

Postgraduate Education Unit, Faculty of Medicine

University of Turku, Turku, Finland

A BIOMEDICAL POSTGRADUATE COURSE

NANOSTRUCTURE IMAGING BY MICROSCOPIC METHODS IN BIO-MEDICAL RESEARCH Spring 2018

<https://www.utu.fi/fi/yksikot/med/opiskelu/Jatkotutkinto/PGE/Sivut/kurssit.aspx>

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ORGANIZER AND LECTURER:

Professor emeritus Lauri J. Pelliniemi, (LJP) Laboratory of Electron Microscopy,

lauri.pelliniemi@utu.fi, tel. 333 7312, 045-2302245

CO- LECTURERS:

Helen Cooper FT, (HC), Eeva-Liisa Eskelinen, FT, Prof. (ELE) and Markus Peurla FT, (MP)

DATE AND TIME:

From 7 February to 9 May 2018 on Wednesdays at 10.15 to 11.45. Individual dates and places are given in the program below.

REGISTRATION:

Register on 28 January 2018 or earlier to Anne Johansson at PGE, Medical Faculty,

University of Turku amjohan@utu.fi , tel. 333 8421. Participants are accepted in the order of registration.

LANGUAGE: English

PLACE: Seminar rooms in Medisiina C and B, Kiinamylynkatu 10, 20520 Turku

TARGET GROUPS:

- Graduate students - Postdoctoral fellows - Included in the curriculum of "Master's Degree Programme in Biomedical Imaging"

COURSE CONTENT:

You will learn methods for imaging nanostructures in biomedical and biomaterial research by transmission electron microscopy, scanning transmission electron microscopy, scanning electron microscopy, and scanning tunneling microscopy. Special emphasis is on imaging, localizing, and functional characterization of cell and tissue nanostructures, macromolecules, nanoparticles, and molecular aggregates. Applications of methods in various research projects are presented.

VOLUME:

24 hours lectures giving 2.4 CU rounded up to 2 CU with full attendance. Participation is recorded each time.

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PLACE: Seminar rooms in Medisiina, Kiinamyllynkatu 10, 20520 Turku

TIME: Wednesdays at 10.15---11.45

PROGRAM:

07.02.2018 Seminar room B 611. (LJP) 1. Introduction and specimen preparation: Electron optics, Specimen preparation for TEM, Specimen preparation for SEM

14.02.2018 Seminar room C 144 a. (LJP) 2. Physical and technical principles of different electron microscopes and their use: - Structure and function of transmission electron microscope (TEM) - Structure and function of Scanning electron microscope (SEM) - Structure and function of Scanning transmission electron microscope (STEM) - Structure and function of High-voltage electron microscope (HVEM)

28.02.2018 Seminar room C 144a (LJP)

3. Operation of transmission (TEM) and scanning (SEM) electron microscopes - Transmission electron microscope - Scanning electron microscope

14.03.2018 Seminar room C 144a (LJP)

4. Image processing and interpretation. Occupational safety: - Image recording and publication - Image interpretation - Occupational safety in laboratory work

21.03.2018 Seminar room B611. (LJP)

5. Localization of molecules in nanostructures by immunocytochemistry: - Basic requirements - Production of antibodies - Electron dense labels - Fixation - Cryotechniques - Immunolabeling reactions - Pre-embedding labeling methods - Postembedding labeling methods - Controls

28.03.2018 Seminar room B611. (LJP)

6. Special techniques for nanostructural localization of molecules, 3-D imaging, and measurements: - Enzyme cytochemistry - Radioautography - In situ hybridization - Electron microscopic tomography - Stereology and morphometry - Freeze-fracturing

04.04.2018 Seminar room B611. (LJP)

7. Localization of elements and analysis of molecular structures by electron microscopy: - Identification and localization of elements by x-ray (electron probe) microanalysis - Imaging of macromolecular structures of DNA, RNA, proteins, and proteoglycans

11.04.2018 Seminar room B611. (LJP)

8. Facilities of electron microscopy in Turku campus

18.04.2018 Seminar room C144a. (HC)

9. Immunolabeling-EM & protein localization: applications

25.04.2018 Seminar room C 124b. (MP) 10. Electron tomography

02.05.2018 Seminar room B 611 (MP) 11. Particle imaging: applications

09.05.2018 Seminar room B 611 (ELE) 12. Correlative light and electron microscopy: applications

16.05.2018 Optional day

23.05.2018 Optional day