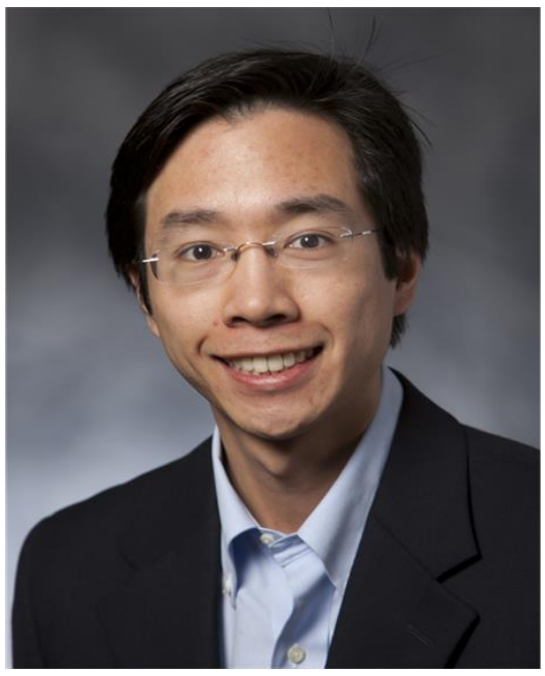
Electrical & Computer ENGINEERING

Carnegie Mellon University

Graduate Seminar



Rethinking Datacenter Management with Game Theory

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Thursday, November 2nd **4:30 PM** **Scaife Hall 125**

Abstract:

Sharing datacenter hardware improves energy efficiency, but whether strategic users participate in consolidated systems depends on management policies. Users who dislike allocations may refuse to participate and deploy private, less-efficient systems. We rethink systems management, drawing on game theory to model strategic behavior and incentivize participation. We illustrate this perspective for three fundamental challenges in datacenters. For workload colocation, we design matching games to produce stable coalitions in which more users share with preferred co-runners. For resource allocation, we use Cobb-Douglas utility functions to produce fair allocations that incentivize users to share cache and memory. For power delivery, we design sprinting games to produce equilibria in which users selfishly draw power for performance boosts yet avoid oversubscribing the shared supply. Collectively, these varied solution concepts provide a rich toolkit for rigorously managing datacenters shared by strategic and competitive users.

Bio:

Benjamin Lee is an Associate Professor of Electrical and Computer Engineering at Duke University. Dr. Lee received his B.S. from the University of California at Berkeley, his Ph.D. from Harvard University, and his post-doctorate from Stanford University.

His research focuses on computer architectures, security / privacy, and energy efficiency with links to statistical inference and algorithmic economics. His research has been recognized by IEEE Micro Top Picks (4x), Communications of the ACM Research Highlights (2x), as well as varied paper honors from ASPLOS, MICRO, and SC.

He received the NSF Computing Innovation Fellowship, NSF CAREER Award, and Google Faculty Research Award. He held visiting positions at Microsoft Research, Intel Labs, and Lawrence Livermore National Lab.

SEMINAR NOTES: (REFRESHMENTS SERVED AT 4 PM)

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