

Date

January 2020

Information for applicants to the positions as associate professor in data science

History and organization — NMBU

[NMBU](#)'s history begins with the establishment of an agricultural college at Ås in 1859. In 1897 the college was promoted to a research college with the right to confer doctoral degrees. In 2005 we attained full university status, becoming the *Norwegian University of Life Sciences*. In 2014, the university merged with the Norwegian School of Veterinary Science and adopted its current Norwegian name and acronym NMBU, *Norges miljø- og biovitenskapelige universitet*. In 2020, the veterinary school will move from Oslo to our beautiful Campus Ås. NMBU currently has about 5200 students (including 520 PhD students), 1700 employees (of which 800 in academic positions) and offers 64 study programs. The university is organised into seven faculties:

- [Biosciences](#)
- [Chemistry, Biotechnology and Food Science](#)
- [Environmental Sciences and Natural Resource Management](#)
- [Landscape and Society](#)
- [School of Economics and Business](#)
- [Science and Technology \(REALTEK\)](#)
- [Veterinary Medicine](#)

History and organization — Faculty of Science and Technology (REALTEK)

[The faculty](#) was formed in 2005 by merging several institutes and adopted its current name and status in 2017. REALTEK currently has about 130 employees, 70 PhD students and 1100 students. There has been a marked rise in student



numbers in recent years and the faculty now offers study programs within a broad range of engineering disciplines including Data Science, Industrial Economics, Physics and Robotics (five-year integrated master programs, *sivilingeniør*), a two-year MSc in Data Science and high-school science teacher degrees. REALTEK's main office building was completely renovated in 2018. The faculty is organised in seven sections

- Data science
- Applied mathematics
- Science
- Geomatics
- Civil and environmental engineering
- Mechanical and process engineering
- Teaching and teacher training

REALTEK's strategic goals towards 2023 are

1. REALTEK is a faculty for employees and students with openness and mutual respect, great ambitions, academic freedom, collaboration and community.
2. We educate graduates who are particularly attractive in the job market as they are competent in innovation and the interplay between people, nature, and technology.
3. We contribute primarily to solving select United National Sustainable Development Goals. We have strengthened research and innovation in applied data science, education and human-centred technology.
4. An effective organisation adapted to our strategy.

[The complete strategy document is available on our website.](#)



History and organization — Data Science at NMBU

NMBU and related institution at Ås, such as NOFIMA, have a long tradition in statistics and data analysis, driven by research into animal breeding, design of experiments, multivariate analysis, chemometrics and increasingly over the past two decades in image analysis including hyperspectral imaging. These activities are today mainly located in the *Breeding and Quantitative Genetics* and *Genome Biology* groups at the Faculty for Bioscience, the *Biostatistics* group at the faculty for Chemistry, Biotechnology and Food Science, and at REALTEK in the sections for Data Science, Science, and Applied Mathematics.



Building on these traditions, REALTEK has been offering a two-year English-language master program in Data Science since the academic year 2017/18, making NMBU the first Norwegian university to offer a Data Science program. From 2018/19, we also offer a five-year integrated master of technology in data science (sivilingeniør).

The master's degree in industrial economics provides a solid foundation in engineering combined with good knowledge in economics and management and entrepreneurial thinking. Environment and sustainability are a common thread throughout the program.

About the Data Science section at REALTEK

Data science at REALTEK is focused on applications. Our faculty combines a wide range of engineering fields in a single building, facilitating frequent interdisciplinary interactions and joint strategic efforts between data scientists and fields of application. NMBU's compact (and beautiful) campus offers many further opportunities to apply data science, especially in biosciences and economics. At REALTEK and NMBU you will never have to walk far to meet colleagues eager to engage in data science research inspired by the UN Sustainable Development Goals.

Since the spring of 2019, Data Science is established as a section at REALTEK. Two of the positions currently advertised will be in the Data Science section, while the third position will be a joint appointment with the Industrial Economics group. In addition, three PhD students (increasing to four by the end of the year) and one head engineer (temporary). Faculty members are shown in the table below

Name	Title	Profile
Hans Ekkehard Plesser	Professor	Brain Simulation Technology; section head
Kristian Hovde Liland	Assoc. prof.	Multivariate processing and analysis, spectroscopy, machine learning
Kristin Tøndel	Professor	Multivariate data analysis, metamodelling, cardiac modelling
Oliver Tomic	Assoc. prof.	Multivariate analysis, machine learning
Current announcement	Assoc. prof.	Data management for a data science world
Current announcement	Assoc. prof.	Machine learning for the 21st century
Current announcement	Assoc. prof.	Value-oriented deployment of data science

We participate in a range of externally funded research projects, including

- Human Brain Project: Building a European infrastructure for brain science (Plesser)
- DEEP-EST: Novel hybrid supercomputing architectures (Plesser)



- FutureFarm: Tomorrow's digital farming solutions (Tomic)
- PROVIZ: Prostate cancer visualization by MRI - Improved diagnostics using artificial intelligence (Tøndel)
- New Hydrate Management: New understanding of hydrate phenomena in oil systems to enable safe operation within the hydrate zone (Tøndel)
- DeepHyperSpec: Combining spectral and image information in the analysis of hyperspectral imaging data (Liland, Tøndel)

Other colleagues involved in Data Science or closely related topics at REALTEK include

Name	Title	Section	Profile
Ulf Indahl	Assoc. prof.	Appl. math.	Multivariate analysis, machine learning
Ole Elvetun	Assoc. prof.	Appl. math.	Optimisation
Cecilia Futsæther	Professor	Science	Medical image analysis
Ingunn Burud	Assoc. prof.	Science	Hyperspectral imaging
Achim Kohler	Professor	Science	Biospectroscopy
Pål From	Professor	Mech. eng.	Robotics

A characteristic feature of REALTEK and the Data Science section is a focus on collaboration and mutual assistance, fostered by a high degree of presence in the office. We all travel or work from home from time to time, but you can generally expect to find us on campus between 9 and 16—and we will expect to see you as our new colleagues there as well.

Study programs at the section for Data Science

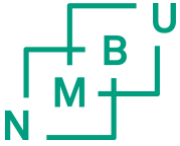
The section is responsible for two study programs

- five-year integrated master in technology/Data Science (300 ECTS)
- two-year English-language master in Data Science (120 ECTS)

with 25 places per class in the five year and 20 places in the two-year program. Recruitment to both programs is satisfactory, although we aim to improve the gender balance among incoming students in the future. Students of the first class in the two-year program (autumn 2017 to spring 2019) easily found relevant positions upon completion of their studies.

The section currently offers the following courses

Code	Title	ECTS	Lang.
DAT110	Introduction to data analysis and visualisation	10	N
DAT121	Introduction to two-year master program	5	E
DAT200	Applied machine learning	10	E
DAT300	Applied machine learning II	10	E
DAT390	Data science seminar	10	E
IMRT100	Introduction to five-year master program	5	N
INF120	Programming and data processing	10	N
INF200	Advanced programming	10	E
INF221	Computer science for data scientists	10	E



Other courses at the faculty especially relevant for data science include

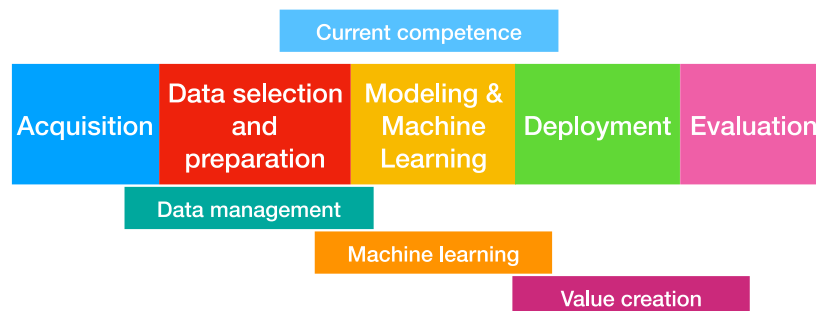
Code	Title	ECTS	Lang.
INF100	Principles of information processing	5	N
INF230	Data processing and analysis	10	E
INF250	Image analysis	10	E
MATH280	Applied linear algebra	10	E

The faculty is considering to establish several new courses over the next two years

Topic	Level	ECTS	Lang
Programming for robotics and embedded systems	200	5	E
ICT and society	200	10	N/E
Modern multivariate methods	300	5	E
Mathematical foundations of data science	300	10	E
Human-computer interfaces	200	5	
Information systems	200	10	

Profile for positions

The advertised positions shall complement our current competencies to allow us to cover the complete data science process in our research and our study programs.



You will contribute to teaching in our two- and five-year master programs in Data Science and Industrial Economics as well as to teaching introductory courses for students from other programs. Normal course load is 20 ECTS credits per academic year, plus supervision of master and doctoral students. Most introductory courses are taught in Norwegian, while graduate-level courses in data science are offered in English. Student numbers range from some 300 for large undergraduate courses to 30 for advanced courses. As all colleagues in the section are expected to teach courses at all levels, the ability to teach in Norwegian is required (at the latest two years, preferably one year after starting in the position).

You will also supervise master students. Our master students write a 30 ECTS thesis, usually from January to May of their final year. From 2023, we expect to have about 45 students writing a master thesis in Data Science per year, while about 30 students write mater theses in Industrial Economics.



Research expectations

You are expected to develop your own research programme, build collaboration across and beyond NMBU and to attract research funding from national and international sources. REALTEK aims to grant new faculty members one doctoral student position early in their career, but most of our doctoral students and almost all post-docs are externally funded.

Teaching requirements

In addition to courses specific to Data Science, such as machine learning and data processing, we also teach very popular programming courses based on a software carpentry approach (INF120, INF200) and will add a programming course directed towards robotics in the near future. New colleagues should ideally be able to teach these courses in a rotation scheme.

We consider experience in developing non-trivial software projects over time for use by third parties an important asset for teaching programming even to beginners. At least one new colleague should have such experience.

Career development

Sabbaticals are usually available after six years with a full teaching load for men and after four years for women in associate professor positions.

Given sufficient research production and teaching experience, you can apply for promotion to full professor in accordance with national regulations for science, technology, engineering and mathematics.

Position in Machine Learning for the 21st Century

You have contributed to the great strides taken in machine learning over the past decade and are eager to address the problems facing machine learning today, such as the dependence on very large amounts of training data, the demand for models that can explain their decisions, robustness of results, and learning of behaviour or skills. Collaboration with our robotics group may be particularly attractive.

Position in Data Management for a Data Science World

Your research focus is on data acquisition, quality or provisioning as a crucial step in the data science process in a world moving from models based on individual data silos to models integrating a wide range of data sources while facing strict requirements concerning privacy and accountability. Relevant research topics that would integrate well with research at REALTEK include data acquisition in industry and infrastructures, distributed and federated learning and FAIR data interoperability.

Position in value-oriented deployment of data science

In your research, you focus on identifying value in the deployment of data science for decision support and automatization in industrial and public sector use cases, including operations, infrastructure and production. You are particularly



interested in how to integrate humans as ultimate decision makers in complex data-driven systems, covering areas such as human perception of complex processes and uncertainty of data and human-computer interaction. An interest in cost structures and cost management of data science use case, the economics of the digital transformation of industry and public sector and the future of work in the digital economy would be an asset.

Evaluation process and comments on requirements

Applications for each of the three positions within Data Science will be evaluated independently. Applicants must therefore clearly indicate for which position they want to be considered.

All applicants shall provide a research plan indicating which of our focus areas they want to work in and a description of teaching experience and ambitions. The latter should follow [NMBU's guidelines for documents of teaching competence](#).

For each position, a dedicated scientific evaluation committee including external experts will be appointed to evaluate the candidates on academic merit. The committees will provide shortlists for the positions and evaluations will be shared with applicants according to rules and regulations for appointments to Norwegian academic positions.

Based on the shortlists provided by the scientific evaluation committees, the hiring committee for the positions will invite candidates for trial lectures and interviews. We anticipate that these interviews will take place in June 2020.

Comments on requirements for the position

Doctoral and master degree in relevant discipline Key relevant disciplines are data science, machine learning, artificial intelligence, statistics, informatics and mathematics, but since data science is a new and interdisciplinary field we may also consider your application if you hold degrees in other relevant disciplines, provided your research work clearly establishes you as a data scientist. If you obtained your doctoral degree outside Norway, it has to be equivalent to a Norwegian doctoral degree. This is generally the case for doctoral degrees in sciences obtained in one of the 48 member countries of the European Higher Education Area following the "Bologna" qualification framework (EHEA-QF). For more information, please see section 2.4 of [NOKUT's Criteria for general recognition of foreign higher education](#).

Scientific achievements Your scientific achievements will be evaluated based on your publications in international peer-reviewed journals, in rigorously peer-reviewed conference proceedings, or monographs. Please accompany your bibliography with information about your contributions to multi-author publications, at least for those publications included with your application.

Experience in international and interdisciplinary projects Data Science crosses disciplinary boundaries in an international world of research. We expect that you have worked across both scientific and national boundaries.



Teaching experience NMBU follows national guidelines for the educational competence of associate professors, designed to further improve university education in Norway. We strongly recommend that you consult [NMBU's competence guidelines](#) and describe your educational experience and competence using the template provided in the guidelines. If you do not yet meet the basic requirements according to the guidelines, you will need to do so within two years after your appointment.

Experience with software or data carpentry Key courses in our curriculum are inspired by the carpentry approach, as many of our students are non-specialists (in programming). We therefore consider experience with carpentry an advantage.

Experience with software development for third parties Developing software for use by others (as opposed to software written only for use in your research group) requires much more from the developer, especially for long-lived projects with large developer communities. We believe that such experience is essential for good programming training and thus consider it an important asset. Please include links to source code repositories for projects you have contributed to.

Experience in supervision Mentoring master and doctoral students is a demanding part of faculty duties, so any documented experience in this is an asset.

Experience in external project funding Writing grant applications and managing funds awarded is an art in itself. Experience either as a PI or as a junior project member assisting a PI in crucial parts of project acquisition or management is therefore considered useful. In the latter case, a statement of pertaining PIs about your role in projects would be of advantage.

University pedagogics training Completed training is an asset; if you have not completed university training, you will be required to take the pertaining course offered by NMBU within two years of starting in your position, in addition to your normal teaching duties.

Ability to engage students and colleagues We expect you to be excited about Data Science and to convey that excitement through innovative teaching and research ideas.

Drive to build interdisciplinary projects As an associate professor, you are expected to create your own research area and team in collaboration with others. We expect you to have the necessary motivation and engagement.

Excellent spoken and written English You will be teaching in English, so we expect you to speak English at least as well as your (non-native-English speaking) students.

Ability to disseminate research results Dissemination is an important part of academia, so you should be able to explain your research to school classes, journalists or politicians. You are welcome to include links to material you have published.

Fluency in Norwegian, Danish or Swedish Within a year, at the latest two years, after starting with us, you must be sufficiently fluent in Norwegian to teach Norwegian-language courses (Danish and Swedish are fine provided the



Norwegian students understand you well enough). *This requirement is by no means meant to discourage applicants who do not speak Norwegian yet*, and we will support you in learning Norwegian if necessary. However, you should reflect carefully about whether you will have the motivation, determination and talent to learn Norwegian well within a year. While the time limit may seem demanding, our experience is that a successful start in a new language depends crucially on a determined effort at the very beginning.

Further information

For more information please contact for the positions in machine learning and data management

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and for the position in value-oriented deployment of data science

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For information about moving to and working in Norway, please see

<http://www.nyinorge.no/en/Ny-i-Norge-velg-sprak/New-in-Norway/>.