



Potomac

Modular Flow Cytometer

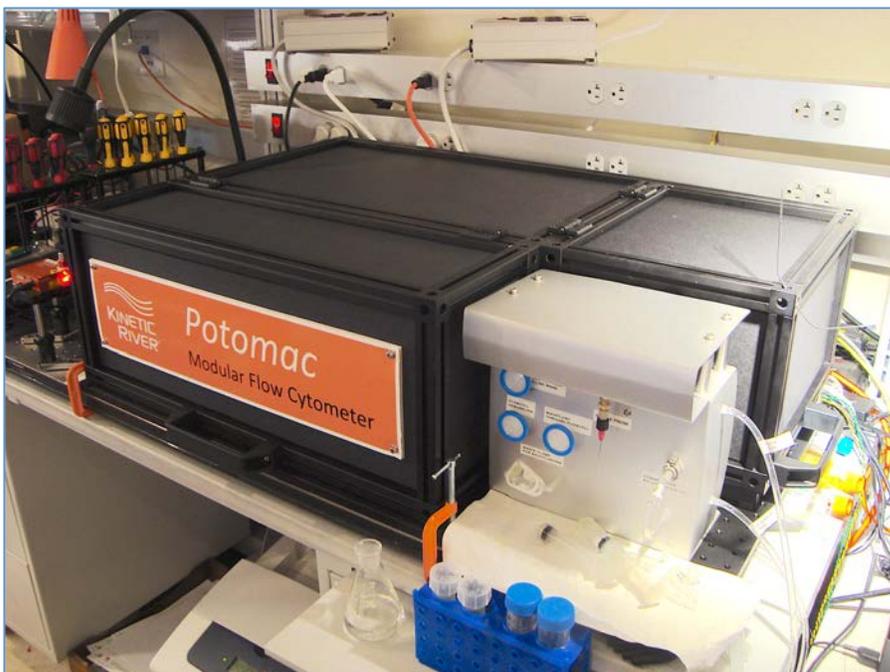
Tech Notes

For many applications on the cutting edge of research, “one-size” most definitely doesn’t “fit all.” Whether your work requires the use of exotic light sources, custom flow cells, or novel detection schemes, the need for unique features and customization is often at odds with the capabilities of fixed-layout, turnkey systems.

We designed and developed a **flexible** and completely **customizable** solution to address this kind of need. With a **modular** system architecture and built mainly using off-the-shelf components, the **Potomac** Modular Flow Cytometer adapts to your requirements.

The **Potomac** platform can support from **1 to 7 lasers**, and from **4 to 20 channels** of detection. Solid-state excitation lasers (from Toptica, Qioptiq, Pavilion, and others) are fiber-coupled for stable delivery and to make it easy to swap sources without the need for realignment. Filters from Semrock, Alluxa, and Chroma provide spectral separation. The detection channels use compact Hamamatsu PMTs or silicon photomultipliers (SiPMs) from SensL. The entire optomechanical structure is based on rails and cube/rod assemblies (from Thorlabs and others) to simplify alignment, modifications, and upgrades. Even the fluidic system offers a choice between a dual syringe pump and a traditional pressurized-sheath drive. A custom signal processing and DAQ unit manages data collection and formatting.

Most importantly, the **Potomac** can be easily customized for unique requirements, such as porting external light sources or incorporation of a custom component. The system can be also easily **upgraded** over time, allowing you to start with a basic system and adding capabilities as you grow.



A 2-laser, 7-detector Potomac installed at the National Cancer Institute



Potomac

Modular Flow Cytometer

Specifications

Excitation Optics

Standard laser options (up to 7):

- 405 nm (\leq 180 mW)
- 488 nm (\leq 120 mW)
- 532 nm (\leq 100 mW)
- 561 nm (\leq 100 mW)
- 594 nm (\leq 30 mW)
- 640 nm (\leq 120 mW)
- 785 nm (\leq 180 mW)

Custom laser options (powers vary):

- 375, 395, 420, 445, 460, 473, 505, 515, 633, 660, 685, 705, 750, 730, 830, 850 nm

Emission Optics

Scattering channels:

- FSC: 2 - 10°
- SSC: 90°, 1.2 NA

Fluorescence channels:

- up to 18 channels
- customizable bandpass selections

Detectors:

- PMTs or silicon photomultipliers (SiPMs)

Fluidics

Hydrostatic pressure injection option:

- 8-L sheath capacity, pressure up to 30 psig
- Sample injection speed: 1 - 100 μ L/min

Syringe drive sample injection option:

- Sample size: 5, 10, 20, 50, or 100 μ L
- Injection speed: 0.1 - 60 μ L/min

Signal Processing

Data formatting:

- Flow Cytometry Standard (FCS) 3.0

Performance

Sensitivity (488-nm excitation, 530/30-nm channel):

- FITC \leq 1000 MESF (typ.)
- 5/6 Spherotech Rainbow beads
- CV 6% (typ.)

Throughput:

- 10,000 events/s (typ.)

Installation Requirements

Dimensions:

- 24" x 36" x 10" (W x L x H)
(separate sheath and waste tanks)

Weight:

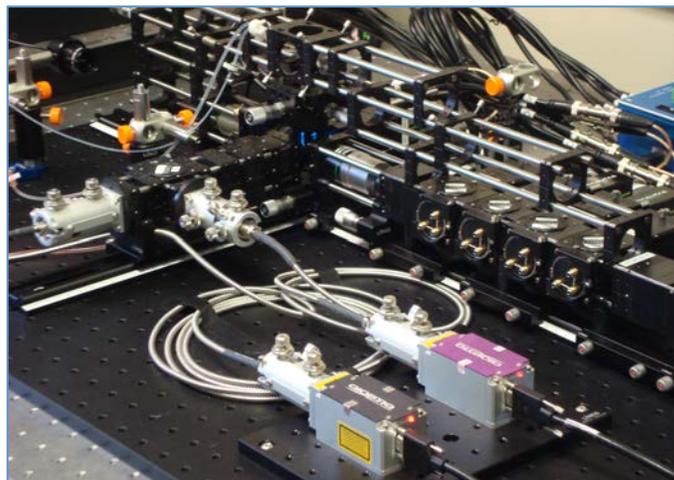
- 150 lbs. (2-laser, 7-detector system)

Environmental:

- 15°-30°C, 60% RH

Power:

- North America: 120 VAC, 50/60 Hz, 5A
- Japan: 100 VAC, 50/60 Hz, 5A
- Rest of world: 230 VAC, 50/60 Hz, 3A



Interior of a 2-laser, 6-detector Potomac