96p4 Jirák & Krššák

„ Czech-Austrian Workshop on Magnetic Resonance Imaging and Spectroscopy 2023”

Final Report

The goal of this project was to organize an international workshop on Magnetic Resonance for Czech and Austrian research fellows and students. The main objective was to familiarize the audience with scientific projects and recent advances in medical research sites focused on magnetic resonance imaging and spectroscopy. These traditional workshops have been organized by participating groups from Vienna and Prague since 1995, fostering collaboration between research groups and institutions in two different countries: the Czech Republic and Austria. Collaborative efforts can lead to more significant research outcomes and broaden the impact of the research. This year, we gathered participants from Charles University in Prague, the Institute for Clinical and Experimental Medicine, the Medical University of Vienna, CEITEC (the Central European Institute of Technology), Masaryk University, Graz University of Technology, the Medical University of Innsbruck, the Medical University of Graz, the Institute of Scientific Measurement, Czech Academy of Sciences in Brno, and Bruker Biospin.

The workshop focused on Magnetic Resonance Imaging and Spectroscopy (MRI, MRS) and took place in Znojmo at Hotel Premium from October 23rd to 25th, 2023. It was attended by 63 scientists. The expenses of 35 people from Austria and 20 from the Czech Republic were covered by this project, as proposed (96p4). Renting fee for the conference room, sound system, data projector, and payment for hotel services (meals, etc.) was also covered within the approved budget.

The workshop achieved a great mix of young scientists at all educational levels, from those visiting and participating in the workshop for the first time to senior scientists who regularly return. This diversity sparked lively presentations and discussions from various fields of biomedical MR research. This year, graduate and undergraduate students had the opportunity to present their research ideas and results to an international audience, with a total of 30 presentations in 6 scientific sessions (please see the attached program of the workshop). Students particularly valued the opportunity to give their talks within this motivated and friendly platform, providing them with a valuable educational experience. This exposure can help them develop their presentation skills and receive constructive feedback.

The keynote lecture in the scientific part of the meeting was delivered by senior guest Dr. J. Klohs from Bruker Biospin, who talked about trends in preclinical magnetic resonance spectroscopy. Further, short presentations covered most of the topics related to magnetic resonance, with a focus on:

i) Functional MRI;

ii) MRI/MRS: Data processing and quantification;

iii) MRI/MRS of the brain;

iv) MR perfusion and cardio;

v) Artificial intelligence algorithms and parametric quantitative MRI/MRS characterization;

vi) Multinuclear MRI/MRS.

The complete program of the workshop, including presentation titles and the list of participants, is attached (Program_Aktion_2023.pdf). The workshop also aimed to facilitate discussions and consultations regarding problems with MR sequences and data evaluation, the design and construction of radiofrequency coils, unification of quantitative parameters (based on an automatic approach) for determining MR signal, and the preparation of joint projects. The workshop was complemented by a short tour to the downtown of Znojmo and a social event for all participants in the evening of October 24th, sponsored by Bruker Biospin. The involvement of an industry partner highlights the connection between academic research and industry, potentially leading to innovations and technology transfer.

At the end of the workshop, two students were awarded for the best scientific presentations. This year, the awardees were Eng. D. Hývlová from the Institute of Scientific Measurement, Czech Academy of Sciences, and Eng. D. Havlíček from the Institute for Clinical and Experimental Medicine. Such recognition can motivate participants to continue making valuable contributions in the future. Further on, for seven PhD students of Medical University of Vienna, this workshop represented part of "Basic Seminar: Experimental in vivo Magnetic Resonance Imaging and Spectroscopy (WS 2023/2024)" counting one ECTS for their PhD curriculum in Medical Physics or Medical Imaging. For the next year we plan to involve further students of the "Platform for brain research using UHF MRI, histology, and AI" supported by the doc.funds.connect program DFH-50 of Austrian Science Foundation awarded to and supervised by Prof. Grabner, Klagenfurt and Prof. Bogner, Vienna.

In summary, the Czech-Austrian workshop on magnetic resonance imaging and spectroscopy in 2023 was successful, and its total expenditure did not exceed the budget (the unspent subsidy of CZK 555 for the 96p4 project was returned). It promoted collaboration, knowledge exchange, education, and problem-solving in the field of magnetic resonance imaging and spectroscopy, benefiting both participants and the broader scientific community. It played a pivotal role in advancing research and facilitating international partnerships.

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