Are you interested in bioinformatics and data science? Join an exciting research group working on grass genomics at NMBU

PhD scholarship within Timothy (Phleum pratense) genomics

About the position
The Department of Plant Sciences (IPV), Faculty of Biosciences (BIOVIT) at the Norwegian University of Life Sciences (NMBU) has a vacant 3-year PhD-position within bioinformatics and data science. The research work is an integrated part of the newly funded project 'NeXTim - Securing adaptation of timothy cultivars under climate change and during seed multiplication using genomics and big-data approaches', funded by the Research Council of Norway (RCN) and the plant breeding company Graminor AS.

Timothy is the most important forage grass species in Norway, especially in the northern part. Climate change creates more unstable winter conditions with more freezing and ice- encasement. This requires robust cultivars with superior

adaptation to secure a sustainable agriculture in the north. To secure northern adaptation, it is also important that the cultivars are multiplied in a system that does not change the characteristics of the cultivars through genetic shifts during seed multiplication.

In this project, the PhD candidate will study the potential genetic shifts using genotyping-by-sequencing strategies and identify genes involved in freezing and ice-encasement tolerance and perform comparative transcriptome studies to identify novel candidate genes for freezing and ice-encasement tolerance. Further, the PhD candidate will apply advanced machine-learning models to develop genomic prediction models by combining historical yield data from multi-location-year trials, climate, soil, and genomic data.

Main tasks
- Genotyping by GBS/ddRAD and SNP discovery using SNP calling bioinformatic tools.
- Compare genome wide allele frequency fingerprints (GWAFFs) to track the genetic shifts.
- RNA-seq. for identifying candidate genes and quantifying gene expression responsive to freezing and ice-encasement tolerance, using relevant bioinformatic tools.
- Applying deep learning models (e.g. recurrent neural network), to train and predict best timothy cultivars using climate, yield and genotype data.
- Compulsory training covering a minimum of 35 ECTS credits in accordance with regulations on the PhD degree at BIOVIT.
- The PhD student will learn to plan experiments, analyze and interpret results and present the results for international publication.

The successful candidate is expected to enter a plan for the progress of the work towards a PhD degree during the first months of the appointment, with a view to completing a doctorate within the PhD scholarship period.

Qualification requirements, desired experiences, knowledge and personal qualities
The successful applicant must meet the conditions defined for admission to a PhD programme at NMBU. The applicant must have an academically relevant education corresponding to a five-year Norwegian degree programme, where 120 credits are at master's degree level. The applicant must have a documented strong academic background from previous studies and be able to document proficiency in both written and oral English. For more detailed information on the admission criteria please see the PhD Regulations and the relevant PhD programme description.

The applicant must document expertise and interest in the research subject, especially in bioinformatics/data science.

Required Academic qualifications:

- Master's degree in Bioinformatics / Data science
- Proficiency in English, both written and spoken (please see English language requirements in PhD regulations at NMBU)

The following experiences and skills will be emphasized:

- experience with programs like R/Perl/Python
- experience with RNAseq and genotyping-by-sequencing
- experience with machine learning algorithms
- background of plant genetics is an advantage

You need to have:

- Interest in research and high motivation
- Ability to collaborate, but also work independently
- Strong communication and cooperation skills

Remuneration and further information

The position is placed in government pay scale position code 1017 PhD. Fellow. PhD. Fellows are normally placed in pay grade 54 (NOK 479.600,-) on the Norwegian Government salary scale upon employment and follow ordinary meriting regulations.

Employment is conducted according to national guidelines for University and Technical College PhD scholars.

For further information, please contact Dr. Mallikarjuna Rao Kovi,

Researcher, e-mail: mallikarjuna.rao.kovi@nmbu.no; phone +4767232757.

Professor Odd Arne Rognli, Vice-dean for research / Department head (IPV), e-mail: odd-arne.rognli@nmbu.no; phone +4767232790.

Information for PhD applicants and general information to applicants

Application

To apply online for this vacancy, please click on the 'Apply for this job' button above. This will route you to the University's Web Recruitment System, where you will need to register an account (if you have not already) and log in before completing the online application form.

Application deadline: 27.05.2020

Applications should include (electronically) a letter of intent, curriculum vitae, full publication list, copies of degree certificates and transcripts of academic records (all certified), and a list of two persons who may act as references (with phone numbers and e-mail addresses). Publications should be included electronically

within the application deadline. The relevant NMBU Department may require further documentation, e.g. proof of English proficiency.

Printed material which cannot be sent electronically should be sent by surface mail to: The Norwegian University of Life Sciences, Faculty of Biosciences, P.O. Box 5003, NO-1432 Ås, **within 27.5. 2020.** Please quote reference number: **20/01633.**

If it is difficult to judge the applicant's contribution for publications with multiple authors, a short description of the applicant's contribution must be included.

About The Faculty of Biosciences

The Faculty of Biosciences is organized into two departments: Department of Animal and Aquacultural Sciences and Department of Plant Sciences. The main objective of the Faculty of Biosciences is to contribute to the development of sustainable agriculture and food production systems through basic and applied research on plants and animals including fish (aquaculture).
Research is organized in the following groups: Breeding and quantitative genetics, Ethology and Animal Environment, Nutrition and Physiology in Monogastric Animals, Ruminant Nutrition and Physiology, Genome Biology, Agroecology, Genetics and Plant Breeding, Plant Biology and Plant Biotechnology, Plant Protection and Food Crops.
The Faculty houses Centre for Integrative Genetics (CIGENE) and the research centre for Research-based Innovation (SFI) - Foods of Norway. The faculty is responsible for bachelor- and master programmes in Biology, Animal Science and Plant Science, and international master programmes in Agroecology, Plant Science, Aquaculture, Animal Breeding Genetics and Feed Manufacturing Technology. PhD programmes include Animal Science and Aquaculture, and Plant Sciences. The faculty employs approximately 240 scientists, technicians, and administrative personnel. Around 480 bachelor and master students and 90 PhD students are enrolled in educational programmes within the faculty, offering a stimulating and supportive learning environment.
The Department of Plant Sciences (IPV) has the national responsibility for education and research on sustainable production and utilisation of plants for food, feed, ornamental and recreational purposes. The Department is conducting research on crop plants and plants in natural ecosystems, addressing major societal challenges related to sustainable plant production. The research and teaching focus on fundamental plant biology, sustainable agriculture, agroecology, safe and sufficient food and feed, innovation in plant production systems, and plant breeding.

The Norwegian University of Life Sciences (NMBU)

NMBU has a special responsibility for research and education that ensures the basis of life for future generations.

Sustainability is rooted in everything we do and we provide knowledge for life.

NMBU has 1700 employees and 5200 students and is organized in seven faculties. NMBU has a campus in Ås and in Oslo. In 2021 we are co-located on Ås. Further information on NMBU is available at www.nmbu.no

Jobbnorge ID: 186516, Deadline: 27.05.2020, Customer reference: 20/01633