JAGIELLONIAN UNIVERSITY
IN KRAKOW

Institute of Zoology
Department of Cell Biology and Imaging

www.binoz.uj.edu.pl/iz/zch

Laboratory of Electron microscopy: TEM & SEM
Laboratory of Confocal microscopy

Head: prof. dr hab. Elżbieta Pyza

dr Grzegorz Tylko
dr Jolanta Górska-Andrzejak

The Third Campus
The LifeScience Park
due for completion in 2011

Institute of
Zoology
February 2011

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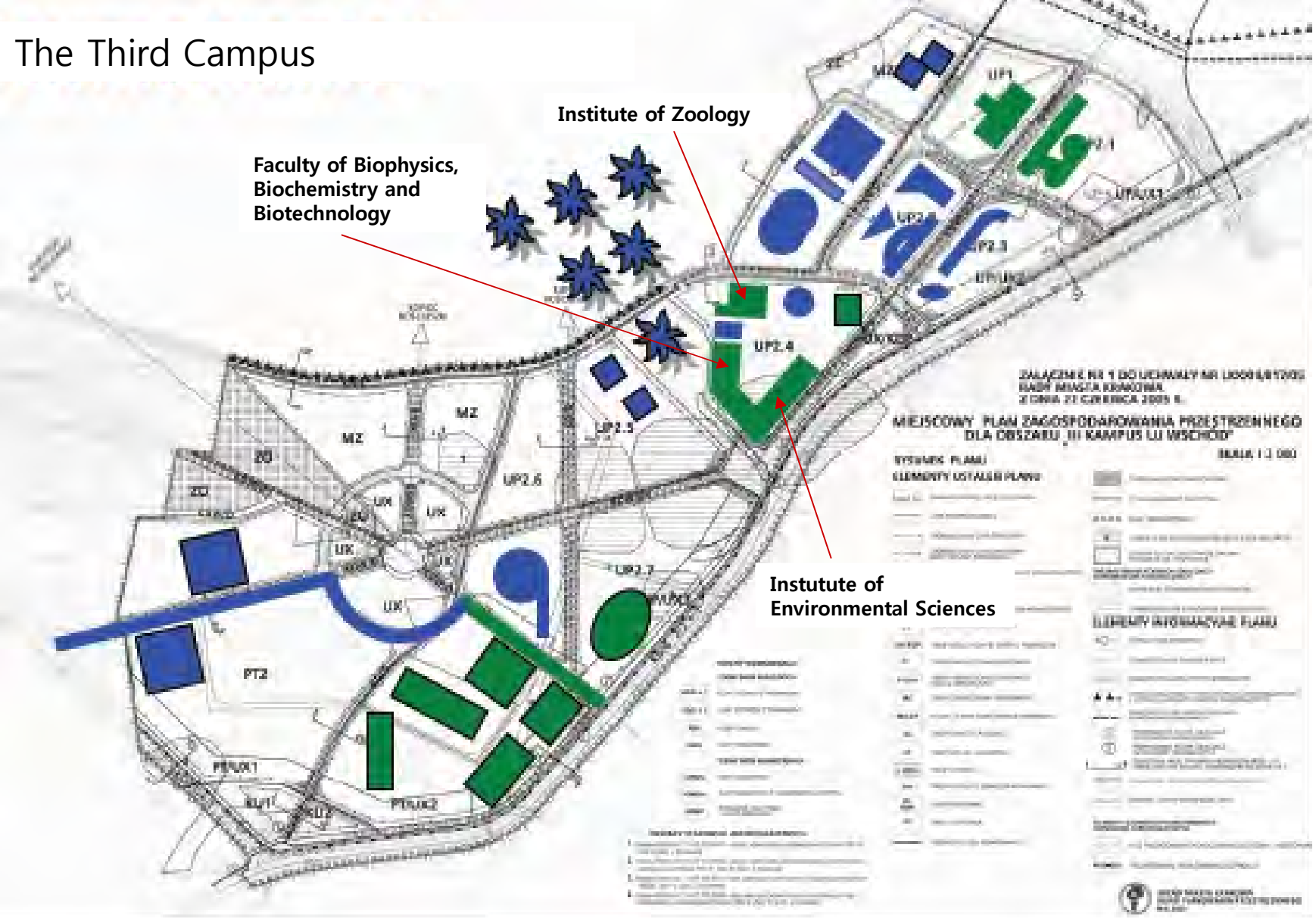
The Third Campus



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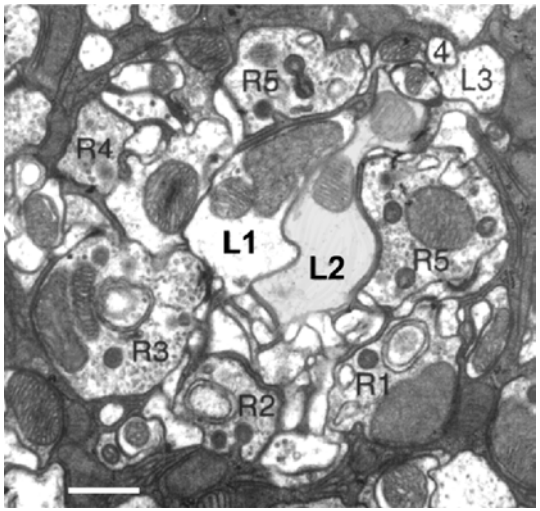
TEM – current equipment base

JEOL JEM-100SX

basic imaging of cell ultrastructure

Research focus and scope: Daily synaptic plasticity in the

a) visual system of *Drosophila*



b) barrel cortex of the mouse

serial EM
Micrograph
reconstruction

access policy: open access, help of technicians

TEM – planned equipment base

Possibilities of the new TEM:

- Imaging at low temperatures (cryo)
- Electron tomography (3D reconstruction)
- STEM imaging (scanning transmission mode)
- Imaging of non-contrasted biological specimens in Electron Energy Filtering mode (Omega filter)
- Low Z-number elemental analysis using EELS (Elemental Energy Loss Spectroscopy)

Additional specimen preparation equipment:

- HPF (high pressure freezer)
- FS (freeze –substitution)
- cryoultramicrotome

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Scanning EM

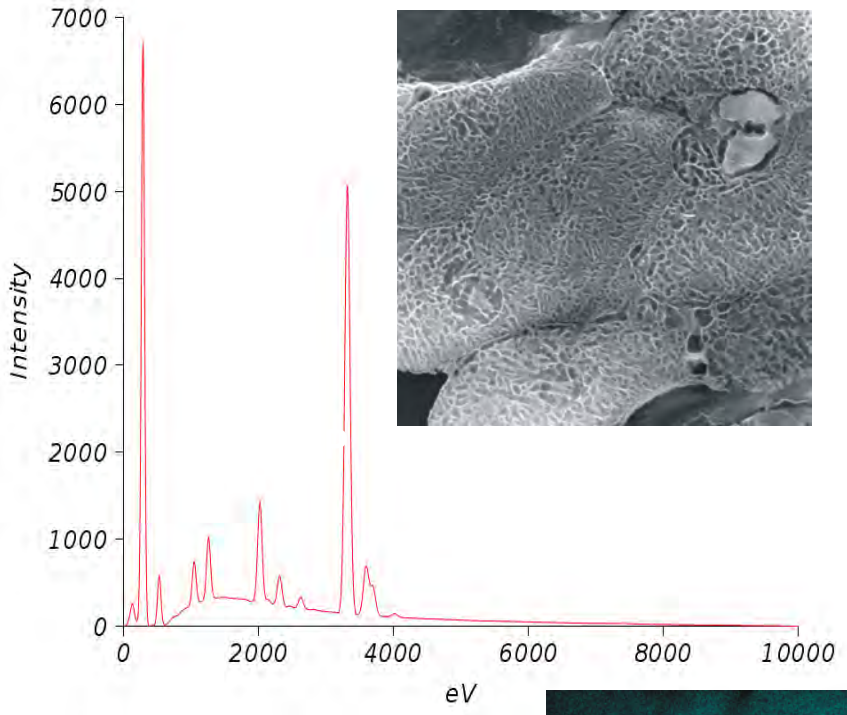
SEM JSM-5410

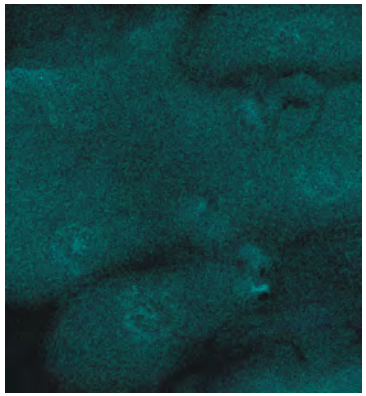
Jeol

- Imaging with medium resolution due to tungsten e- emiter
- Quantitative elemental analysis of biological, geological and metallurgical specimens (energy dispersive spectrometry; X-ray microanalysis)
- Image analysis package (size, diameter, area measurements of specimens under investigation)

access policy: open access, help of technicians

Research focus and scope:





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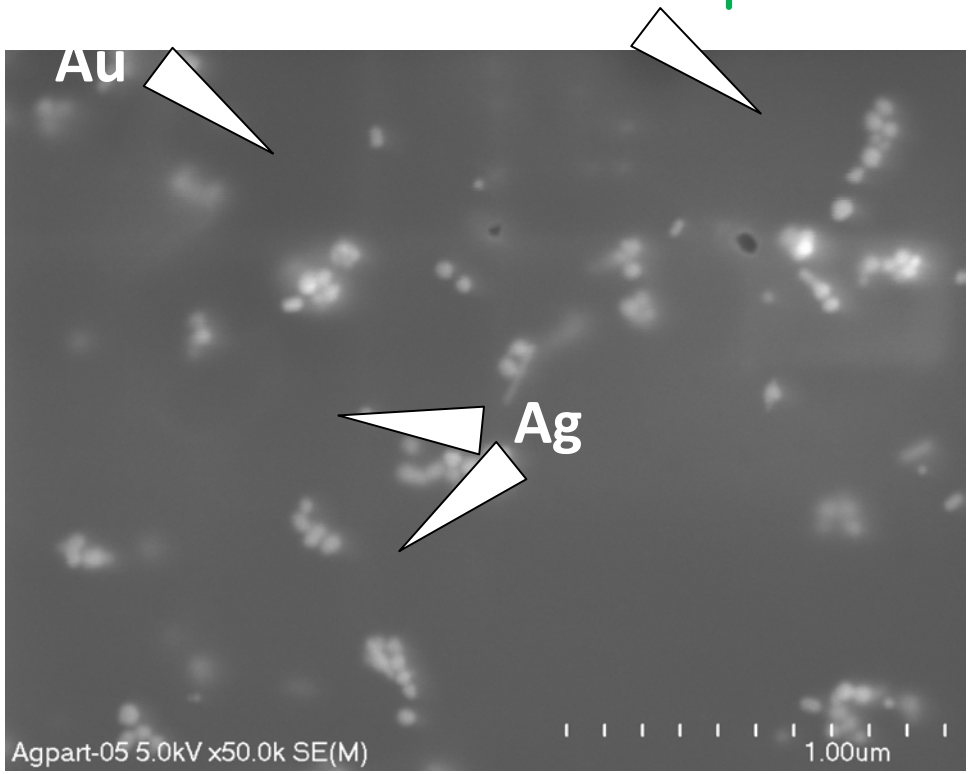
Scanning EM

Research focus and scope:



HITACHI S-4700 FEG

- Imaging with high resolution (Field Emission Gun e- emiter)
- Low electron energy imaging
- BSE (backscattered electrons) imaging
- Qualitative X-ray microanalysis of nanoparticles
- Cathodoluminescence

access policy: open access, help of technician

Planned equipment base:
FIB (Focus Ion Beam) in cryo-SEM environment

- FIB and imaging of biological materials at low temperature (cryo)
- FEG or LaB6 e- emission gun
- imaging and 3D reconstruction of resin embedded biological materials
- low e- energy imaging and X-ray microanalysis concomitant with 3D reconstruction

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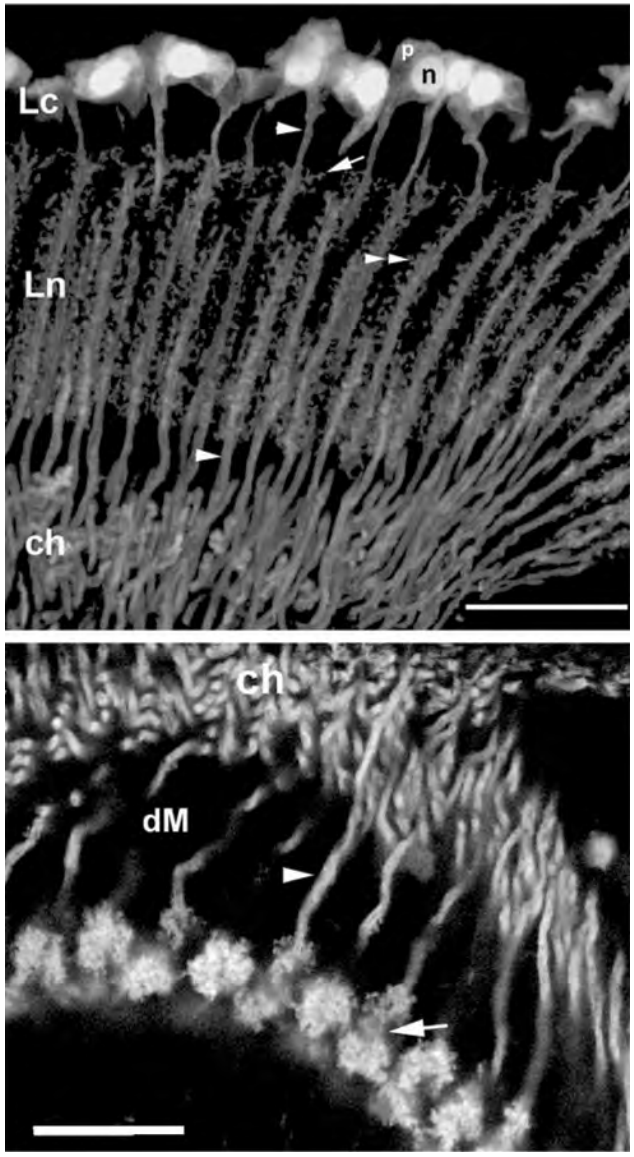
Confocal microscope: Zeiss LSM 510 Meta equipped with Confocor 3

Axiovert 200M Meta

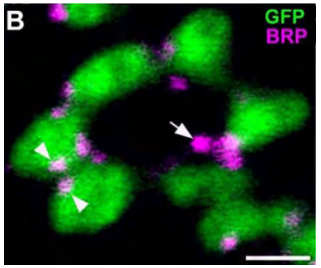
Objectives	Lasers
10XPlan-Neo/0.3 NA	Argon2; 458 ,477, 488, 514nm
20XPlan-Apo/0.75 NA (DIC)	HeNe543; 543nm
40X Plan-Neo/1.3 NA Oil (DIC)	HeNe633; 633nm
63X Plan-Apo/1.4 NA Oil (DIC)	Diode 405-30; 405nm

Multiple fluorescence and colocalization analysis, FRAP, FLIP, FCS

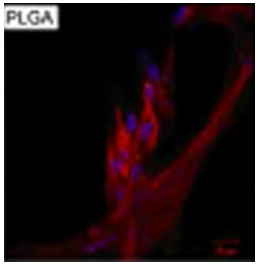
Research focus and scope:



Daily changes in neurons morphology



Daily synaptic plasticity



Stem-cells adhesion to different scaffolds

The needs of the local research community

(in terms of access to technologies & access to equipment)

Nowadays:

- **TEM/SEM**
  - ~20 persons (TEM)
  - ~20 persons (SEM)
  - UJ: IZ, IB, IG, Biotechnology, Collegium Medicum
  - Other Universities: AR, AGH, AWF
- **Confocal**
  - ~ 10 persons from IZ

Our and others needs:

access to technologies:

ELECTRON MICROSCOPY:
FIB for 3D imaging and X-ray microanalysis at low temperatures

FLUORESCENCE MICROSCOPY:
Fluorescence Lifetime Imaging (FLIM), multiphoton excitation, Stimulated Emission Depletion (STED)

access to equipment:

TISSUE & CELL PREPARATION:
HFP (high pressure freezer)
FS (freeze substitution)
Automated tissue processing machine for TEM

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Thank you