

The postdoc positions are open in mechanistic modeling and systems and control, which collectively span the responsibilities of (1) designing advanced control systems for continuous mRNA manufacturing, including model predictive control of the end-to-end manufacturing system while taking disturbances and model uncertainties into account; (2) building mechanistic models and control systems for multiphase flow-based nanoparticle formation, lyophilization, and continuous chromatography systems.

For the nanoparticle formation, the models will be constructed for a process involving multiple liquid streams containing multiple components that impinge on each other in laminar or highly turbulent flow to create a nanoemulsion in a confined environment. The mechanistic modeling for the nanodroplets that are formed will then model the transition of the nanodroplets into the formation of solid lipid nanoparticles, to predict the macromolecular interactions and spatiotemporal evolution of multicomponent composition. For the lyophilization, nontraditional approaches for accelerated processing will be explored which have a potential of providing a 5-fold reduction in residence time. For chromatography, a wide variety of novel designs will be explored, including affinity chromatography and column-less designs that do not have oscillatory dynamics.

The faculty supervisors are Profs. Richard D. Braatz and Allan S. Myerson.

Job Requirements

REQUIRED: Ph.D. in the area of mechanistic modeling or systems and control. The position is open for engineers from any discipline, including from chemical, mechanical, and electrical engineering.

This is a sponsored research position for the period of one year with the possibility of an extension.

Applicants should apply through the "Apply Now" button at https://careers.peopleclick.com/careerscp/client_mit/external/en-us/gateway/viewFromLink.html?jobPostId=26671&localeCode=en-us&referralCode=70953-23000-28104