

**DANIEL J. EPSTEIN DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING**

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**EPSTEIN INSTITUTE SEMINAR • ISE 651 SEMINAR**

***Pareto Efficiency in Robust Optimization***

**Dan E. Iancu**

**Assistant Professor, Graduate School of Business  
Stanford University**

**ABSTRACT**

In this talk, we formalize and adapt the well-known concept of Pareto efficiency in the context of the popular robust optimization (RO) methodology. We argue that the classical RO paradigm need not produce solutions that possess the associated property of Pareto optimality, and illustrate via examples how this could lead to inefficiencies and sub-optimal performance in practice. We provide a basic theoretical characterization of Pareto robustly optimal (PRO) solutions, and extend the RO framework by proposing practical methods that verify Pareto optimality, and generate solutions that are PRO. Critically important, our methodology involves solving optimization problems that are of the same complexity as the underlying robust problems, hence the potential improvements from our framework come at essentially no computational cost. We perform numerical experiments drawn from three different application areas (portfolio optimization, inventory management, and project management), which demonstrate that PRO solutions have a significant upside compared with solutions obtained via classical RO methods, at no extra cost or downside. (Joint work with Nikolaos Trichakis from HBS)

**TUESDAY, APRIL 30, 2013  
VON KLEINSMID CENTER (VKC) ROOM 100  
3:45 – 5:00 PM**

## **SPEAKER BIO**



### **Dan Andrei Iancu**

Assistant Professor of Operations, Information and Technology  
Graduate School of Business  
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Dan Iancu is an Assistant Professor of Operations, Information and Technology at Stanford University's Graduate School of Business. Prior to joining the faculty at the Graduate School of Business, he spent one year as a Goldstine Fellow in the Risk Analytics Group at the IBM T.J. Watson Research Center. A native of Romania, Professor Iancu holds a BS degree in Electrical Engineering and Computer Science from Yale University (2004), an SM in Engineering Sciences from Harvard University (2006), and a PhD in Operations Research from the Sloan School of Management at the Massachusetts Institute of Technology (2010). He was the recipient of the Best Student Paper Prize of the INFORMS Optimization Society (2009), and of two teaching prizes, at Harvard and at MIT Sloan.

Professor Iancu's research is focused on problems at the interface of finance and operations that typically involve taking actions in rapidly changing environments, under high degrees of risk and uncertainty. His work deals with both the development of innovative algorithms and analytical support tools, as well as with understanding how these interact with business decision making. Specific applications include multiaccount portfolio optimization, strategic and tactical supply chain management, and dynamic pricing.