



## PhD position in NMR metabolomics of honey bees.

The NMR group in the **National Institute of Chemical Physics and Biophysics (KBFI)** in Tallinn, in collaboration with the Institute of Agricultural and Environmental Sciences at the **Estonian University of Life Sciences (EMU)**, has an opening for a PhD position for studying honey bee health and honey bee metabolomics by NMR spectroscopy.

### Project summary:

Agricultural activities are known to exert adverse effects on biodiversity. Yet, contrary to expectations, honey bee yearly survival appears to be better in intensively managed areas. Therefore, establishing the factors of agricultural practices that support bee fitness would allow to develop farming and beekeeping strategies that offer optimal performance for both.

The PhD project will use NMR metabolomics to study the metabolic profiles of bees to understand changes in their metabolome and survival in response to variations in habitats. We will look into bee population density, landscape, foraging distances, honey composition, foraging plants, pathogens, pesticide residues, etc. Some of these analyses will be done by complementary analytical methods like DNA sequencing and mass spectrometry. We will build a multimodal dataset, where honey bee metabolome NMR analysis will take central stage. These results will form the bases of a model that will assist farmers and beekeepers to adopt agricultural and bee keeping strategies that support each other and provide policymakers with new insights for designing effective regulations.

### Research Group:

The PhD candidate will join the KBFI NMR group and will be supervised by Indrek Reile (KBFI, head of solution NMR) and by Reet Karise (EMU, associate professor in applied entomology). The candidate will have access to 6 NMR spectrometers (200-800 MHz) and modern sample preparation facilities. Honey bee sampling and sample preparation will be carried out in collaboration with the entomology team in EMU. Training in required methods (from sampling to NMR metabolomics analysis) will be available. The interdisciplinary project may include field work for sample collection and methods development. The candidate will work in close proximity to researchers in biomarker discovery and biomedical applications and there will be opportunities to be involved in these fields too.

### The candidate:

We are looking for a candidate with prior experience and enthusiasm in at least one of the research disciplines involved (NMR, metabolomics, honey, entomology) and willingness to learn about the rest. Candidates with prior experience with solution NMR and/or metabolomics will be given priority. The candidate must hold a MSc degree in a relevant field or be close to defending an MSc.



# Keemilise ja Bioloogilise Füüsika Instituut

National Institute of Chemical Physics and Biophysics

KBFI is a research-only institution and therefore the PhD candidate will be enrolled as a doctoral student to an Estonian university. The candidate will have access to lectures, courses and academic resources at the full PhD curriculum capacity. Funding will be available for 4 years since the start of contract.

Interested candidates should get in touch at [indrek.reile@kbfi.ee](mailto:indrek.reile@kbfi.ee). Informal enquiries can be directed to the same address.