

Nordic Testbed Network



Supporting digital transformation in the Nordic bioeconomy

Digitalisation plays a vital role in the rapid development of the Nordic and Baltic bioeconomy. Access to **cutting edge platforms for development, so-called testbeds**, where new digital knowledge and technology can be developed is fundamental. Managing a testbed is however a complex task.

To facilitate the development of new and existing testbeds, the Nordic Testbed Network aims to **unite and strengthen testbeds** aimed at supporting the digital transformation of the bioeconomy.

The Nordic Testbed Network is managed by Nordic Forest Research (SNS), Nordic Agri Research (NKJ), and the Nordic Council of Ministers' working group on fisheries and aligned with initiatives such as the North Digital Declaration and the Nordic Bioeconomy Program.



Sign up [here](#) by June 2nd

A link to the event will be sent to those who sign up
Participating at the event is free of any charge

Digital Twins

Use cases, opportunities, challenges

Join us online
Virtual meeting

WHEN: June 9, 10.00-12.00 CET

WHERE: Zoom, link will be sent out to those who signed up

FOCUS: Discovering Digital Twins, highlighting opportunities and discussing challenges

AGENDA

- **Welcoming our new testbed members**, DIGIRAS, SINTEF ACE, AORO, Smart Bioeconomy Testbed
- **Inspiring examples: Destination Earth & Fields of the World - Agrimetrics**,
 - Thomas Geenen, Technology Partnership Lead for Destination Earth
 - Richard Tiffin, Chief Scientific Officer at Agrimetrics
- **Panel discussion: Digital Twins, Data, and Modelling**, Intelligent organic farming testbed, Liisa Pesonen (Luke), Maria Nordström (Skogforsk), Martin Holmberg (RISE)
- **Workshop:** What is needed to support testbed development? Based on the interviews with all existing network members, we will discuss what messages we want to send to policymakers. This will feed into a policy brief being sent to the Nordic Council of Ministers.



INTRODUCING THE TOPIC

Learning from experts and discussing with other testbeds – Digital Twins

- The topic **Digital Twins** has been highlighted as interesting by several of the network's members, spanning areas such as data gathering, data uniformisation, testing, and more.
- **Digital Twins** are complex computer models fed with continuous flow of observations from the physical world. They allow a better understanding of past situations, monitor present situations, as well as predict future challenges.
- At this virtual meeting you will get the chance to **learn from others**, as well as **sharing your experiences** on this topic.
- While waiting for June 9th, have a look at the following pages to meet our new **testbeds members** and get to know our **speakers**.
- **We are looking forward to meeting you virtually in June!**



NEW TESTBEDS JOINING THE NETWORK



- **SINTEF ACE** (Testbed for Aquaculture Engineering) provides an arena where new aquaculture technologies are designed, developed, and tested in realistic conditions of fish farms along the coast of Trøndelag, Norway.
- It is a full-scale laboratory where research is made possible through a research aquaculture license, that allows the laboratory to farm fish commercially
- The research is based on an interdisciplinary expertise in biology-technology interaction and focus on technology for operation activities as well as surveillance of equipment and environment.
- At **DIGIRAS**, Land-based fish production is optimised with next generation digital recirculating aquaculture systems (RAS). DIGIRAS focuses on developing digital solutions for parameters and processes in RAS, which in turn will lead to more sustainable production under special attention to fish health and welfare.
- It involves four different RAS farms in Norway, Greece and Germany, cultivating five economically important species.
- The project is organised in seven R&D and two managing work packages, each tackling specific topics in relation to digitalisation.

Both testbeds were introduced in our previous newsletter, read more [here](#)



NEW TESTBEDS JOINING THE NETWORK



- **AORO: Arctic Off-Road Robotics Lab** is a co-operation between Luleå University of Technology, Swedish University of Agricultural Sciences and Skogstekniska klustret (the Cluster of Forest Technology). It is focused on research and development for the future's autonomous forestry.
- AORO is specializing in mobile systems for forestry work in difficult terrain. Research is conducted using a mobile research facility and a large terrain-going and crane-equipped experimental platform.
- The testbed is located at the Skogstekniska Klustret in Umeå
- **Smart Bioeconomy Testbed** is part of Bioeconomy Campus that is located in Saarijärvi, Central Finland.
- Its operations concentrate on user-centred testing of digital solutions for Smart Farming and Smart Bioeconomy. On the smart farm, a Living Lab is used for Multi-Actor Approach, bringing together the needed expertise and end-users to produce successful innovations that penetrate to markets.
- A Digital Innovation Hub for Smart Agriculture & Bioeconomy (AB Smart DIH) is operated where the testbed operations are accompanied by several other related services such as business acceleration, competence building, and education.



KEYNOTE BIOGRAPHY



- **Thomas Geenen** is the Technology Partnership Lead for Destination Earth (DestinE) at the European Centre for Medium-Range Weather Forecasts (ECMWF). He has a Master's degree in Geophysics as well as a PhD from Utrecht University. Thomas has extensive experience of high-performance computing and data analytics. At DestinE, he focuses on ensuring that the technologies required for DestinE aligns with Europe's and national digital strategies, ECMWF and Member States capabilities, and that operational centres and future services are enabled to exploit the DestinE technology.
- **Destination Earth** (DestinE) aims to develop – on a global scale - a highly accurate digital model of the Earth to monitor and predict the interaction between natural phenomena and human activities. As part of the European Commission's Green Deal and Digital Strategy, DestinE will contribute to achieving the objectives of the twin transition, green and digital. Using an unprecedented amount of data, innovative Earth system models and cutting-edge computing, Destination Earth will allow users to explore interactively the different components of the Earth system and natural and human-induced change. It will allow to look at the past and present and to test and develop future scenarios. Interested to learn more, check out: [Destination Earth | ECMWF](#)



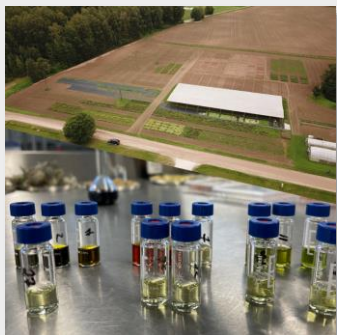
KEYNOTE BIOGRAPHY



- **Richard Tiffin** is Agrimetrics' Chief Scientific Officer and Professor of Applied Economics at the University of Reading. Richard completed a PhD in Agricultural Economics at the University of London. He lectured in Agricultural Economics at both Newcastle and Durham before joining the University of Reading where he was appointed Professor in 2006. Richard was previously Director of the Centre for Food Security, leading the University of Reading's strategic research in the area of food security and fostering internal and external collaborations to meet the multidisciplinary food security agenda.
- **Agrimetrics** is one of four Agri-tech Centres created with initial public funding from Innovate UK. The Agri-Tech Centres are a unique collaboration between Government, academia and industry to drive greater efficiency, resilience and wealth across the agrifood sector. Its mission is to transform the agrifood sector through a thriving Data Marketplace, where data can be easily shared, monetised, and accessed. Since 2014, they have been enabling agrifood organisations to realise the value trapped in their data. In 2019, they launched The Agrifood Data Marketplace. Use case with regards to digital twins: [Open access Digital Twins of fields to accelerate innovation - Agricultural Food Data Marketplace | Field Data | Crop Analytics | Livestock Data | Crop Growth Forecasting | Agrimetrics](#)



VIDEO GREETING FROM:



- **INTELLIGENT ORGANIC FARMING TESTBED** by the Institute for Environmental Solutions (IES) is located in Cēsis county, in the Northern part of Latvia.
- The testbed demonstrates a close cooperation between research and the industry for growing medicinal and aromatic plants, and production of high-value added plant-based products demanded in the largest pharmaceutical, cosmetics, and food manufacturers in Europe.
- The testbed will share its experience of data gathering for 3D modelling
 - The various challenges it involves
 - Its use cases and applications
 - Next steps in terms of 3D modelling



PANELLIST BIOGRAPHY



- **Liisa Pesonen** is a Senior Scientist at Luke (Natural Resources Institute of Finland, former MTT Agrifood Research Finland) and a member of Nordic Testbed Network's reference group. She is also involved in AgriHubi, a Finnish competence network promoting farm business management and digitalisation <https://maaseutuverkosto.fi/sv/agrihubi/>
- The Natural Resources Institute Finland (**Luke**) is a research organisation operating under the Ministry of Agriculture and Forestry of Finland. Luke's task is to promote competitive business based on the sustainable use of renewable natural resources, as well as wellbeing and the vitality of the countryside. Its mission is to build a sustainable future and well-being from renewable natural resources.



PANELLIST BIOGRAPHY



- **Maria Nordström** is Process Manager Digitalization at Skogforsk and is taking part in the Testbed Mistra Digital Forest. After a Masters in Chemical engineering, she pursued Post graduate studies at KTH (Royal Institute of Technology, Sweden) in wood chemistry and analytical chemistry. She was previously Senior Research Analyst at McKinsey & Co.
- **Skogforsk** (the Forestry Research Institute of Sweden) is the central research body for the Swedish forestry sector and is financed jointly by the government and the members of the Institute. Its mission is to develop and communicate knowledge, services and products to support even greater sustainability in forestry to benefit the society. The demand-driven applied research includes a wide variety of fields, such as forest technology, raw-material utilization, environmental impact and conservation, forest tree breeding, logistics, forest bioenergy and silviculture.



PANELLIST BIOGRAPHY



- **Martin Holmberg** is the Research Director for Autonomous Systems at RISE, he is an expert in information and C2 systems. He received his PhD in Applied Physics at Linköping University in 1997. He has since then worked as a research director at the Swedish Defense Research Agency focusing on data fusion in sensor networks, and as a Professor in Command and Control Science at the Swedish Defence University.
- **RISE** RESEARCH INSTITUTES OF SWEDEN is Sweden's research institute and innovation partner. Through international collaboration programmes with industry, academia and the public sector, RISE ensure the competitiveness of the Swedish business community on an international level and contribute to a sustainable society. Close to 3 000 employees engage in and support all types of innovation processes. RISE is an independent, state-owned research institute, which offers unique expertise and 130 testbeds and demonstration environments for future-proof technologies, products and services.

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How can we approach the topic?

Initiatives such as Destination Earth and the Digital Twin projects within Agrimetrics are outstanding examples of use cases for Digital Twins. Moreover, they showcase possible cooperation models facilitating the development of Digital Twins. It is also interesting to learn about 3D modelling as well as data gathering and uniformisation as initial steps towards the creation of a Digital Twin.

What are Digital Twins?

They are “digital replicas of the highly complex Earth systems – are based on a seamless fusion of real-time observations and high-resolution predictive modelling [...]” (DestinE)

They are realistic digital representations of real-world objects and living organisms:

- They represent specific objects
- They are real-time elements updated via digital information from the real-world elements they represent
- Actions can be implemented on digital twins with information coming from their real-world twins
- Comprehensiveness might not be reached: gaps are expected due to lack of available data

Why are Digital Twins relevant for the bioeconomy?

Amongst others, they provide users with tailored access to high-quality knowledge for user-specific scenario development for decision support.

Remote monitoring and updates through Digital Twins harness great opportunities for livestock management, projections for arable farming, as well as indoor farming and aquaculture.

- Digital Twins enable increased efficiency in systems management
- Savings in time can be implemented through distance decision-making
- Digital Twins can be used to show sustainability and quality of agriculture, forestry, or aquaculture to consumers