

## Challenges in Simulating a Small-Batch Biotech Manufacturing Process

**Presenter:** Patricia Randall, PhD, Director, Princeton Consultants

For a biotech manufacturer seeking to reduce production costs resulting from small batch sizes and manual processing, AnyLogic simulation enables the rigorous evaluation of different scenarios related to process improvement, plant scheduling strategy, and capacity planning. Dr. Randall will discuss how her team built a simulation with an optimization model embedded, and overcame a lack of data and insufficient software tools and other resources, as well as the following challenges:

- The system to simulate did not exist yet, making it difficult to baseline and determine whether bad results were bugs or issues with the proposed facility design
- It required an optimization model to schedule the start of every major operation, resulting in performance issues
- The very complex process flow entailed a lot of products separating, taking different paths, and then joining back together
- Time-outs and failures in the process led to generous time-window buffers that had to be balanced with lower resource utilization