



We invite you to a practical course on the fundamentals of MRI on the magnetic resonance system with the strongest magnetic field used in the Czech Republic for imaging. A total of three lessons will take place on the preclinical MR scanner Bruker 9.4T at the Institute of Scientific Instruments of the Czech Academy of Sciences. In each lesson, you will first acquire imaging data, experiment with various settings and observe their effects on the measured images. You will take the acquired data home and process them (according to your choice, e.g., in Matlab, Python,...) with the help of offered consultations and compare your results with the theoretical assumptions.

Lesson 1 - MRI Basics, SNR Measurement

Practical Part - March 22nd, 9-11 am

- Measurement of spin and gradient echo
- Phase and frequency encoding
- Influence of basic measurement parameters (TR, TE, slice thickness, averaging) on noise level
- Visual evaluation of the signal-to-noise ratio

Processing of measured data – consultation April 5th, 9-11 am (via Zoom)

- Loading of measured MRI data (DICOM format)
- Measurement of signal-to-noise ratio in images
- Comparison of the results with theoretical assumptions

Lesson 2 - Relaxation Times

Practical Part - April 12th, 9-11 am

- Contrast agents for MRI
- Measurement of contrast-agent samples using the multi-echo spin echo method
- Quantification of T2 in ParaVision 7

Processing of measured data - consultation April 23rd, 9-11 am (via Zoom)

- Loading of measured MRI data (DICOM format)
- Calculation of T2 and subsequently r2 relaxivity of the contrast agent
- Comparison with theoretical assumptions

Lesson 3 - Diffusion Imaging

Practical Part - April 26th, 9-11 am

- DWI and DTI of a rat brain phantom
- Processing in ParaVision 7

Processing of measured data - consultation April 30th, 9-11 am (via Zoom)

- Loading of measured MRI data (DICOM format)
- ADC map calculation
- Comparison with theoretical assumptions

Location:

Institute of Scientific Instruments
of the Czech Academy of Sciences,
Královopolská 147, Brno

Registration:

<https://forms.office.com/r/C5CLT7t9Qg>



Participation is free of charge.

Prerequisites:

Knowledge of MRI basics,
for example, according to
mriquestions.com - chapters:
...Magnets & Scanners
...The NMR Phenomenon
...Pulse Sequences
...Making an Image
...K-space & Rapid Imaging
...Contrast Agents

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<https://www.isibrno.cz/czbi/>