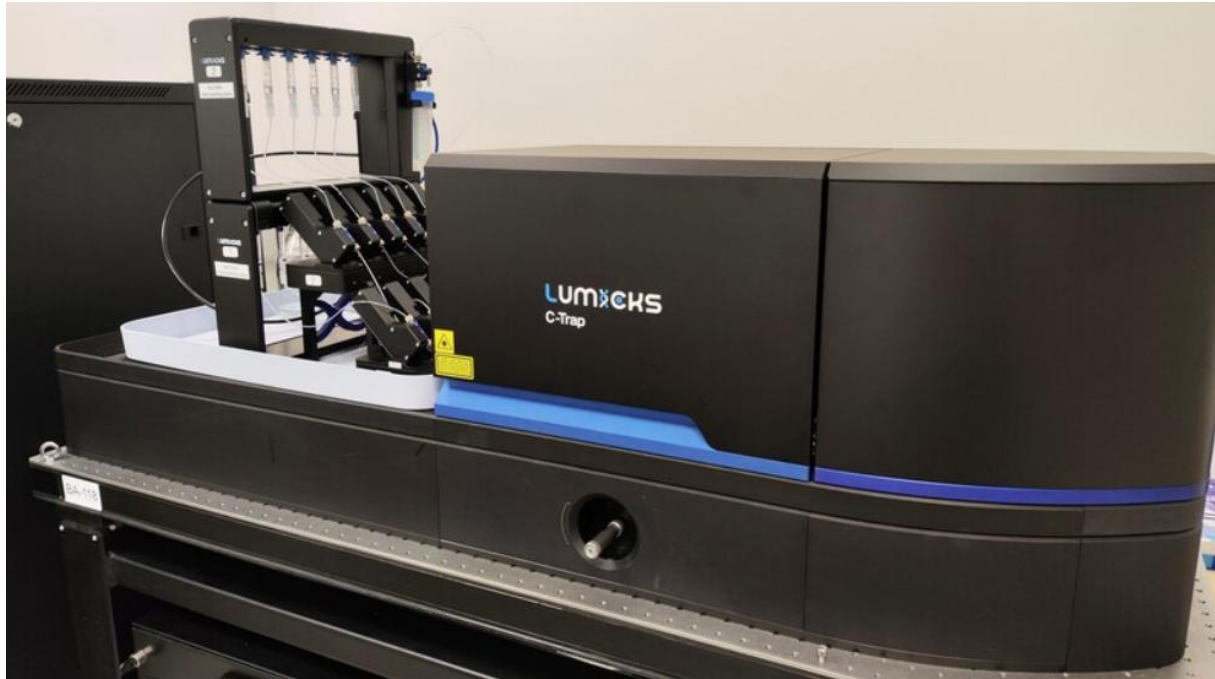


Lumicks C-trap



Single-molecule biophysics platform combining high-resolution optical tweezers with multi-color confocal fluorescence microscopy and microfluidics. It features 2 or 4 optical traps; 488, 561 and 640 nm confocal imaging; 2 microfluidic units with 5 channels each. Enables manipulation of single molecules (DNA, RNA, proteins) and measurements of sub-piconewton forces while visualizing dynamic molecular interactions and binding events in real time (Room 1.105, Main Building).

Objective and Condenser

- Objective: Nikon CFI Plan Apo VC 60x WI, 1.2 NA, 0.27 WD
- Condenser: Leica P, 60x, 1.4 NA, Oil immersion, 1.1 WD

Lasers

- Trapping laser 1064 nm, 20W nominal, ~3.5 W max at objective, split into two or four traps
- Excitation lasers: 488, 561, 638 nm (@ 100% > 15 uW at the objective)

Widefield illumination

- Brightfield LED 850nm

Filters

- 488 channel: BP 525/45
- 561 channel: BP 600/50
- 638 channel: BP 680/42

Detectors and Cameras

- 2 PSD detectors for force measurements (100 MHz)
- 3 APDs for fluorescence, 50-70% efficiency, 45ns dead time
- Z-Finder Camera CMOS (detects reflection of the trapping laser for z-positioning)
- Moon Camera CMOS (ensures proper collimation of the transmitted trapping laser)
- Bright-field Camera CMOS (sample visualization)

Confocal Scanner

- 2-axis, 50x35 μm range, up to 200 Hz per line
- Pinhole size: 488 nm = 1.7 AU, 561 nm = 1.5 AU, 638 nm = 1.6 AU

Imaging modalities

- Brightfield imaging
- Confocal fluorescence imaging: 3 colour 2D scan, Kymograph
- Force measurements: force – distance curves, force clamp

XYZ stage

- XY Microstage, 15x15 mm range
- XY+Z Nanostage, 200x200x200 μm range

Environmental control

- Temperature control, room temperature – up to 45°C

Microfluidics

- 2 independent microfluidic units + 2 Flowcells (22 μl)
- 5 channels: Beads, DNA, buffer, protein 1, protein 2

Software

- Acquisition software: Bluelake
- Analysis software: Lakeview