Laboratory of Scientific computing and visualization

Department of Biophotonics

International Laser Center
Bratislava

Areas of activity

Multispectral and statistical data analysis

Mathematical modeling

Scientific visualization

High-performance computing

Numerical techniques

Real-time conferencing and collaboration

Equipment

IBM cluster 1350 – 8 nodes

1 xSeries 345 and 7 xSeries 335

dual processor - Intel Xeon 2.8 GHz

2GB memory on each node

10/100Mbps Ethernet

Myrinet®-2000

Operating RH9

Equipment

2x SUN UltraSparc60 workstation, dual processor

Sun Enterprise Server 450, dual processor

IBM IntelliStation M Pro visualization workstation

SGI Octane workstation

Video processing hardware

ATM network

Applications

- Visualization toolkit IRIS Explorer
  for both Unix and Windows platform

- Portland cluster development kit for Linux

- Numerical Fortran Parallel Libraries From NAG

- Numerical C libraries

- Gaussian 03 for quantum chemistry computations

- Cerius

- CodeWarior Studio for Linux

- WorkShop Studio 5.0 for Solaris

Laser scanning multispectral confocal microscopy

Areas of activity

multi-parametric characterisation of biological systems in physiological conditions, material analysis, fusion of molecular / single-cell / tissue techniques, emission fingerprinting, FRAP, FRET

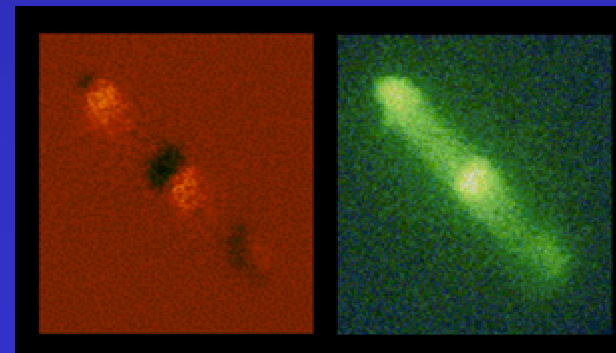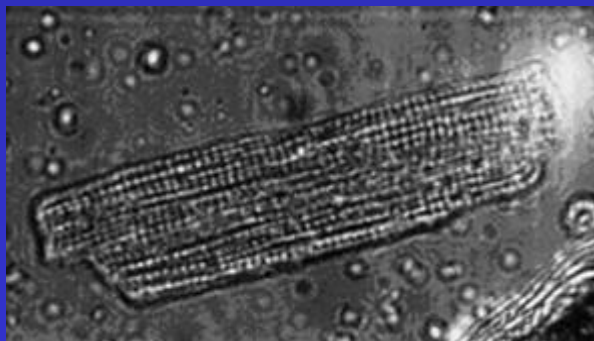# Mapping of physiological processes in living cells
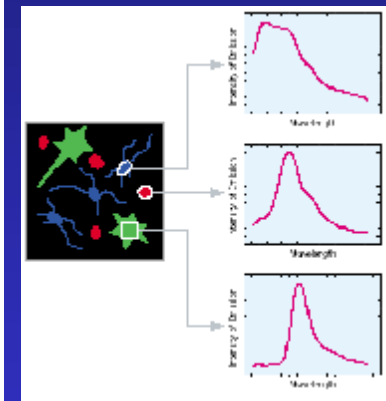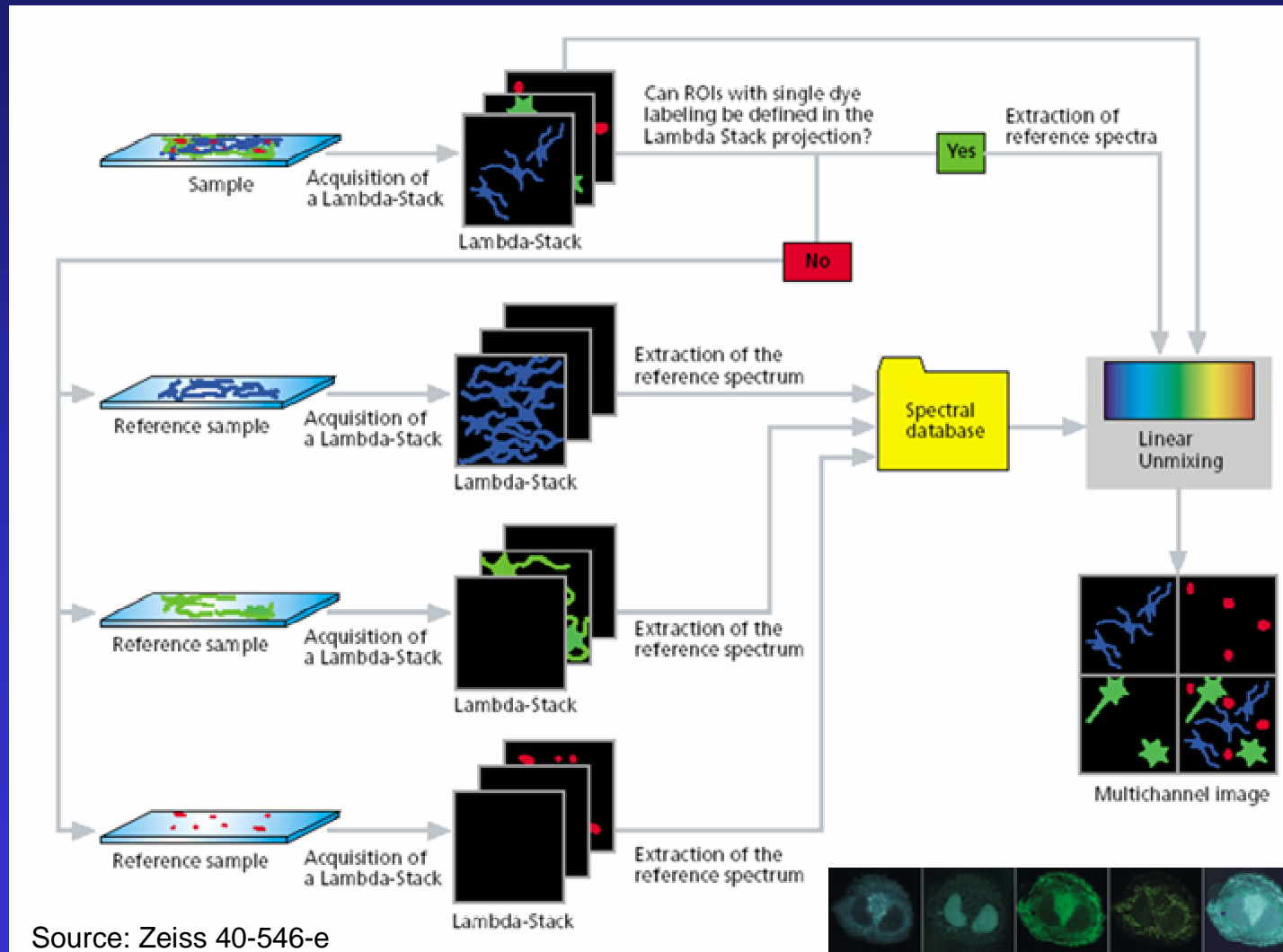
sample conditioning

temperature control
incubation / perfusion
under physiological conditions
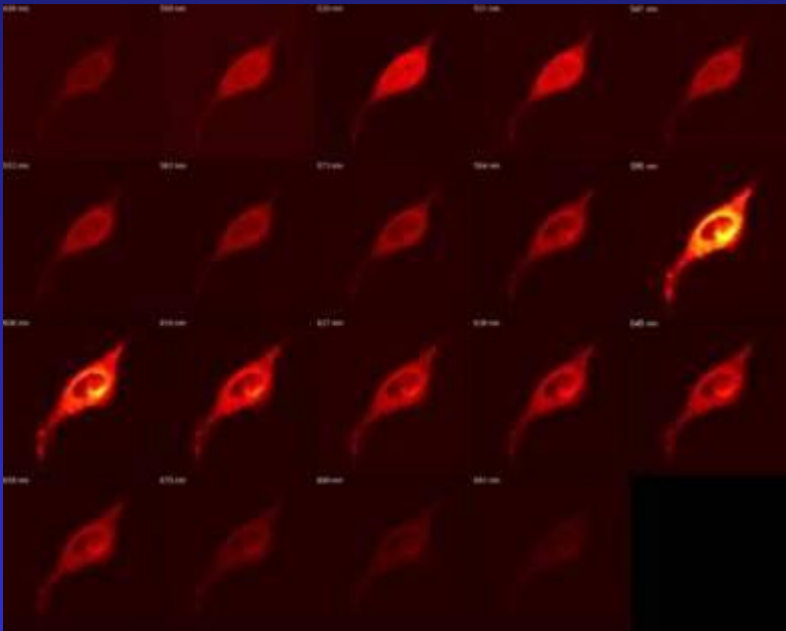+ Facility for cell cultivation

automatisation

Programmable experiment protocols
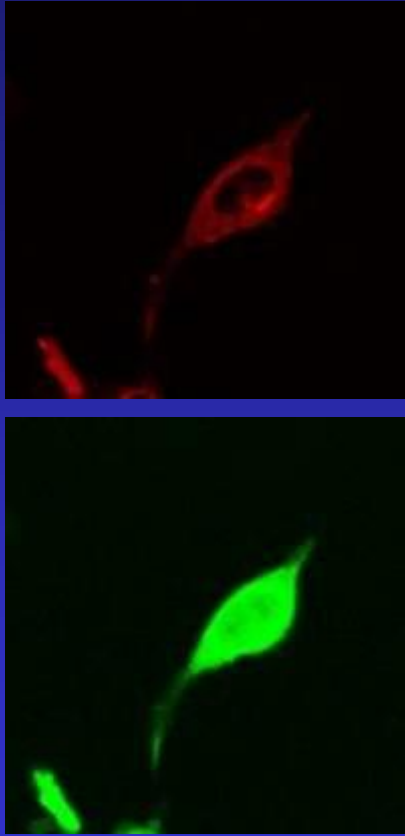and data-processing procedures

Emission fingerprinting (λ microscopy)

Source: Zeiss 40-546-e

Distribution of compounds in cells
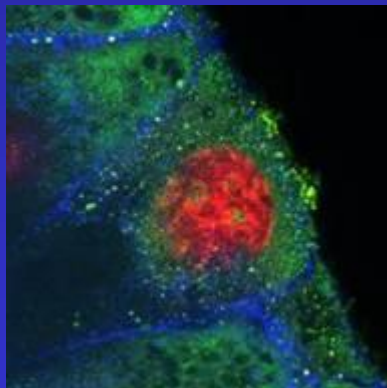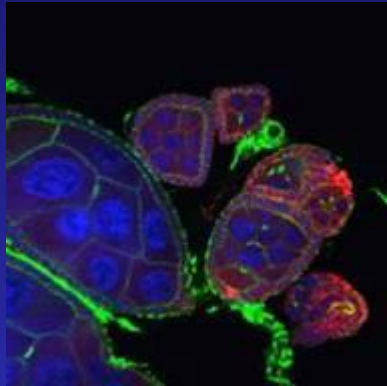
Spectrally resolved images

Unmixed images

Expression of various proteins and their location in cells

3D reconstruction

3D stack of images
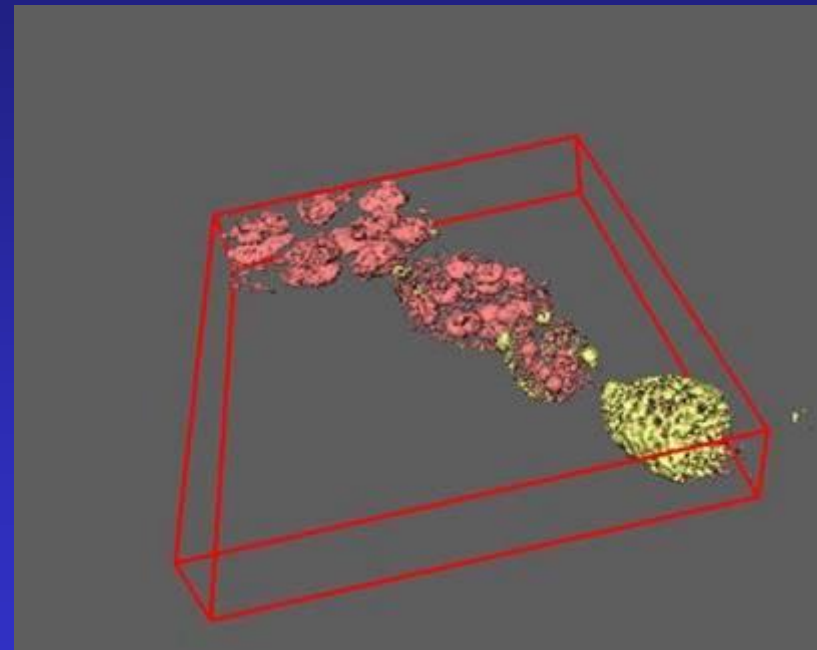
Problems

3D reconstruction

Visualization of volume data sets

3D deconvolution methods for microscopy

Visualization of multidimensional data sets

Quantification and analysis of multidimensional data sets