

Medical Research Center Oulu and Biocenter Oulu are organizing together the course

## Biomedical Imaging Methods between April 7 and 29, 2016.

The course consists of lectures and demonstrations, and additional optional parts. Please find the current version of the programme below.

### Responsible person:

Dr. Simo Saarakkala, Faculty of Medicine

**Registration to the course: WebOodi and if not possible (doctoral students), e-mail to leena.seiteri(at)oulu.fi**

**The deadline to register is April 1st.** The lectures are open to all, but the number of participants to the demonstration is limited to 40.

### 580402S BIOMEDICAL IMAGING METHODS (1 - 5 ECTS)

Spring 2016

#### Lectures (23 h):

##### April 7, 2016 (place: P107)

12:15 – 12:45

Simo Saarakkala: *Introduction to the course structure and organization.*

12:45 – 13:30

Seppo Vainio: *Introduction to biomedical imaging.*

13:30 – 14:00

Break

14:00 – 15:30

Seppo Vainio: *Basics and applications of optical projection tomography (OPT).*

##### April 12, 2016 (place:338B)

12:15 – 14:00

Mikko Nissi: *Basics and applications of magnetic resonance imaging (MRI).*

14:00 – 14:15

Break

14:15 – 14:30

Antti Salo: *Basics and applications of in vivo optical imaging technique.*

14:30 – 15:00

Veli-Pekka Ronkainen: *Basics and applications of Multiphoton and Light sheet microscopy.*

##### April 13, 2016 (place: P107)

13:15 – 14:45

Lassi Rieppo: *Basics and applications of FTIR and Raman spectroscopy.*

14:45 – 16:00

Lassi Rieppo: *Basics and applications of Polarized Light Microscopy (PLM).*

##### April 14, 2016 (place: 338B)

12:15 – 13:45

Matti Kinnunen: *Basics and applications of optical coherence tomography (OCT).*

13:45 – 14:15

Break

14:15 – 15:45

Simo Saarakkala: *Basics of computed tomography (CT).*

##### April 19, 2016 (place: 338B)

12:15 – 13:45

Mikko Finnilä: *Applications of micro-CT imaging for in vitro, ex vivo and in vivo research.*

13:45 – 14:15

Break

14:15 – 15:00

Zoltan Szabo: *Ultrasound imaging of small animals.*

##### April 21, 2016 (place: 338B)

12:15 – 13:45

Gabriela Lorite: *Basics and applications of Scanning Electron Microscopy.*

##### April 26, 2016 (place: P117)

12:15 – 13:45

Gabriela Lorite: *Basics and applications Atomic Force Microscopy (AFM) – Part I.*

13:45 – 14:00

Break

14:00 – 15:30

Gabriela Lorite: *Basics and applications of Atomic Force Microscopy (AFM) – Part II.*

### **Demonstrations (10 h):**

April 27, 2016

12:00 – 15:00 Demonstration I

April 28, 2016

09:00 – 12:00 Demonstration II

April 28, 2016

13:00 – 16:00 Demonstration III

April 29, 2016

09:00 – 12:00 Demonstration IV

April 29, 2016

13:00 – 16:00 Demonstration V

Zoltan Szabo:	Ultrasound imaging of small animals <i>in vivo</i> (Kontinkangas campus)
Ilkka Pietilä	Optical projection tomography <i>ex vivo</i> (Kontinkangas campus)
Sakari Karhula:	Micro-CT imaging <i>ex vivo</i> (Kontinkangas campus)
Joonas Oinas:	FTIR imaging <i>ex vivo</i> (Linnanmaa campus)
Gabriela Lorite:	Atomic Force Microscopy <i>ex vivo</i> (Linnanmaa campus)

### **Practical exercise + report:**

The practical exercise includes hands-on measurements and analysis of biological samples *ex vivo* with one of the following imaging equipments: 1) FTIR imaging microscope (located at the Linnanmaa campus), 2) Micro-CT device (located at the Kontinkangas campus), or 3) Polarized Light microscope (located at the Kontinkangas campus). There is a possibility to measure and analyze your own tissue samples. Each student conducts a practical exercise with only one imaging equipment.

The imaging equipment and time for the practical exercise will be agreed after the first lecture.

### **Written final exam:**

Written final exam will be organized on May 6, 2016 at 09:00 – 12:00 (place: A101). It will be based on the materials given from lectures, demonstrations, and practical exercise. The exam will be graded in a scale of 1-5.

### **Obtained credits:**

Participating all the lectures:	1 ECTS
+participating all the demonstrations:	2 ECTS
+conducting the practical exercise and report:	3 ECTS
+taking the final exam	5 ECTS