Principles of Flow Cytometry

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Education Objective: This two-day interactive course will cover the principles of flow cytometry through a series of lectures and interactive sessions. Students will learn core concepts in experimental design, implementation, staining, compensation, controls, statistical analysis, and troubleshooting. At the end of this course, students will have a better understanding of the complexities of flow cytometry and nuances to consider for their workflow

Target Audience: Users with basic experience in flow cytometry seeking to expand their skillset for more sophisticated questions – and answers. Learning/reviewing the fundamentals will ensure that your flow cytometry experiments will yield results the first time, which saves you time and money in the long run.

Instructor
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Scientific Director of the Core Technologies
Director of Flow Cytometry

Course Topics

09:00-09:15 Course introduction
09:15-09:30 Activity 1 – Test your flow cytometry knowledge – a little quiz to test your knowledge before delving into the course material. Repeating this at the end will help gauge what you learned.
0930:-10:30 Cytometry 101 – Reagents and Fluorochromes – understand the fundamental tools used in flow cytometry and how these tools are paired to generate data.
10:30-10:45 Coffee Break
10:45-11:45 Cytometry 102 -- Introducing the Hardware – learn how a flow cytometer generates data and the interactions of the three key components of any flow cytometer – the fluidics, the optics and electronics.

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11:45-12:00 Questions from the morning
12:00-13:00 Lunch
13:00-15:30 **Activity 2** – Interactive activities on a flow cytometer – working with an instrument, learns how to go from QC to data acquisition. Explore the inner workings of the flow cytometer to understand the three components, how to determine optimal settings for detectors and more.
15:30-15:45 Coffee Break
15:45 16:45 **Cytometry 201** – Principles of Compensation – addressing the physics of fluorescence and how the flow cytometer measures light, this lecture will delve into the essential process of compensation and the rules necessary to ensure it is properly applied every time.
16:45-17:00 Questions

Day 2

09:00-10:00 **Cytometry 202** – Controls in Flow Cytometry – the lifeblood of all scientific experiment and critical for interpreting the data to successful draw conclusions from the experiment.
10:00-10:45 **Activity 3** – Practical compensation – using real data, learns how to properly compensate an experiment. Learn how to apply the three rules of compensation to your data.
10:45-11:00 **Coffee**
11:00-12:00 **Cytometry 203** – Flow Cytometry Data – unravel the details of flow cytometry data. From binning and scaling to displays and gating, this lecture will present information on the end result of researchers hard work.
12:00-13:00 **Lunch**
13:00-13:45 **Cytometry 204** -- Principles of Panel Design – at the heart of every flow cytometry experiment is a panel, the combination of reagents that has been designed to optimally identify the populations of interest
13:45-15:00 **Activity 4** – Practical data analysis – apply the ideas of data analysis to a dataset. See how compensation and controls work together to identify the populations of interest while excluding unwanted cells.
15:00-16:15 **Activity5** – Panel design – apply the rule for panel design to develop a multicolor panel to answer a real-life experimental question. See how fluorochrome choice, instrument choice and reagent choice play together to identify the best panel.
15:15-15:30 **Coffee**
16:15-16:45 **Cytometry 303** -- Troubleshooting – even with the best-planned experiments, things can go wrong. Learning what those 'adverse events' are, how to recognize them and how to recover from that is a critical skill. This lecture will equip you with the tools to use when that adverse event happens to you.
16:45-17:00 **Final questions and Wrapup**

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Bonus Material To Be Provided

Cytometry 301 – Statistics in Flow Cytometry – beyond the scatter plot and histogram, flow cytometry data is very numbers rich. Learn about how to properly perform secondary analysis that will allow you to perform hypothesis testing with the data.

Cytometry 302 – Rare event analysis – with the ability to measure thousands of events per second, flow cytometry is well suited to identifying and characterizing rare events (below 0.1% of a population). However, when working at that level, there are extra considerations that need to be made to ensure accurate data is being generated.

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