Investigation of Monodispersity of Microparticles
Jinpyo Seo, Biomedical Engineering
Mentor: Brent Vernon, Ph.D.
School of Biological Health and System Engineering

Objective
Poly(Lactide-co-Glycolide) (PLGA) is a useful copolymer for microparticle drug delivery system for reasons such as biodegradability and controlled release rate (1, 2). The objective of this experiment is to find the fabrication method that would yield the most monodisperse microparticles.

Objective
The 3 variables in this experiment:
1. Polymer flow rate (PLGA injection with syringe pump)
2. Surfactant flow rate (polyvinyl alcohol (PVA) flow rate)
3. Tube length
Combination of these 3 variables were analyzed to see which set would minimize the polydispersity index (PDI).

Results & Conclusion
The particles were imaged with bright field microscopy and ImageJ, then analyzed on Minitab. The graphs reveal that for low PDI, there is not a single combination, but multiple options to fabricate monodisperse particles.

Future Direction
Studying ways to lower PDI of PLGA microparticles will make their drug release more uniform. This research will continue to improve their drug delivery capabilities through release study and degradation study.

Acknowledgement
I’d like to thank Dr. Vernon of the Biomaterials Lab and Rex Moore of Droplet, LLC. for their mentorship.

References