Yueyang Zhong

The University of Chicago Booth School of Business

Amy Ward
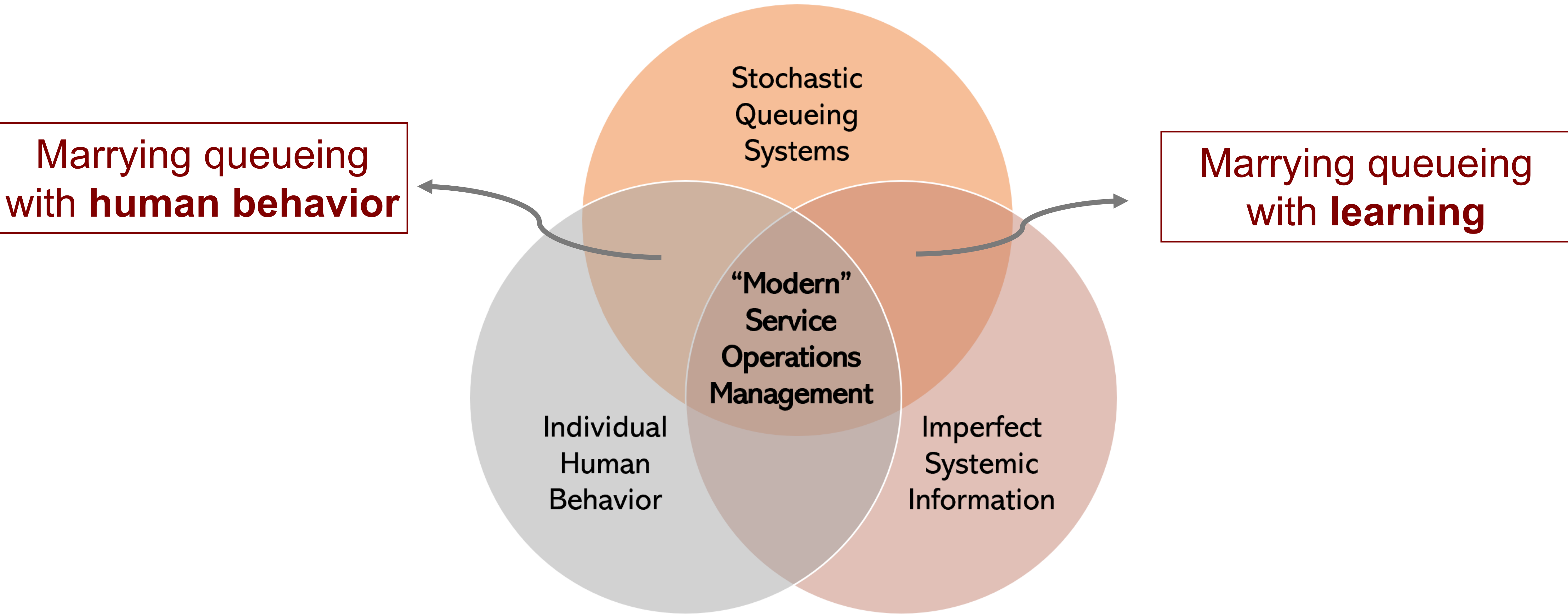Chicago Booth

John Birge
Chicago Booth

Raga Gopalakrishnan
Queen's University

Stochastic modeling and optimization in modern stochastic service systems

Marrying Queueing with Human Behavior

- **Motivation**: Empirical and psychological evidence
- **Vision**: Bridge the gap between theory and empirics

Human Customers

[Hassin and Haviv, 2003]
[Hassin, 2016]

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……

Human Servers (Open)

Empirical papers

A few theoretical papers
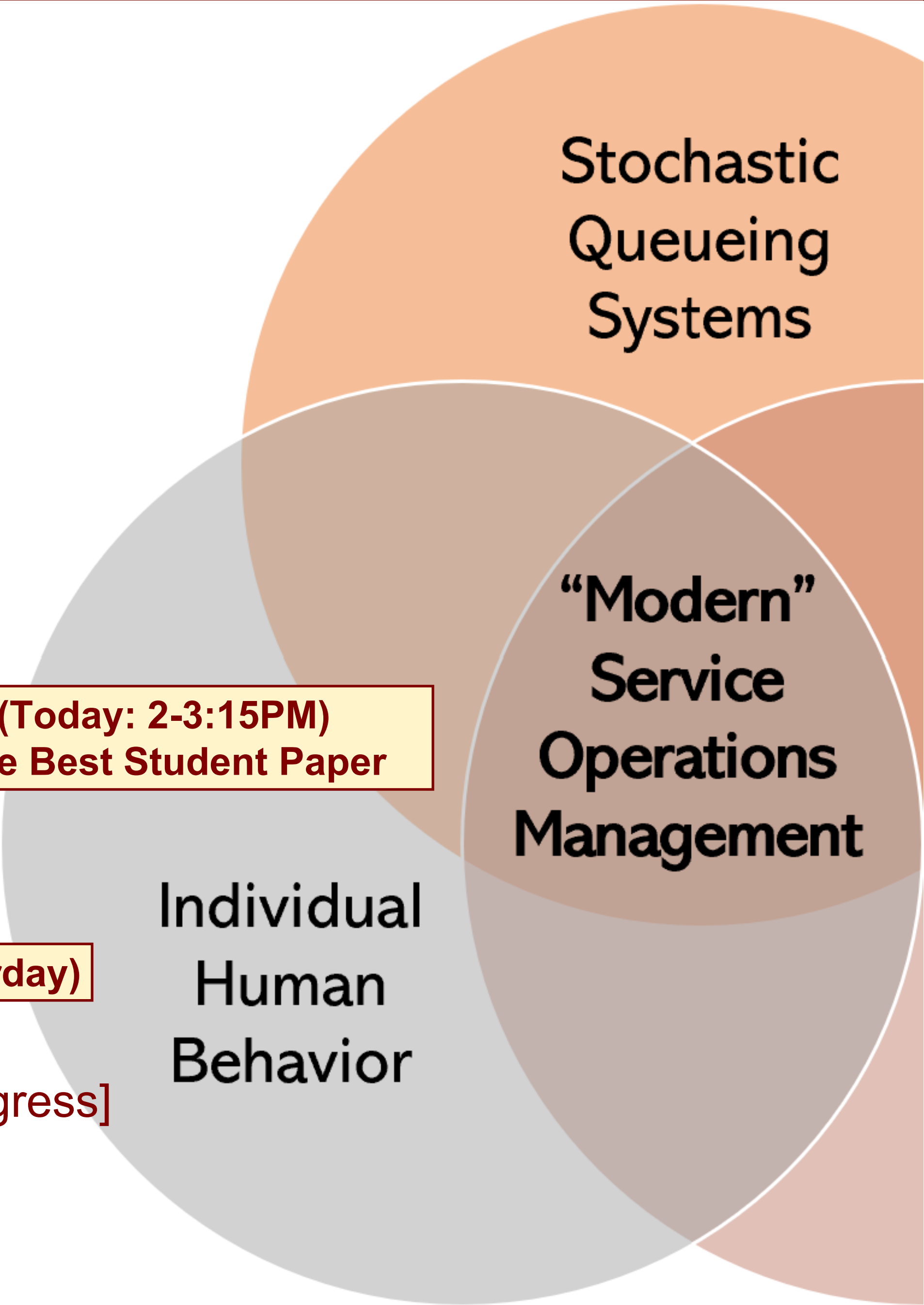[Zhong et al., 2022,
Minor Revision at OR]

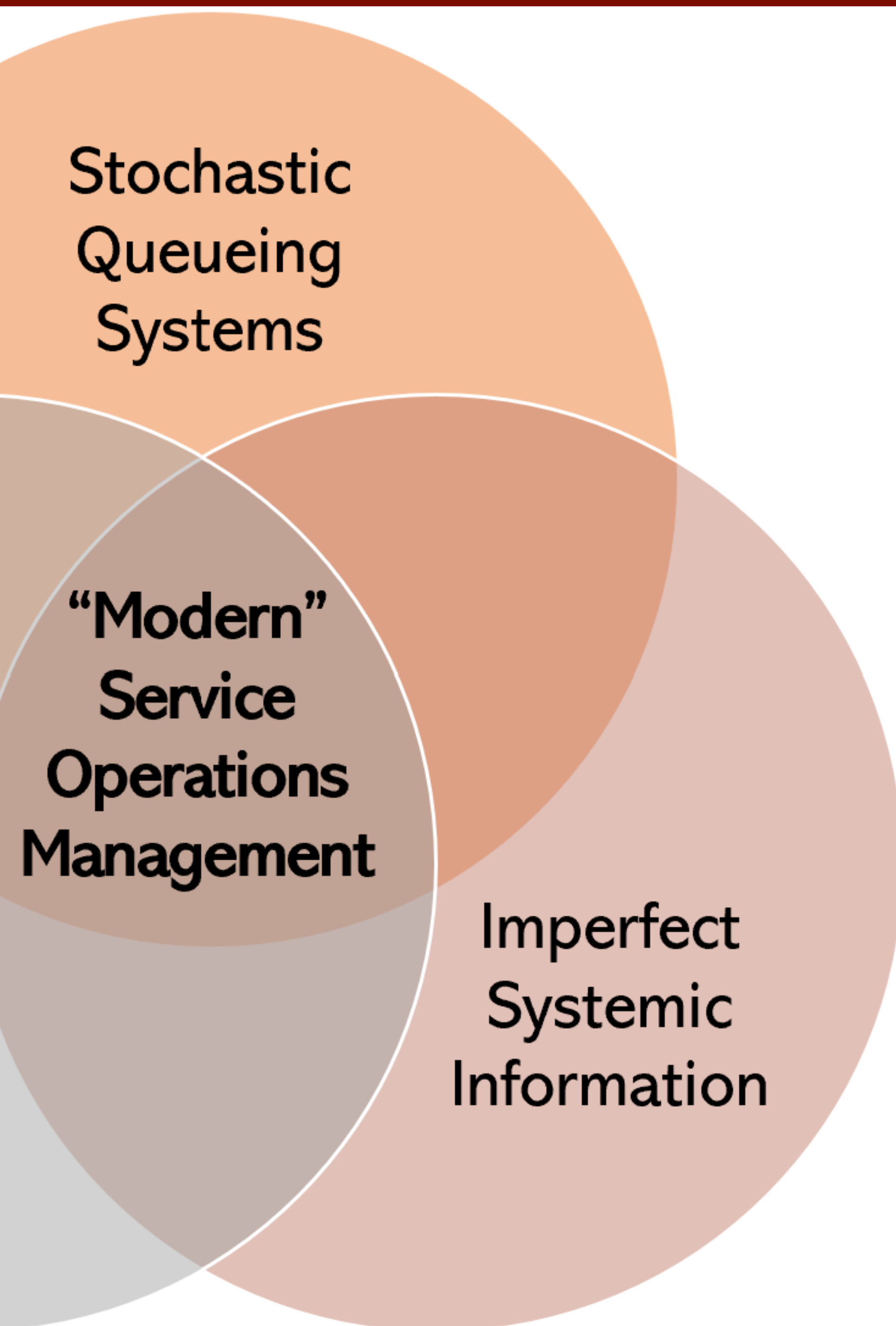Session MD51 (Today: 2-3:15PM)
Service Science Best Student Paper

Human Customers and Human Servers (Open)

[Zhong et al., 2022, Working paper]   Session SB31 (Yesterday)

Online experiment on Prolific: [Zhong et al., 2022, Work-in-progress]

Stochastic Queueing Systems

"Modern" Service Operations Management

Individual Human Behavior

Marrying Queueing with Learning

- **Motivation**: Catastrophes, new industries

- **Vision**: integrate statistical learning into optimal control in queue

- **Challenge**: interaction between learning and queueing
 "Exploit asymptotic analysis to define an easier learning problem"

Learn-to-schedule: multi-class many-server, abandonment
(Application examples) Call Centers [Aksin, Armony, Mehrotra, 2007], Data Centers [Harchol-Balter, 2013], ED [Hu, Chan, Dong, 2022], Service Systems [Green, Kolesar, Whitt, 2007]…

[Zhong et al., 2022, Major Revision at OR]   (instance-dependent)
[Zhong et al., 2022, Work-in-progress] (worst-case)

Session TB69 (Tomorrow 11:00AM)
Learning Algorithms to Manage Service Systems

Future: Develop novel methodologies for human-centered operational challenges

? How to incentivize human entities to truthfully contribute good data points?

? How does one use data to learn endogenous human behavior?

Stochastic Queueing Systems

"Modern" Service Operations Management

Individual Human Behavior

Imperfect Systemic Information