

## **Training school in the use of open source software V6 24-26 June 2009 Ancaster Hall, University Park**

### **Target Audience:**

- (1) Pathologists who are newcomers to image analysis (i.e. with little or no experience)
- (2) Signal processing engineers (i.e. interested in medical imaging)
- (3) PhD students

### **Objectives:**

- (a) To train Pathologists in the basic principles of image analysis of standard brightfield images (segmentation, 16/32/64 bit images, thresholding etc)
- (b) To provide a comprehensive list of image capture technologies
- (c) To provide a comprehensive list of image analysis software
- (d) To provide a list of on-line resources and other communities involved in imageJ
- (e) To provide training in the use of open source image analysis software for the capture of images from a variety of sources
- (f) To provide training in basic image analysis using open source software (measurements / masking / ROI / segmentation / texturing / cell counting / ploidy analysis etc)

### **By the end of the session the attendees should:**

- (i) Understand the theory and limitations of image capture and manipulation
- (ii) Be able to use ImageJ to view images captured by different hardwares
- (iii) Be able to perform basic image analysis
- (iv) Identify appropriate plug-ins for their requirements

### **Format of training school:**

- (a) Formal lectures
- (b) Interactive tutorials
- (c) Problem solving exercises
- (d) Problems / presentations brought in by attendees
- (e) Examples of solutions

- (f) Discussion sessions (including commercial companies) to discuss future directions

**Proposed location:**

Ancaster Hall, Nottingham University

**Faculty**

M Ilyas (organiser)

Vincenzo Dela Mea

Marcial Rojo

Branimir Reljin

Gabriel Landini

Paulette Herlin

Qiu Guoping

Arvydas Laurinavicius

Nicolas Elie

## Preliminary program: 24-26<sup>th</sup> June 2009

All attendees to bring own laptop

### Day 1

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|---------------|---|
| 09:00 – 09:30 | Introduction – the role of image analysis in Pathology (covering: image analysis as diagnostic aids / telepathology / image analysis in research etc.) – Marcial Rojo   |
| 09:30 – 10:15 | What is a digital image? (covering: pixels, formats such as jpg/bmp/tiff etc, brightfield images – rgb/cmykcielab/binary transformation, multispectral images) – Branimir Reljin  |
| 10:15 – 10:45 | Tea / Coffee  |
| 10:45 – 11:30 | Methods of image capture and viewing (covering: digital photography, the different slide scanners, commercial software sold with scanners, use of ImageJ to view scanned images, what the meaning of 8 or 16 bit is and why it's important). – Marcial Rojo |
| 11:30 – 12:15 | Basic use of imageJ (covering: the basic functions/tools of the program, measuring size and area, counting particles manually etc) – Vincenzo Delamea   |
| 12:15 - 12:30 | Loading ImageJ onto laptops (including plug-ins)  |
| 12:30 – 13:30 | Lunch   |
| 13:30 – 14:00 | Worked examples with ImageJ (Led by Vincenzo Delamea)   |
| 14:00 – 15:30 | Practical session of easy image analysis problems (Led by Vincenzo Delamea)   |
| 15:30 – 16:00 | Tea / coffee  |
| 16:00 – 17:00 | Going through practical examples (Led by Vincenzo Delamea)  |

## Day 2

09:00 – 09:45	Image fragmentation (covering: identifying and marking ROIs, applying masks to sequential images) – Qiu Guoping
09:45 – 10:15	Worked examples with ImageJ - (Led by Paulette Herlin)
10:15 – 10:45	Tea / coffee
10:45 – 12:15	Practical session of image analysis problems (Led by Paulette Herlin)
12:15 – 12:45	Going through practical examples (Led by Paulette Herlin)
12:45 – 13:45	Lunch
13:45 – 14:15	Further image fragmentation (covering: segmentation, binary transformation, particle counting, thresholding) – Gabriel Landini
14:15 – 14:45	Worked examples with ImageJ - (Led by Gabriel Landini)
14:45 – 15:30	Practical session of image analysis problems (Led by Gabriel Landini)
15:30 – 16:00	Tea / Coffee
16:00 – 16:30	Practical session of image analysis problems (Led by Gabriel Landini)
16:30 – 17:00	Going through practical examples (Led by Gabriel Landini)

### Day 3

- 09:00 – 09:45 More fragmentation analysis ( texture analysis, k-means clustering) – Gabriel Landini
- 09:45 – 10:30 Immunohistochemistry (covering: nuclear / cytoplasmic / membranous staining, segmentation and thresholding, viewing through RGB / Cielab., TMA databasing) – Marcial Rojo
- 10:30 – 11:30 Practical session of image analysis problems (Led by Marcial Rojo) and Coffee
- 11:30 – 12:00 Going through practical examples (Led by Marcial Rojo)
- 12:00 – 13:30 Presentation by Slidepath  
(i) SlidePath image analysis algorithms,  
(ii) integrating Image J into slidepath,  
(iii) Databasing and high-throughput analysis
- 13:30 – 14:30 Lunch and finish