

**The University of Chicago Booth School of Business**

**Operations Management/Management Science Workshop**

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**Professor Chung Piaw Teo, National University of Singapore**

**Title:** On the Design of Sparse but Efficient Structures in Operations

**Paper Link:**

[https://www.dropbox.com/s/lh5thp5iujcjcw/On%20the%20Design%20of%20Sparse%20but%20Efficient%20Structures%20in%20Operations\\_short.pdf?dl=0](https://www.dropbox.com/s/lh5thp5iujcjcw/On%20the%20Design%20of%20Sparse%20but%20Efficient%20Structures%20in%20Operations_short.pdf?dl=0)

**Abstract:**

The belief that "a little flexibility added at the right place can reap significant benefits for operations" has been widely accepted in the community. Unfortunately, despite the extensive literature on operational flexibility, to date no known methodology exists to guide managers to design (i.e., slightly flexible) and yet efficient operations.

We address this issue using a distributionally robust approach to model the performance of a stochastic system under different process structures. We use the dual prices obtained from a related conic program to guide managers in the design process. This leads to a general solution methodology for the construction of efficient sparse structures for several classes of operational problems.

Our approach can be used to design simple yet efficient structures for workforce deployment and for any level of sparsity requirement to respond to deviations and disruptions in the operational environment. Furthermore, in the case of the classical process flexibility problem, our methodology can recover the  $k$ -chain structures that are known to be extremely efficient for this type of problem when the system is balanced and symmetric.

**Short Bio:**

TEO Chung Piaw is Provost Chair Professor and Head of Decision Sciences Department at NUS Business School. Prior to his current appointments, he was Acting Deputy Dean, Vice-Dean of the Research & PhD Program as well as Chair of the PhD Committee in the School. He was an Eschbach Scholar in Northwestern University (US), Professor in Sungkyunkwan Graduate School of Business (Korea), and a Distinguished Visiting Professor in YuanZe University (Taiwan).

He is currently spearheading an effort to develop in NUS an Institute on Operations Research and Analytics, as part of the University's strategic initiatives in the Smart Nation Research Program. The Institute will welcome its first batch of PhD students in 2017.

His research interests lie in service and manufacturing flexibility, discrete optimization, ports container operations, matching and exchange, and healthcare. He is currently an area editor for OR (Operations and Supply Chains), and associate editor of Management Science (Optimization). He has also served on several international committees such as the Chair of the Nicholson Paper Competition (INFORMS, US), member of the IMPACT Prize Committee (INFORMS, US), Fudan Prize Committee on Outstanding Contribution to Management (China), and the Hong Kong PhD Fellowship Scheme Selection Panel.