

## Technical Specifications

### Confocals

| Specification         | Options               | Butterfly            | Firefly              | Bumblebee            | Dragonfly                                                          |
|-----------------------|-----------------------|----------------------|----------------------|----------------------|--------------------------------------------------------------------|
| Manufacturers name    |                       | Nikon A1R            | Nikon A1+            | Leica SP5            | Andor Dragonfly                                                    |
| Microscope Stand      |                       | TiE                  | TiE                  | DM5000               | TiE                                                                |
| Objectives            | Air                   | 4,10,20,40           | 10, 20               | 5,10,20, 40          | 10,20                                                              |
|                       | Oil                   | 40, 60, 100          | 40, 60               | 40, 63, 100          | 40, 60, 100                                                        |
|                       | Water                 | 20,40,60             | 20,40,60             |                      | 20,40,60                                                           |
| Fluorophores          |                       | D,C,G,Y,R,FR         | D,C,G,Y,R,FR         | D,C,G,Y,R,FR         | D,C,G,Y,R,FR                                                       |
| Lasers                |                       | 405, Argon, 561, 640 | 405, Argon, 561, 640 | 405, Argon, 561, 640 | 405(100mW), 445(75), 488(150), 514(40) 561(150), 637(140), 685(40) |
| Detectors             | PMTs (less sensitive) | 4                    | 2                    | 3                    | NA (sCMOS Camera)                                                  |
|                       | GaSP (more sensitive) | 0                    | 2                    | 1                    | NA (EMCCD Camera)                                                  |
|                       | Transmitted Light     | Y                    | Y                    | Y                    | Y                                                                  |
| Dichroics for imaging | Position 1            | 405/488              | 405/488              | NA, uses AOBS        | See separate table (A)                                             |
|                       | Position 2            | 405/488/561          | 405/488/561          |                      |                                                                    |
|                       | Position 3            | 405/488/561/640      | 405/488/561/640      |                      |                                                                    |

|                        |                              |                  |                  |                  |        |
|------------------------|------------------------------|------------------|------------------|------------------|--------|
|                        | Position 4                   | 457/514          | 457/514          |                  |        |
|                        | Position 5                   | BS 20/80         | BS 20/80         |                  |        |
|                        | Position 6                   | 457/514/561      |                  |                  |        |
|                        |                              |                  |                  |                  |        |
| Emission Filters       | PMT1                         | 450/50 or 482/35 | 450/50 or 482/35 | Flexible         | NA (*) |
|                        | PMT2                         | 525/50 or 540/30 | 525/50 or 540/30 | Flexible         | NA (*) |
|                        |                              |                  |                  |                  |        |
|                        | PMT3                         | 595/50           | 595/50           | Flexible         | NA (*) |
|                        |                              |                  |                  |                  |        |
|                        | PMT4                         | 700/75           | 700/75           | Flexible         | NA (*) |
| Specialised techniques | Spectral Unmixing            | +                | X                | +++              | X      |
|                        | FRET                         | Y                | Y                | +++              | +      |
|                        | FRAP/PA                      | ++               | +                | +++              | ?      |
|                        | Tiling                       | ++               | ++               | +++              | ++     |
|                        | Mark and Find                | ++               | ++               | ++               | ++     |
|                        | TIRF                         | X                | Y                | X                | Y      |
|                        | Super-resolution             | X                | X                | Y – ‘Hyvolution’ | Y-SRRF |
|                        | Programmable, for Plates etc | Y (in future)    | N                | N                | Y      |

**Nikon N-SIM and STORM Specification Table**

|                           |                                                                                                |                                                                                                                   |
|---------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Microscope</b>         | Nikon N-SIM Structured Illumination Microscope                                                 | Nikon N-STORM Microscope                                                                                          |
| <b>Stand</b>              | Nikon Ti                                                                                       | Nikon Ti                                                                                                          |
| <b>Objective Lenses</b>   | 100x Oil lens NA 1.49, 60x Water lens NA 1.2                                                   | 100x Oil lens NA 1.49                                                                                             |
| <b>Excitation Sources</b> | 405, 488, 561 OPSL and 640 Diode                                                               | 405, 488, 561, 640 solid state lasers                                                                             |
| <b>Emission Filtering</b> | DAPI, Alexa488, Alexa561, Alexa647 or similar                                                  | Alexa488, Alexa561, Alexa647                                                                                      |
| <b>Camera</b>             | Andor iXon3 DU-897E EMCCD camera                                                               | Andor iXon3 DU-897E EMCCD camera                                                                                  |
| <b>Cell Maintenance</b>   | Fixed samples only                                                                             | Fixed samples only                                                                                                |
| <b>Sample Platform</b>    | Standard 1x3 inch slides, 35mm dishes, 18-22mm coverslips (high-precision $\pm 5\mu\text{m}$ ) | Standard 1x3 inch slides, 35mm dishes, 18-22mm coverslips (high-precision $\pm 5\mu\text{m}$ )                    |
| <b>Software</b>           | Nikon Nis-Elements (Version 5.1)                                                               | Nikon Nis-Elements (Version 5.1)                                                                                  |
| <b>Operating System</b>   | Windows 10                                                                                     | Windows 10                                                                                                        |
| <b>Techniques</b>         | 3D N-SIM, SRRF (Post-processing in Image-J)<br>3D sample range 6 – 10 $\mu\text{m}$            | TIRF, 3D-STORM, N-STORM, PALM, PAINT, SRRF<br>(Post-processing in Image-J)<br>3D sample range 600nm (astigmatism) |

## Dyes we can support

| Common Fluorophores |              |             |                                                                                                                                   |
|---------------------|--------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Fluorochrome        |              |             |                                                                                                                                   |
|                     | Excitation   | Emission    | Dyes                                                                                                                              |
| Blue                | 350 - 410nm  | 380 - 440nm | DAPI, Hoechst, AF350, AF400, SYTOX blue, Vybrant Dyecycle Violet, Pacific Blue, Cell Trace Violet, EDU Pacific Blue,              |
| Cyan                | 420 - 450nm  | 460 - 490nm | Cerrulean, Live/Dead Aqua, eFluor 450, mTurquoise, mTeal                                                                          |
| Green               | 480 - 505 nm | 510 - 540nm | FITC, Oregon Green, Cy2, AF488, eGFP, Clover-FP, Fluo3, Live/Dead Aqua, Mitotracker green                                         |
| Yellow              | 514 - 540nm  | 530 - 550m, | eYFP, Venus, Cy3, TRITC, AlexaFluor532, AlexaFluor 543                                                                            |
| Red                 | 560 - 600nm  | 580 - 620nm | Texas Red, mCherry, AlexaFluor568, AlexaFluor594, Rhod3, Live/Dead Red, Zombie red, Mitotracker Orange, SYTOX Orange, PI, TagRFP, |
| Far Red             | 630 - 670nm  | 650 - 720nm | Cy5, AF633, AF647, SiR DNA, Draq5, mKate                                                                                          |
| IR                  | 680 - 800nm  | 720 - 900nm | AlexaFluor 680, 700, 750                                                                                                          |

## Objective lenses for Confocals

### Nikon Objectives

| Magnification | Type                                      | Medium               |
|---------------|-------------------------------------------|----------------------|
| 4x            | Plan Fluor 0.13 Ph1                       | Air                  |
| 10x           | Plan Fluor 0.3 Ph1                        | Air                  |
| 20x           | Plan Apochromat VC 0.75 DIC N2            | Air                  |
| 20x           | Korr                                      | Air                  |
| 20x           | Plan Fluor 0.75 MImm DIC N2               | Water, Glycerol, Oil |
| 40x           | Plan Fluor 0.75 DIC N2                    | Air                  |
| 40x           | Plan Neofluar 1.4                         | Oil                  |
| 40x           | Apochromat LWD $\lambda$ S 1.15 WI DIC N2 | Water                |
| 60x           | Apochromat $\lambda$ S 1.4                | Oil                  |
| 60x           | Plan Apochromat VC 1.2 WI DIC N2          | Water                |
| 100x          | Plan Apochromat VC 1.4 DIC N2             | Oil                  |

### Leica Objectives

| Magnification | Type                      | Medium             |
|---------------|---------------------------|--------------------|
| 5x            | HC PL Fluotar 0.15        | Air                |
| 10x           | HC PL Apo 0.4             | Air                |
| 10x           | HCX PL Fluotar 0.3        | Air                |
| 20x           | HCX PL Fluotar 0.5        | Air                |
| 20x           | HC PL Apo 0.75 IMM Corr   | Water/Glycerol/Oil |
| 40x           | HC PL Apo 0.85 Corr       | Air                |
| 40x           | HCX PL Apo 0.75-1.25 Iris | Oil                |
| 63x           | HCX PL Apo 0.6-1.4 Iris   | Oil                |
| 100x          | HC PL Apo 1.4             | Oil                |

