Friday Plenary Session

May 6, 2016, 11:30 AM – 12:20 PM; Venue: Salon IV & V

Dr. Russell Allgor, Chief Scientist, World Wide Operations and Amazon Logistics

Abstract Title: Fulfillment Challenges Create Research Opportunities at Amazon

Abstract: Amazon's retail growth drives the need for increased fulfillment and transportation capacity that supports a highly seasonal peak. To meet the demand, Amazon evolves its network of fulfillment and transportation infrastructure, while improving processes.

Designing and operating this fulfillment and transportation network creates a plethora of modeling and optimization challenges for our Operations Research team. Our first step is to identify potential opportunities for adding value back into the organization. We quantify the maximum benefit of improving particular processes to determine the value of pursuing particular research areas and to measure the success of changes and room for further improvement.

To do this, we need to understand the existing processes and construct appropriate models. We use these models to quantify the opportunity, and then identify algorithms and mechanisms to capture as much of the opportunity as possible. We estimate the impact of proposed algorithms using simulation and other modeling techniques to demonstrate the value of changing processes and systems to the business and software teams.

Our next step is to implement these changes in the physical processes for full scale deployment or pilot experiments. We ensure that the process improvements provide solutions that scale with the business and adapt as the conditions evolve. We implement the successful candidates after getting buy-in for the required system and process changes across the organization.

During this presentation, I will cover several examples of successful process improvements drawn from our fulfillment and transportation operations.

Dr. Russell Allgor Biography:

Since 2000, Dr. Russell Allgor, Chief Scientist for Amazon.com, has led a team of mathematical modeling experts in Amazon's Global Fulfillment Systems and Worldwide Logistics group. This talented group focuses on using modeling, simulation, and optimization methods to improve the efficiency of Amazon's operations. They focus on problems including network design and facility location, inventory planning, order assignment, equipment and process design, and process control within and across facilities. Ideas and algorithms developed by Russell and his team have returned hundreds of millions of dollars to Amazon's bottom line.

Prior to joining Amazon.com, Russell worked in the applied research and development department for Bayer AG in Leverkusen, Germany working on the design and optimization of batch and continuous chemical processes, including the color red for Legos. Prior to that, he was with Air Products and Chemicals, working in process simulation and design. He received a PhD in chemical engineering from Massachusetts Institute of Technology (MIT), where his research focused on modeling and optimization of discrete continuous dynamic systems. He holds a Bachelor of Science in chemical engineering from Princeton University.

Russell is originally from Ocean, New Jersey and currently resides with his family in Seattle, Washington.