **Optimal Replenishment Policy for a Capacitated Production System with Uncertain Yield and Outsourcing**
- Author** Qing Li, Shaohui Zheng and Stuart X. Zhu (Hong Kong University of Science and Technology)
- Abstract** We study a single-item periodic-review inventory system with two sources of supply: in-house production and outsourcing. The two sources differ in leadtimes, yields and costs. Demands in consecutive periods are independent random variable and stockout is fully backlogged. Our problem is to characterize the optimal dynamic policy that simultaneously determines the in-house production quantity and the outsourcing quantity for each period to minimize the total discounted cost. We show that the optimal policy for in-house production can be characterized by a threshold and the production quantity is decreasing in the starting inventory. The optimal outsourcing policy, however, is more complex, and a threshold-type policy is optimal only under a more restrictive assumption about the yields. To study the operational effects of uncertain yield and dual sourcing, we first compare our model with one model with dual sourcing and certain yield. We prove that the threshold of in-house production with uncertain yield is higher than that with certain yield. Second, we compare ours with one model with only in-house production and uncertain yield. We obtain a counter-

intuitive observation, i.e., the production quantity in the sole-source system may be less than that in a dual-source system.

**Title** **Optimal Policies for inventory systems with separate delivery-requests and order-quantity decisions**

**Author** Qing Li, Xiaoli Wu and Kiling Cheung (Hong Kong University of Science and Technology)

**Abstract** Motivated by logistics practices, we consider a retailer replenishes its inventory by making a delivery request without specifying a quantity, then deciding the quantity when the delivery vehicle arrives after one period. A fixed cost is incurred whenever a delivery request is made, regardless of the quantity ordered later. The new feature of this research relative to previous work (e.g., Scarf 1960) is the separation of the delivery request and the quantity decision, or the postponement of ordering until one-period demand information is observed. Due to such separation, both the state space and the action space must be augmented in the model. We show that the optimal policy for delivery requests is of a threshold type: a delivery request is made if and only if the inventory on hand is below a threshold. The optimal decision on ordering is more complex and there might be multiple order-up-to levels. Our numerical studies show, nonetheless, that the cost of an ordering policy that considers (at most) two order-up-to levels is close to the minimal when the planning horizon is not too short. We also identify conditions under which a base-stock policy is optimal for ordering. To understand the effects of ordering postponement, we compare our model with Scarf (1960) with a one-period leadtime. We show that postponement leads to not only a lower cost but also a higher threshold for making delivery requests.

**Title** **Control Policy of Inventory and Delivery Speed for a Push-and-Pull System**

**Author** He Xu (Hua Zhong University of Science and Technology), Stuart X. Zhu (Hong Kong University of Science and Technology), and Liming Liu (Hong Kong Polytechnic University)

**Abstract** This paper studies the design and control issues for a firm operating a two-stage push-and-pull system with leadtime quotation and stock decisions. The firm has two design strategies: either perform in-house production or outsource the operations at the pull stage to a third-party service provider. To evaluate the performance and control policy of different system designs, we construct a decision model to minimize the holding costs of the semi-finished product and the finished product, the late delivery cost, and customers' waiting cost by optimizing base-stock level of the semi-finished product and the quoted leadtime. We show that under the certain condition, the system control follows a threshold policy depending on the utilization. If the utilization is lower than the threshold, the system follows a make-to-order strategy. Otherwise, the system follows an assemble-to-order strategy. We also do comparison for these two strategies. We find that under the same control policy, the stock level decision is dominated by the system variability while the time decision depends on all the factors including system variability, cost parameters and utilization.

**Title** **Order Postponement in a Supplier-Retailer Channel**

**Author** Chunyang Tong (Shanghai University of Finance and Economics)

**Abstract** This paper explores the optimal supply contract with terms including a time window for order decision postponement and a flat wholesale price. Under this contract, the product manufacturer offers the retailer a time window for partially observing product demand and making a purchase decision upon conclusion of the time window. Using a Stackelberg game model, we examine how this contractual arrangement would affect the wholesale price of a supply product and profitability for both the manufacturer and retailer. This study indicates that, by optimally postponing the order-quantity decision and pre-committing to the optimal wholesale price, both the manufacturer and the retailer benefit in terms of expected profit, providing that the costs associated with the test selling are not considered. The manufacturer's optimal wholesale pricing strategy increases when the allowed time windows for observing demand is larger and/or it is more costly for him to have a delayed production schedule. The optimal contractual term regarding the length of time-window for order postponement depends upon the product's cost-price margin, the variability of demand, and the cost structure associated with the demand observation. The benefit from learning more about demand decreases as the demand-learning duration increases. Furthermore, in a supply chain structure in which the manufacturer is the leader, the optimal demand-learning time window in a decentralized system is of a shorter length than in a centralized system. It is suggested that if some portion of the manufacturer's costs associated with the demand learning are shared by the retailer, the profits for both the manufacturer and the retailer, as well as for the system as a whole, can be improved.

**Title** **Inventory Models with Alternative Delivery Lead times, Priority Disciplines, and Demand Backlogging**

**Author** Haifeng Wang and Houmin Yan (Chinese University of Hong Kong)

**Abstract** A supplier has a periodic review inventory system that provides multiple lead-time options to its customers. The inventory replenishment lead time is a multiples of the inventory reviewing cycle. Customers are classified into two groups: short lead-time customers who require the product immediately as long as the supplier has an on-hand inventory; and long lead-time customers who allow the supplier to backlog their orders. We consider an inventory commitment problem, that is, how does the supplier commit its on-hand and replenished inventories to two groups of customers. For backlog inventory models of multiple customer classes, one has to discuss how the backlogged orders are satisfied. We consider two priority rules in clearing backlogs.

The priority rules are first-come-first-served (FCFS) and short-lead-time-customer-first-served (SCFS). For both priority discipline, we characterize the optimal inventory commitment and inventory-replenishment policies. We also compare the optimal policies for the two disciplines and evaluate the performance of the inventory system under different priority disciplines.

## **Plenary Talk 4 :: Monday 09:00 - 09:50**

**Chair**            **Albert Ha, Hong Kong University of Science and Technology**

**Speaker**        **Paul Zipkin, Duke University**

**Title**            **Quality Snags in the Mortgage-Finance Supply Chain**

**Abstract**        This essay views the current financial crisis through the lens of quality management. The crisis represents a failure of quality, and solving it will require, among other things, careful management of quality in financial institutions and across financial supply chains. This will be difficult for several reasons, but not impossible. I offer several recommendations, partly inspired by successful quality practices in industry.

## **Plenary Talk 5 :: Monday 9:55-10:45**

**Chair**            **Houmin Yan, Chinese University of Hong Kong**

**Speaker**        **Fangruo Chen, Columbia University**

**Title**            **Marketing-Operations Interface Research: The Case of Salesforce Incentives**

**Abstract**        In the corporate world, inter-functional coordination is increasingly viewed as a key source of competitive advantage. Marketing and operations are, of course, two main functions of almost any business, and developing the capability of marketing-operations coordination deserves the attention of top management. Fortunately (or not surprisingly), research on the Marketing-Operations interface has attracted the attention of many academic researchers, e.g., the study on the interaction between pricing and inventory decisions dates back several decades. In this talk, I will describe several recent developments that re-examine an important topic in Marketing, namely the salesforce compensation problem, in light of its implications for a firm's operations, and show how operational considerations may alter or refine what we have learned from Marketing.

## **Plenary Talk 6 :: Monday 11:15-12:05**

**Chair**            **Hanqin Zhang, Chinese Academy of Sciences / National University of Singapore**

**Speaker**        **Jeannette Song, Duke University**

**Title**            **Recent Developments in Multi-Sourcing Inventory Models**

**Abstract** This talk reviews some recent developments in inventory models with multiple supply sources, including multiple suppliers, multiple transportation modes, and expediting options. Multi-source inventory problems are fundamental problems in inventory management, and have been studied ever since the early stage of inventory theory. Unfortunately, these problems are intrinsically complex. Despite several decades of effort, the theory is still limited. In recent years, due to unprecedented forces of globalization and advancement of technology, companies are presented tremendous opportunities to source globally. The ability to take advantage of the available resources from any location in the world has become vital for companies to stay competitive. As such, prudent decisions in supply management are of strategic importance. In response to this, we have seen a resurgence of research interests on these issues. The purpose of this overview is to facilitate our understanding of the state-of-the-art research in this area and shed light on a few future research directions.

## **Session M1 :: Monday 14:00-15:20**

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**Chair** Yifan Xu, Fudan University

**Title** **Competitive and Collaborative Quality and Warranty Management in a Supply Chain**

**Author** Yue Dai (Fudan University), Sean X. Zhou (Chinese University of Hong Kong), and Yifan Xu (Fudan University)

**Abstract** Product warranty is becoming an increasing important marketing strategy which often can impress upon customers the unobservable product quality. Product quality in turn affects the cost resulting from the warranty coverage. To study these two aspects jointly in supply chain management, we develop a system with one supplier who supplies a product to an OEM (original equipment manufacturer) selling to customers. Customer demand is random and affected by the length of product warranty period. Warranty costs are incurred at both the supplier and the manufacturer, which depend on the product quality level and the length of the warranty period. Two different scenarios are analyzed: supplier warranty and manufacturer warranty. The product quality is set by the supplier while the manufacturer determines ordering quantity. We investigate the equilibrium behavior of the decentralized supply chains and provide some structural properties of the equilibrium. We find that, when quality and warranty issues are involved, it is not always beneficial for the supplier/manufacturer to squeeze the margin of the other party in the supply chain. Meanwhile, our numerical results show that when the warranty period is determined by the one with a higher marginal warranty cost with respect to the protection period, the decentralized supply chain can be better off. And this could benefit both parties through sharing the resulting additional profit. Furthermore, we design a supplier-development and buy-back contract that coordinates the supply chain in both cases.

**Title**                    **Quality Differentiation in Time Competition**

**Author**                Weixin Shang (Fudan University) and Liming Liu (Hong Kong Polytechnic University)

**Abstract**             We investigate competitive firm behaviors in service industries where customers are sensitive to both promised delivery/waiting time (PDT) and quality of service (QoS) measured by on-time delivery rate. To study the competition in PDT and QoS at the marketing level with inflexible capacities, we construct an oligopoly game with an external QoS constraint. We show that there exists a unique Nash equilibrium, which can be computed using an efficient algorithm. The equilibrium QoS exhibits a switching surface structure with respect to capacities that determines firms' quality differentiation strategies. We find that the market status quo is usually disrupted when time competition is introduced, and the firms with a larger residual capacity (without time competition) will gain market share. To study the competition in capacity at the strategic level, we construct a two-stage game in which the firms compete in capacity in the first stage and in PDT and QoS in the second stage. We show that besides interior equilibria commonly considered in literature, we may have boundary equilibria. We find that the efficiency indicator, defined as the ratio of revenue rate to capacity cost rate, plays a key role here. Interior equilibria exist only if all firms are efficient, and the more efficient firm will gain market share from time competition. Boundary equilibria exist if and only if the firms are mostly inefficient (or capacity investment is expensive in general in this market). Under a boundary equilibrium, the firm that gains market share from time competition may not be the more efficient firm, and quality differentiation may be used by the firm to protect her market advantage by setting a higher barrier to the change of status quo for the competitors. The dual-role of quality differentiation, i.e., either helping a more efficient firm to compete more effectively or helping a (possibly less efficient) firm to threaten competitors and protect the market advantage, highlights the importance of a clear understanding of time competition and the strategic actions that should be taken by senior corporate management.

**Title**                    **Overbooking with Bilateral Transference in Parallel Flights**

**Author**                Yifan Xu and Yanming Ge (Fudan University)

**Abstract**             In current competitive airline market, overbooking has been an ordinary and efficient procedure for airlines to deal with the risk of cancellations and no-shows. However, with the rapid development of world economy, the uncertainty caused by various factors such as weather, traffic jam, and activities from economy, politics and society is increasing dramatically and has been a challenge to management. Although rising the overbooking level is still one comment method to handle the uncertainty in airline market, it will push the uncertainty more serious reversely. Now many airlines such as China Eastern Airlines, China Southern Airlines and Shanghai Airlines are implementing a policy named bilateral transference (or forward and backward transference) among parallel flights in the busy route between Shanghai and Beijing. The policy allows overflow passengers due to overbooking move to later flights under some compensations while passengers who arrive airport ahead of their schedule to board any early flight with surplus capacity in free. This scheme greatly improves the occupation and rises the revenue. However, how to determine the

transferring quantity among parallel flights in a route is an urgent and unsolved problem to airlines. In this paper, we explore the insight of forward and backward transference from a simpler case, bi-lateral transference between two parallel flights. We design a method to determine the optimal transferring quantity between two flights and analyze some properties of the scheme. Then, we extend the result in two parallel flights to parallel multi-flights. Lastly, we present some numerical tests which show the intuition within bilateral transference.

**Title**                    **Obtaining Fast Service Through Stable Allocation Policies**

**Author**                Xiting Gong(Beijing University) and Gangshu Cai(Kansas State University)

**Abstract**            Fast service and short delivery lead times have been very important for buyers procuring service or make-to-order products, and thus how to stimulate suppliers to build more capacities becomes critical and significant. An important incentive scheme is to make them compete by allocating demands to them based on their performance. In the context of a queueing model with two strategic servers, previous research is aimed at finding optimal allocation policies without considering their stability, i.e., to maintain the queueing system stable whenever possible. This paper studies a variety of state-independent allocation policies and compares their performance. We find that balanced allocation, which attempts to equalize service providers' residual capacities, performs quite well whenever it has Nash equilibrium. However, the competition caused by this policy is sometimes so much that Nash equilibrium fails to exist. To overcome this shortcoming, we design a stable policy that allocates demands to servers in proportion to their residual capacities and adjusts the level of competition between servers with a parameter. We show that it converges to balanced allocation and is sometimes an optimal state-dependent policy.

## **Session M2 :: Monday 15:50-17:30**

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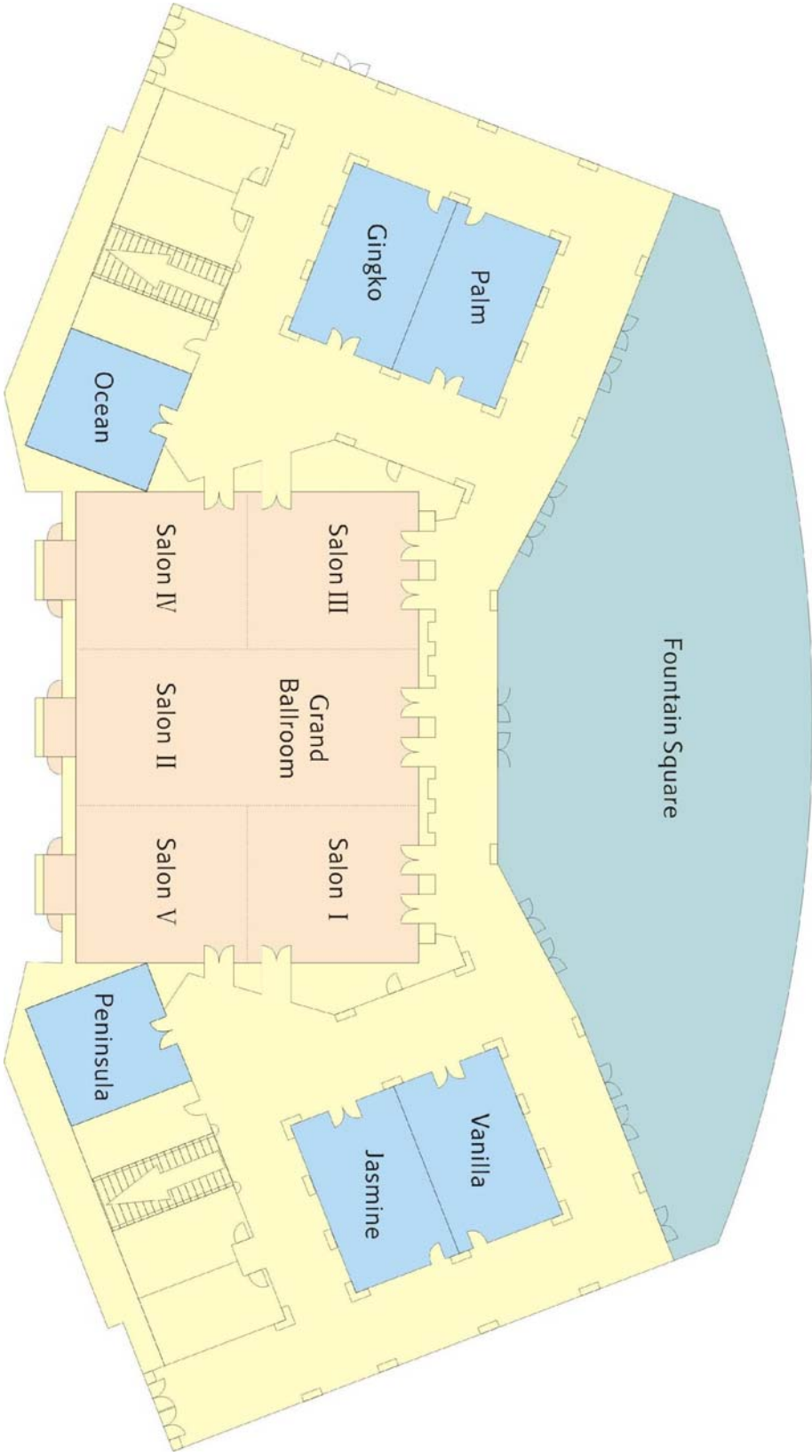
**Chair**                    **Hongtao Zhang, Hong Kong University of Science and Technology**

**Title**                    **A Dynamic Pricing-Inventory Control Problem with Batch-ordering and Random Leadtimes**

**Author**                Frank Y. Chen, Liuxin Chen and Zhan (James) Pang (Chinese University of Hong Kong)

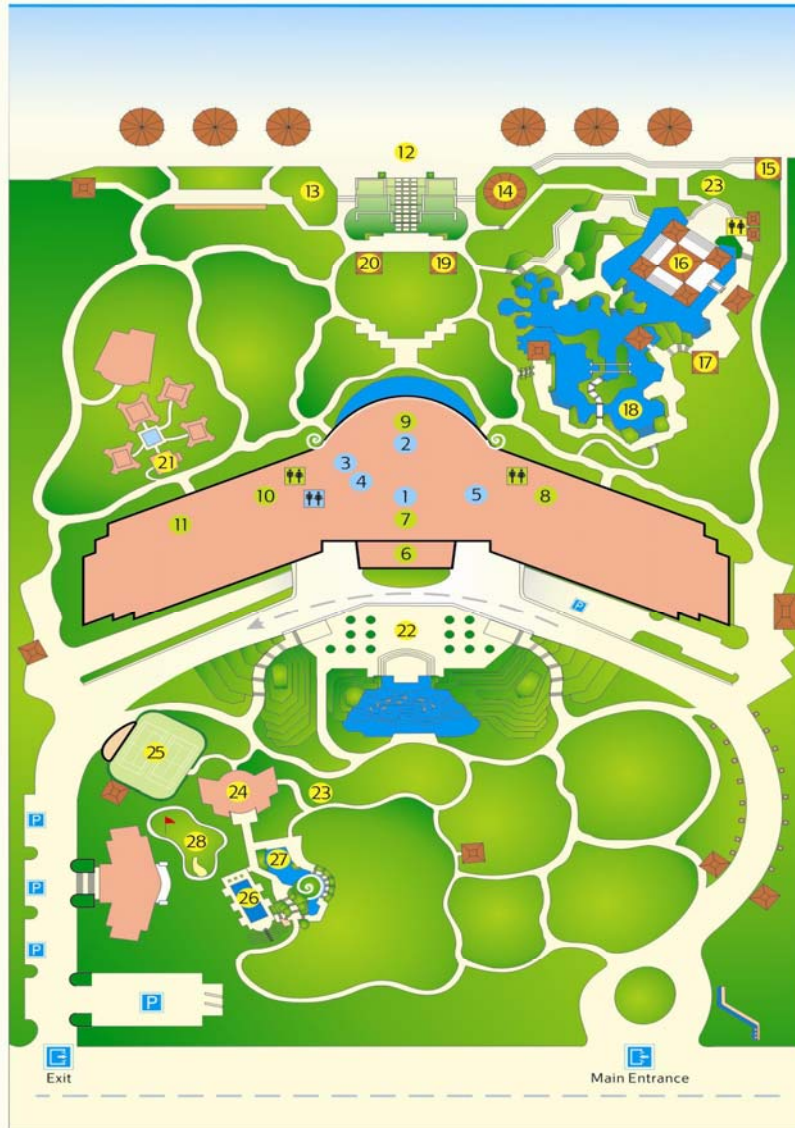
**Abstract**            We consider a joint pricing and inventory control problem in a continuous-review inventory system with lost sales and a stochastic leadtime. The demand process is Poisson with a price-sensitive arrival rate. The inventory is replenished in a lot size of  $Q$ , and the replenishment leadtime is assumed to follow an Erlang (or mixed Erlang) distribution with the number of phases denoting the status of delivery process. The objective is to maximize the total expected discounted or average profit over an infinite horizon. Assuming that at most one replenishment order is outstanding at any point in time, we show that, in the lost-sales case, the  $(r,Q)$  policy is optimal for the replenishment of stock and that the optimal pricing control can be characterized as state-dependent price-switch levels.

- Title**                    **Strategically Sharing Demand Information in Competing Channels**
- Author**                 Tian Li and Hongtao Zhang (Hong Kong University of Science and Technology)
- Abstract**               We consider two competing supply chains, each with a manufacturer and a retailer. Each retailer conducts market research which does not always generate valuable information. In case it does, the retailer has the choice of disclosing that information to his manufacturer. The uncertainty in the success of market research enables a retailer to credibly conceal high-demand news. We study the firms' equilibrium behavior and examine how market research capability and retail competition impact information sharing and profits. We show that a retailer may become worse off with a greater market research capability and that his optimal capability level is increasing in the competition intensity and the other retailer's research capability.
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- Title**                    **Pricing and competition in a transportation market with empty equipment repositioning**
- Author**                 Wei-Hua Zhou (Zhe Jiang University) and Chung-Yee Lee (Hong Kong University of Science and Technology)
- Abstract**               This paper studies a transportation market with two firms providing transportation service between two locations. There are potential demands for transportation service in both directions. Firms make decisions on prices. The realized demands reflect the price decisions of both firms. Equipment is required to transport demand from one location to the other. To sustain the business, firms have to reposition empty equipment from a surplus location to a shortage location and incur repositioning cost if the realized demands are unbalanced. We build a mathematical model to study the pricing strategy and analyze the outcome of competition. The optimal pricing strategy of a firm is either to achieve the balance of realized demands or treat these two directions as two separate markets. We also study the outcome of competition. In case of a duopoly market, we corroborate how the profit of a firm is affected by potential imbalance, unit loaded equipment movement cost, unit empty equipment repositioning cost, price sensitivity and the competition intensity. It is interesting to find that profit may increase with potential imbalance and with unit empty equipment repositioning cost.
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- Title**                    **Procurement-Inventory Control under Fluctuating Prices**
- Author**                 Xiaogang Cao (Wuhan University)
- Abstract**               We address the raw material procurement-inventory problem by using the deterministic optimal control approach. A company has to decide on rates at which raw-material procurement is carried out, while raw material prices and demand levels, vary over time. Through the study of optimality control conditions, we derive insightful properties of the optimal procurement controls for a few special cases. On the other hand, our computational study helps identify solution patterns over parametric changes.



Hotel Ballroom Floor Plan

## RESORT MAP



### Level 3

- 1 Lobby
- 2 View Lounge
- 3 Resort Shop
- 4 Airticket Counter
- 5 Business Center
- Washroom

### Level 1

- 6 Grand Ballroom
- 7 Meeting Rooms
- 8 Indochine
- 9 Marriott Café
- 10 Wan Hao Chinese Restaurant
- 11 Fitness Center
- Washroom

### Outdoor

- 12 Beach
- 13 Beachside Games Area
- 14 Deep Blue
- 14 Beach Service
- 15 Water Sports
- 16 Sea Breeze Pool Bar & Grill
- 17 Pool Service
- 18 Two-tiered Pool
- 19 Lawn Pizza Kitchen
- 20 Smoothie Station
- 21 Quan Spa
- 22 Fountain Square
- 23 Hammocks
- 24 Clubhouse
- 25 Tennis Courts
- 26 Lap Pool
- 27 Kid's Pool
- 28 Putting Green
- Washroom

SANYA MARRIOTT RESORT & SPA  
Yalong Bay National Resort District, Sanya 572000, Hainan, China