



Researcher position in bioinformatics, virology, molecular biology or biotechnology

We are searching for a researcher who will work in a dynamic and internationally active research group using state-of-the-art molecular biology techniques for detection, surveillance and studies of biology, diversity and evolution of viruses (from plant to human pathogens, including SARS-CoV-2).

About the Institute

National Institute of Biology (NIB) is the largest Public Research Institution for Life Sciences in Slovenia. The basic activity of the Institute is basic, developmental and applicative research in the fields of biotechnology, biomedicine, marine biology, ecology and agriculture.

About the Department

Department of Biotechnology and Systems Biology (FITO) is committed to generate highest quality scientific knowledge about complex biological processes with an emphasis on interactions between pathogens and their hosts. This is achieved using state-of-the-art equipment, inclusion in European infrastructural centers, an established quality control system, and involvement in many European and other international projects. The department is recognized for systems biology using omics approaches, bioinformatics and statistics, research on viruses and bacteria, metrology aspects in life science, and research on genetically modified organisms and therapeutic viruses. Two high-tech spinout companies were founded in last ten years as a result of transferring cutting edge research from the department into biotech applications.

About the Group

At Microbiology unit, we perform research spanning from biology, biodiversity, evolution, epidemiology, and diagnostics of microbes to development and validation of tools for their detection. We use state-of-the-art techniques to address different research questions, e.g., quantitative and digital PCR, LAMP, cryo-electron microscopy, high-throughput sequencing and bioinformatics. Our research is focused on plant pathogens and other organisms pathogenic to human and animals, environmental virology and viral ecology (studies of viruses in environmental samples - mainly water) and development of non-chemical solution for virus elimination from water samples. We are part of European reference laboratory for pests on plants (for viruses and phytoplasmas). Recently, we have established monitoring of SARS-CoV-2 and its variants of concern in wastewater samples.

Candidate's profile

We seek for a candidate with PhD in bioinformatics / biostatistics / biotechnology / microbiology / biology or similar fields. Experiences in big data analysis, statistics, data visualization, bioinformatics and/or virology are beneficial.

The candidate will work in a collaborative team (at the moment app. 15 people) environment comprised of senior researchers, laboratory associates, postdocs, PhD students and others. According to the profile of the candidate, duties will range from managing projects from the molecular biology / virology / microbiology field, planning and executing the experiments, analyzing the datasets, including high-throughput sequencing data, statistical analyses and data visualization. Specifically, the topics of the candidate work will likely include discovery, diversity analyses and reconstruction of microbial genomes, either for plant viruses/viromes,



environmental samples or SARS-CoV-2 genomic data, improvement of laboratory and bioinformatics workflows for detection and studies of pathogens, innovative and intuitive ways of data visualization, and planning, applying and executing projects from the field of studies.

Other desirable professional and personal skills:

- Ability to work in a team in a collaborative environment.
- Solutions-driven creative and proactive thinking.
- Attention to detail and quality assurance.
- Ability and interest to work on diverse research topics from basic and applied science fields.
- Good proficiency in English and ability to collaborate with international partners.
- Demonstrated capacity for scientific writing in English.
- Drive to learn/discover new techniques and analysis approaches.
- Willingness to travel to other laboratories abroad and present the research results on conferences.

What do we offer?

- Work in a dynamical, friendly young and world-renowned scientific collective.
- Collaboration with highly skilled professionals, international collaboration and work with high-tech companies.
- Flexible working hours with possibility of occasional work from home.
- Training in specific laboratory or bioinformatics topics.
- Possibilities for scientific and career development and soft-skills training (e.g., leadership, teamwork, project work, negotiations, communication).

Location:

National Institute of Biology is located in Ljubljana, in the vicinity of ZOO and several Faculties. Ljubljana is the capital of Slovenia with high concentration of administrative, cultural, educational and research institutions. It offers a comfortable and peaceful lifestyle with all the amenities in the reach of the hand.

(More info: <https://www.visitljubljana.com/en/visitors/> and <https://www.slovenia.info/en>)

Start of the work:

As soon as possible and according to the candidate's availability.

Application:

For more information, please contact dr. Denis Kutnjak (denis.kutnjak@nib.si).

Please send the motivational letter, CV and recommendations to: kadrovska.sluzba@nib.si until 17th of June 2021.

Relevant recent literature references of the research group:

- Bačnik, K.; Kutnjak, D.; Pecman, A.; Mehle, N.; Tušek Žnidarič, M.; Gutiérrez Aguirre, I.; Ravnikar, M. Viromics and infectivity analysis reveal the release of infective plant viruses from wastewater into the environment. *Water Res.* 2020, 177, doi:10.1016/j.watres.2020.115628.
- Filipić, A.; Gutierrez-Aguirre, I.; Primc, G.; Mozetič, M.; Dobnik, D. Cold Plasma, a New Hope in the Field of Virus Inactivation. *Trends Biotechnol.* 2020, 38, 1278–1291, doi:10.1016/j.tibtech.2020.04.003.
- Kežar, A.; Kavčič, L.; Polák, M.; Nováček, J.; Gutiérrez-Aguirre, I.; Žnidarič, M.T.; Coll, A.; Stare, K.; Gruden, K.; Ravnikar, M.; et al. Structural basis for the multitasking nature of the potato virus Y coat protein. *Sci. Adv.* 2019, 5, eaaw3808, doi:10.1126/sciadv.aaw3808.
- da Silva, W.; Kutnjak, D.; Xu, Y.; Xu, Y.; Giovannoni, J.; Elena, S.F.; Gray, S. Transmission modes affect the population structure of potato virus Y in potato. *PLoS Pathog.* 2020, 16, 1–23, doi:10.1371/journal.ppat.1008608.
- Pecman, A.; Kutnjak, D.; Gutiérrez-Aguirre, I.; Adams, I.; Fox, A.; Boonham, N.; Ravnikar, M. Next generation sequencing for detection and discovery of plant viruses and viroids: Comparison of two approaches. *Front. Microbiol.* 2017, 8, 1–10, doi:10.3389/fmicb.2017.01998.
- Kutnjak, D.; Elena, S.F.; Ravnikar, M. Time-Sampled Population Sequencing Reveals the Interplay of Selection and Genetic Drift in Experimental Evolution of Potato Virus Y. *J. Virol.* 2017, 91, e00690-17, doi:10.1128/JVI.00690-17.
- Kosel, J.; Gutiérrez-Aguirre, I.; Rački, N.; Dreo, T.; Ravnikar, M.; Dular, M. Efficient inactivation of MS-2 virus in water by hydrodynamic cavitation. *Water Res.* 2017, 124, 465–471, doi:10.1016/j.watres.2017.07.077.

Selected ongoing projects:

- EU MSCA ITN INEXTVIR: Innovative Network for Next Generation Training and Sequencing of Virome. Role: Coordinators. 2019-2023. We are coordinating a Marie Skłodowska-Curie innovative training network (ITN) network including 15 PhD students, hosted by 15 partners from 6 EU countries, working on the use of high-throughput sequencing for characterisation of the virome of most important crops in Europe. <https://inextvir.eu/>
- EU H2020 VALITEST: Valitest - Validation of diagnostic tests to support plant health. Role: Partners and WP leaders. 2018-2021. In this project we are focusing on the development of methods for validation of diagnostics tests for plant pathogens, NIB leads the biggest work package and have organized large-scale test performance studies including laboratories from many different countries. <https://www.valitest.eu/>
- EU EFSA SMART-Surveillance: Smart monitoring of airborne plant pathogens: advances in aerobiology, and molecular diagnostics and remote sensing to support risk based plant health surveillance in the EU. Role: Coordinators. 2018-2022. Research on surveillance of plant pathogenic fungi, in which we are employing and comparing different molecular biology tools, such as qPCR and HTS.
- SLO-USA bilateral project BI-US/19-21-016: Development of harmonised high-throughput sequencing approaches for detection of plant pathogens. 2019-2021. Collaboration between NIB and USDA on the topic of high-throughput sequencing for detection of plant viruses.
- SLO ARRS L7-2632: Nanopore high-throughput sequencing for resolution of problems in plant pathogen epidemiology and diagnostics (NanoPhyto). Role: Coordinators. 2020-2023. A project funded by national research agency focused on employment of nanopore sequencing for solving different problems connected to plant health: from virus detection and viral strains discrimination in plants and environment, to sequencing of phytoplasmas' genomes.
- SLO ARRS L4-9325: Development of new, environment-friendly approaches for plant and human virus inactivation in waters. Role: Coordinators. 2018-2021. A project funded by national research agency in which we develop new methods for non-chemical inactivation of viruses in water, such as hydrodynamic cavitation and cold atmospheric plasma and their combination; an innovative device for water inactivation of viruses in water was developed and patented in the frame of this project.
- SLO ARRS P40407: Environmental and applied virology: viruses, friends and foes. Role: Coordinators. 2019-2024. A grant from national research agency dedicated to the research on environmental and applied virology, including, among other, the financing of the research on SARS-CoV-2 in wastewaters, viromes of different water samples and holistic methods for characterisation of therapeutic viruses.