

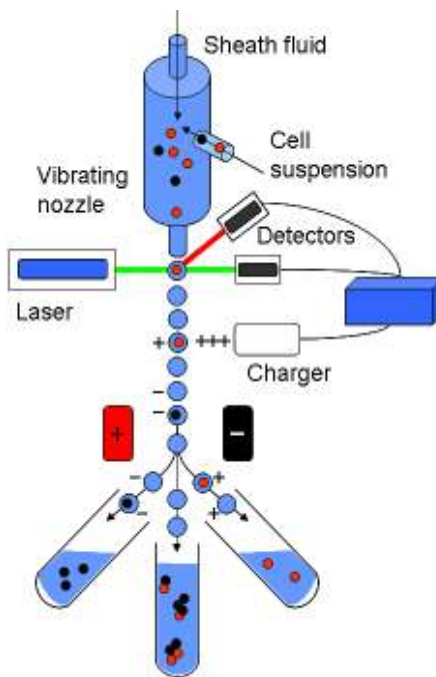
## Flow Cytometric Characterization of Plant Cell Cultures

IGERT Associate Vishal Gaurav

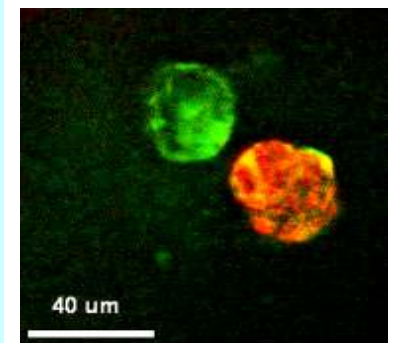
PI: Prof. Susan C. Roberts (UMass Chemical Engineering)

Our laboratory focuses on development and optimization of bioprocesses for production of the anti-cancer agent Paclitaxel (Taxol®) in *Taxus* plant cell suspension cultures with an emphasis on understanding culture heterogeneity and production variability. Most studies concerning metabolite production via cell culture technology rely on culture-average parameters, which are often insufficient to describe culture heterogeneity. The focus of this work is to overcome low and variable yields of secondary metabolite in *Taxus* cultures through characterization of sub-populations using tools like flow cytometry.

We have developed novel methods to isolate, stain, sort and re-culture single cells from aggregated *Taxus* cultures, thereby allowing analysis of single cell phenotypes in a culture population. By analyzing sub-population characteristics and comparing them with varying levels of paclitaxel accumulation, we can understand the inherent molecular and metabolic differences amongst cells in culture, which will help in development of optimization strategies for enhanced paclitaxel accumulation through tools like metabolic engineering and bioprocess development.



A flow cytometric cell sorter, used to isolate distinct cell sub-populations with desirable characteristics



*Taxus* cells stained for viability (green) and paclitaxel accumulation (red)