Objectives
a) Develop a universal, open-source QC platform in R
b) Automatically gate and calculate QC statistics from FCS files
c) Display QC statistics with interactive plots to generate predictive outcomes of maintenance or repair

Why?
There are many different:
- Flow cytometer manufacturers
- Instruments, lasers, and detectors
- QC Beads and acquisition software

Difficult to track performance and predict problems in labs with multiple flow cytometers

Validation
Automated vs. Manual Gating
R k-means
FCS Express

Median Fluorescence Intensity
Peak 1 (Low)
Peak 2 (Mid)
Peak 3 (High)

rCVs
R² = 0.039
R² = 0.0038
R² = 0.0202
R² = 0.58

Shiny App Output
Clustered Peaks
Tabs for multiple instruments
Levey–Jennings Plots
Select Channel
FITC-A

Heatmaps
Select which peak to view
View data information on hover

Future Work
Automatic alerts for when specs (ie. rCVs, MFIs) are out of range.
Build GUI as an alternative to hard coding in R for customizing clustering and data analysis
Automate based on QC schedule

Improve Clustering
How do we automatically gate out Doublets/Debris?

Mixture Model Clustering:
flowClust package

Demo model of application GUI

User Friendliness
Demo App, Poster, More info

Singlet gate:
flowStats package

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Legend:
All peaks
Peak 1 (Low)
Peak 2 (Mid)
Peak 3 (High)

Date
FITC-A, A488
Median
COUNT

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Universal Platform to Extract and Analyze QC Data
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