

*The Hong Kong Polytechnic University  
Department of Logistics and Maritime Studies  
Research Seminar*

## **Approximation Algorithms for Product Framing and Pricing**

by

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**Date: 5 December 2016 (Monday)**

**Time: 10:30am-11:30am**

**Venue: M802, Li Ka Shing Tower**

**The Hong Kong Polytechnic University**

**(Conducted in English)**

### **Abstract:**

We propose one of the first models of “product framing” and pricing. Product framing refers to the way consumer choice is influenced by how the products are framed, or displayed. We present a model where a set of products are displayed, or framed, into a set of virtual web pages. We assume that consumers consider only products in the top pages, with different consumers willing to see a different number of pages. Consumers select a product, if any, from these pages following a general choice model. We show that the product framing problem is NP-hard. We derive algorithms with guaranteed performance relative to an optimal algorithm under reasonable assumptions. Our algorithms are fast, easy to implement, and dominate the best known performance bounds. We also present structural results for pricing under framing effects. At optimality, products are sorted in descending order of quality, and prices are shown to be page dependent, with higher prices associated with products on pages seen by fewer consumers, so products in the first page are of the highest quality and have the lowest prices. (Joint work with Anran Li, Van-Anh Truong and Xinshang Wang).

### **Bio:**

Professor Guillermo Gallego is the Department Head of Industrial Engineering and Logistics Management, and also the Crown Worldwide Professor of Engineering.

Prior to his appointment in January 2016, Prof Gallego was the Liu Family Professor at the Department of Industrial Engineering and Operations Research at Columbia University, where he served as the Department Chairman from 2002-2008. He was named a Manufacturing and Service Operations Management Society (MSOM) Fellow in 2013, Informs Fellow in 2012 and has been the recipient of many awards including the Informs Revenue Management Section Prize (2005), the Revenue Management Historical Prize (2011) and the Revenue Management Practice Prize (2012). He is also the recipient of the 2016 INFORMS Impact Prize.

Prof Gallego’s research interests are Dynamic Pricing and Revenue Optimization, Supply Chain Management, Electronic Commerce, and Inventory Theory. He has published influential papers in the leading journals of his field where he has also occupied a variety of editorial positions. His work has been supported by numerous industrial and government grants. In addition to theoretical research, Prof Gallego has developed strong collaboration with global corporations such as Disney World, Hewlett Packard, IBM, Lucent Technologies, Nomis Solutions, and Sabre Airline Solutions. He has also worked with government agencies such as the National Research Council, the National Science Foundation in United States and the Ireland Development Agency. His graduate students are associated with prestigious universities and occupy leading roles in their chosen fields. He spent his 1996-97 sabbatical at Stanford University and was a visiting scientist at the IBM Watson Research Center from 1999-2003.

Prof Gallego received both his PhD degree (1988) and MS degree (1987) in Operations Research and Industrial Engineering from Cornell University.

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**All are welcome!**