

## 22 new Centres for Research-based Innovation (SFI)

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The Research Council is investing roughly NOK 2 billion in new Centres for Research-based Innovation (SFI). The new centres will receive funding for up to eight years and will start up this autumn.

By Knut van der Wel | Published 03.07.2020

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The objective of the scheme for Centres for Research-based Innovation (SFI) is to enhance innovation and value creation in the private sector. Prominent research groups cooperate with R&D-performing companies to develop expertise and technology for renewing and further developing the business sector.

“Research and development will play a crucial role in enabling the Norwegian business sector to bring back the jobs we had before the COVID-19 pandemic hit, as well as in creating new jobs and promoting restructuring,” says Norwegian Minister of Research and Higher Education Henrik Asheim. “It is the Government’s ambition to make Norway one of the most innovative countries in Europe. Achieving this requires linking the research and business communities together, which is exactly what the SFI scheme entails.”

Seventy consortia submitted applications for SFI centre status and funding to the Research Council last autumn. A full 22 new SFI centres were approved at the meeting of the Executive Board of the Research Council on Thursday, 11 June.

“These centres are particularly important for new industries where there is a substantial need for research competence and technology development,” adds John-Arne Røttingen, Chief Executive of the Research Council. “By investing in long-term collaboration between business and research groups, we lay a solid foundation for transitioning to a greener society and providing future jobs.”

The new centres represent the fourth generation of SFI centres since the scheme was established in 2005. Centres have a period of operation and funding of maximum eight years (an initial five-year period with the possibility of a three-year extension). Each centre will receive an annual allocation of up to NOK 12 million from the Research Council. The new centres awarded SFI funding will be able to start up in autumn.

For an overview of the new centres, see below.

### Extra funding in trying times

The COVID-19 pandemic has caused upheaval for many companies and research institutes. The Research Council has therefore increased the budget for allocations to 22 centres.

“The expertise and technology being developed at the SFI centres are relevant for value creation in a wide range of industries,” says Dr Røttingen. “By expanding the budget framework, we are boosting the contribution of research to business development and generating new opportunities for many companies. The SFI scheme also has an impact on the research institute sector, where many are suddenly facing a declining demand from the business sector.”

He stresses that there was no lack of qualified centre proposals among the 70 grant applications submitted:

“The quality of the centre applications was very high across the board. The members of the Executive Board remarked on this as they were assessing the proposals. They were also impressed by the expedient and comprehensive approach the various groups took to establishing consortia and preparing the applications.”

### Application assessment process

When selecting centres for SFI status and funding, importance is attached to the centre’s potential to generate innovation, business development and sustainable value creation within its thematic priority areas. The scientific merit of the centre’s research must also be of high international calibre.

The application assessment process was carried out in three stages. First, each proposed centre was assessed by minimum four international referees with expertise in the centre’s research area and subject field. Next, the applications were distributed among 16 panels, each with 4–6 members (primarily Norwegians) with sound business insight and the ability to assess matters relating to innovation and value creation. Finally, the Research Council administration assessed the relevance of the applications to the call for proposals. A total of roughly 300 international referees and 80 panel members were involved in assessing the 70 grant applications submitted.

The Executive Board of the Research Council is the allocating body for SFI centres. At its meeting on Thursday, 11 June, the board awarded SFI centre status and funding to 22 new centres. [LENKE]

## Centres for Research-based Innovation (SFI)

The overall objective of the Centres for Research-based Innovation (SFI) scheme is to enhance the ability of the business sector to innovate and create value through a greater focus on long-term research.

- Each centre will receive an annual allocation of NOK 12 million for an initial five-year period, with the possibility of a three-year extension (a total pot of NOK 96 million).
- The inclusion of companies in the centres' activities is one of the requirements of the SFI scheme.
- Public entities may participate alongside companies in the centres' activities. Each centre must have at least three user partners, and these must always include company partners.
- All user partners are to actively participate in the governance, financing and research activities at the centres, and must conduct significant innovation activities of their own as well as be able to take advantage of the research results when developing their activities.

## 22 new Centres for Research-based Innovation (SFI)

Behind each grant application for SFI centre status and funding is a consortium comprising multiple research organisations, private companies and, when relevant, public entities. One of the research organisations has the role of contractual partner with the Research Council and thus serves as the host institution for the centre. All the centres have status as Norwegian Centres for Research-based Innovation, regardless of where in Norway the host institution is located.

### **Centre for Geophysical Forecasting**

- Host institution: Norwegian University of Science and Technology (NTNU)
- Research partner: NORSAR

The centre will develop new technologies and innovations based on geophysical methods for applications and continuous monitoring in the fields of hydrocarbon production, CO<sub>2</sub> storage and monitoring, and geohazards (such as landslides, floods and earthquakes). Activities will explore promising new technologies such as fibre-optic cables and networks in combination with data-driven processes, machine learning technology, geophysics and mathematics. The centre will expand the expertise that has primarily been built up and applied within the petroleum industry and direct it towards new sectors and business areas.

The centre will apply new, interdisciplinary approaches to develop geophysical monitoring across a variety of application areas. There are still large-scale needs within petroleum production, while safe and reliable CCS will completely rely on effective monitoring technology to be realised and accepted. There is a great need for improved monitoring and forecasting technology both nationally and globally of geohazards associated with landslides, earthquakes, infrastructure stability and more.

### **Centre for Industrial Biotechnology**

- Host institution: SINTEF AS
- Research partners: Norwegian Research Centre (NORCE), Norwegian University of Science and Technology (NTNU) and Norwegian University of Life Sciences (NMBU)

The centre will develop expertise and technology that will move Norway towards a more prominent position in the international biotechnology industry. The centre will achieve this by coordinating relevant national infrastructures and expertise in networks that effectively encompass the value chain from research and development to industrialisation and markets.

Establishing a bioeconomy requires close, innovative interaction between academia and industry to promote good understanding of the needs for expertise and technology towards new value chains and markets. There is an urgent need for a national centre for industrial biotechnology that addresses these elements.

### **Centre for Rescue of Earth Materials and Waste in the Circular Economy**

- Host institution: Norwegian University of Life Sciences (NMBU)
- Research partners: Norwegian Geotechnical Institute (NGI), BI Norwegian Business School, Norwegian Institute for Sustainability Research (NORSUS), Institute for Energy Technology (IFE), Norwegian Institute of Bioeconomy Research (NIBIO), NIVA and Norwegian Institute for Air Research (NILU)

The centre's ambition is to become a nationally leading, internationally recognised research and innovation centre for sustainable use of earth materials. The primary objective is to develop technologies, systems innovation and a governance framework for the most sustainable management and treatment of wastes and earth materials.

Significant research is being carried out internationally in the centre's field, but there is uncertainty regarding its applicability for conditions in Norway in terms of both physical environment and the Norwegian regulatory framework. Contaminated soils, surplus masses, and managing waste in economically sustainable ways are key areas in which Norway can promote a cleaner natural environment and better living conditions.

#### **Centre for Research-based Innovation in marine acoustic abundance estimation and backscatter classification**

- Host institution: Institute of Marine Research (IMR)
- Research partners: University of Bergen, Norwegian Research Centre (NORCE) and Norwegian Computing Center (NR)

The primary objective of the centre is to advance the use and interpretation of acoustic methodology and apply this to marine monitoring, fisheries, aquaculture and the energy sector. The centre will improve the understanding and interpretation of fisheries acoustics for sizing and species classification of fish and plankton. The centre's most important anticipated results and impacts are new science, new tools and more precise methods to enhance the sustainability of fisheries and marine ecosystems.

There is a widespread need for enhanced knowledge about sea areas, and thus the centre clearly represents an area with unmet knowledge development needs.

#### **Centre for Research-based Innovation on Mobile Mental Health**

- Host institution: Bergen Hospital Trust
- Research partners: University of Bergen, BI Norwegian Business School, St. Olav's Hospital, Norwegian Centre for E-health Research, and a number of international universities

The centre's primary objective is to expand the use and impact of digital interventions within the mental health field through research on the effectiveness of these compared to standard treatment, on health-economic and socioeconomic impacts, on implementation strategies and on early health technology assessment. Using existing digital interventions as its starting point, the centre will carry out research on and develop methods and models for health care costs/socioeconomic analyses, service design and implementation, and method assessment.

Although the efficacy of digital interventions for patients is well documented, they are not widely used. There is a need for new knowledge about health-economic effects, implementation strategies and method assessment in order to promote greater use.

#### **Centre for Space Sensors and Systems**

- Host institution: University of Oslo
- Research partners: Norwegian Defence Research Establishment (FFI) and University of California, Los Angeles (UCLA)

The centre's primary objective is to promote greater innovation and competitiveness in Norway's space sector and help to address national needs in satellite systems for Earth observation and exploration of the Moon and Mars. The centre will focus on new sensors and sensor systems in connection with the rapid global growth in the use of small satellites whose orbits and equipment can be specially customised to individual projects.

Satellite monitoring has an important role to play in addressing the wide-ranging knowledge needs relating to climate and environmental challenges. The Norwegian Government recently decided to realise the Andøya Spaceport as a launch platform for small satellites, which adds additional relevance to the new centre.

#### **Centre for Subsurface Well Integrity, Plugging and Abandonment**

- Host institution: SINTEF AS
- Research partners: Norwegian University of Science and Technology (NTNU), Norwegian Research Centre (NORCE), Institute for Energy Technology (IFE), University of Stavanger and other departments at SINTEF

The primary objective for the centre is to obtain a scientific understanding of permanent well barriers and develop improved well barrier design. Understanding subsurface well integrity is key for safe utilisation and abandonment of subsurface petroleum resources and reservoirs, utilisation of deep geothermal energy, and secure subsurface storage of CO<sub>2</sub>, hydrogen and nuclear waste.

The centre will help to equip the industry to address future challenges. Thousands of wells on the Norwegian continental shelf

will have to be plugged, entailing enormous costs for the industry and Norway. Although this is a scientific area that has received significant attention for years, research activity and the introduction of new methods have not kept pace with the increasing needs of the industry.

### **Centre for the development of biodegradable plastics in marine applications - Innovations for fisheries and aquaculture**

- Host institution: UiT The Arctic University of Norway in Tromsø
- Research partners: SINTEF Ocean, SINTEF Industry, Norwegian Institute for Sustainability Research (NORSUS) and Norner Research

The centre's primary objective is to reduce plastic litter and the associated problems in the marine environment caused by the fisheries and aquaculture industries. The negative environmental and socio-economic impacts can be significantly reduced if traditional plastics in these sectors are replaced with new biodegradable materials.

The centre will promote more resource-efficient plastic value chains, in line with establishment of a circular economy. The centre will develop new materials and methods, leading to research-based solutions for industry. This will help to promote Norwegian companies as suppliers of equipment for fisheries and aquaculture.

### **Climate Futures**

- Host institution: Norwegian Research Centre AS (NORCE)
- Research partners: University of Bergen, Norwegian Computing Center (NR), Nansen Environmental and Remote Sensing Center (NERSC), Norwegian School of Economics (NHH), SNF and Norwegian Meteorological Institute

The centre's primary objective is to develop new, innovative solutions for predicting and managing climate risks from 10 days to 10 years into the future. The centre will create and sustain a culture for innovation by bringing businesses in weather- and climate-exposed sectors together with researchers to strengthen the international standing and competitiveness of Norwegian companies in these sectors.

The centre's activities will play a key role in enhancing societal security and predictability for many industries dealing with the uncertainty of future climate risk. Activities will address weather and climate predictions in a time perspective that lies between weather forecasts and climate scenarios. This is a perspective that is currently inadequately managed but is widely needed.

### **DigiWells: Digital Well Center for Value Creation, Competitiveness and Minimum Environmental Footprint**

- Host institution: Norwegian Research Centre AS (NORCE)
- Research partners: University of Stavanger, Norwegian University of Science and Technology (NTNU) and University of Bergen

The centre will use increased digitalisation and automation to improve methodologies for placement, design and cost reduction relating to the drilling of oil and gas wells. Activities will target optimisation of well production performance and reduction of negative environmental impacts while enhancing opportunities for value creation. This will be increasingly important to development, operation and, indirectly, resource management on the Norwegian continental shelf.

The centre seeks to advance methodologies and scientific tools beyond the current state-of-the-art in drilling, completions and production. Interdisciplinary and cross-disciplinary collaboration on R&D within the centre may generate considerable new insight and address unmet knowledge development needs.

### **Floating structures for the next generation ocean industries**

- Host institution: SINTEF Ocean
- Research partners: Norwegian University of Science and Technology (NTNU), SINTEF Industry, Norwegian Geotechnical Institute (NGI) and Norwegian Meteorological Institute

The centre's primary objective is to enable Norwegian industry to create new types of floating stationary structures that satisfy the needs and requirements for renewable energy, aquaculture and coastal infrastructure.

The centre focuses on an area where Norway currently has a prominent position and which is highly important for overall value creation. The centre is vital for the development of floating structures for multiple ocean-based industries and for offshore energy production.

### **Norwegian Center for Cybersecurity in Critical Sectors**

- Host institution: Norwegian University of Science and Technology (NTNU)

- Research partners: SINTEF Energy Research, SINTEF Digital, SINTEF Manufacturing, Norwegian Computing Center (NR) and University of Agder

The centre's primary objective is to enhance the capability of private and public sector stakeholders to respond to current and future cyber-security risks by developing, validating and operationalising innovative socio-technical solutions in the energy, health and production sectors and supply chains as well as public security.

There is an urgent need for expertise in the cybersecurity industry in both the private and the public sectors. To protect Norwegian trade and industry and society at large, it is essential to develop generic knowledge and implement demanding cybersecurity applications for reducing the digital vulnerability of major industries and critical infrastructures.

### **Norwegian Center for Research-Based Artificial Intelligence Innovation**

- Host institution: Norwegian University of Science and Technology (NTNU)
- Research partners: University of Oslo, University of Stavanger, SINTEF Digital and Norwegian Computing Center (NR).

The centre's primary objective is to address technical challenges posed by artificial intelligence (AI) as well as non-technical challenges such as ethical issues, explainability and trust in AI. The centre seeks to step up the pace of innovation for sustainable, trustworthy AI in Norwegian industry.

Generic knowledge development and the use of demanding AI applications in major industries will be a vital competitive advantage for the Norwegian business sector.

### **Precision Health Center for optimized cardiac care**

- Host institution: Oslo University Hospital
- Research partners: University of Oslo, Norwegian University of Science and Technology (NTNU), Simula and Sørlandet Hospital Trust

The centre's primary objective is to create a clinically driven, validated ICT platform for cardiology that makes personalised health services possible by using Big Data and artificial intelligence. The centre will develop, test and validate new tools that can reliably predict an individual patients' disease progression, estimate risk of sudden cardiac death, and provide a longitudinal view of past and future care pathway options for optimal disease treatment. Cutting-edge technology such as artificial intelligence has the potential to make critical breakthroughs in the treatment of cardiovascular disease.

Each year, 17 million people die prematurely due to a variety of diseases, and 37 per cent of these die of cardiovascular disease. It is important to achieve earlier detection and more effective intervention than is presently the case. Results from centre activities will help to avoid undertreatment and overtreatment in a number of patient groups, and save the costs to the economy that these treatments entail.

### **Research Centre for Responsible Media Technology & Innovation**

- Host institution: University of Bergen
- Research partners: University of Oslo, University of Stavanger, Norwegian Research Centre (NORCE) and a number of universities outside Norway, including Massachusetts Institute of Technology (MIT) and University of Oxford

The primary objective of the centre is to generate substantial innovation and value creation for the Norwegian news media and media-tech industry, through long-term research into responsible media technologies. The centre will develop advanced new media technology for responsible and effective media user engagement, media content production, media content interaction and accessibility, as well as research on novel methods and metrics for precise audience understanding.

No centre for responsible media in which academia and the media industry collaborate on challenges relating to increased use of technology (such as AI, ML, HCI) in media has been established nationally and internationally. Bringing together media industry stakeholders, the centre will contribute to the development of Norwegian media research, the Norwegian media industry and Norwegian society at large.

### **SFI AutoShip: Safe autonomous ships for sustainable operations**

- Host institution: Norwegian University of Science and Technology (NTNU)
- Research partners: University of Oslo, SINTEF and Institute for Energy Technology (IFE)

The main objective of SFI AutoShip is to utilise the competencies of the entire Norwegian maritime cluster and consolidate Norway's role as a leading global actor in autonomous ships. The centre will develop and administer technologies, systems and operations for safe, sustainable and cost-effective autonomous sea transport systems and operations.

The centre's research activities are focused on an area where Norway is in a particularly good position to develop a leading

global industry in the face of keen international competition.

### **SFI Digital Food Quality**

- Host institution: Nofima
- Research partners: Norwegian University of Life Sciences (NMBU) and SINTEF Digital. Three universities outside Norway will also participate actively in the centre.

The centre's ambition is to transform food production into a more efficient, sustainable industry. The objective is to develop smart, sensor-driven solutions that deliver the essential food-quality information required for successful process optimisation and digitalisation of the food industry. The results will enhance resource efficiency and cost-effectiveness in the production of higher-quality food, which will also help to reduce food waste.

As in most branches, sectors and industries that are restructuring to incorporate increased digitalisation, there is a great need for new knowledge and specialist expertise. The centre will promote this and assemble key stakeholders in the Norwegian food production industry in a collective effort towards digitalisation.

### **SFI Harvest - Technologies for sustainable biomarine value creation**

- Host institution: SINTEF Ocean AS
- Research partners: Nofima, Norwegian University of Life Sciences (NMBU), UIT The Arctic University of Norway in Tromsø, Norwegian University of Science and Technology (NTNU), SINTEF Digital, and research organisations outside Norway, including Matís and University of Porto

The centre's primary objective is to develop knowledge and technologies for harvesting and processing lower-trophic marine resources such as krill, *Calanus finmarchicus* and mesopelagic fish species. The centre will develop technology to locate and monitor stocks, promote sustainable harvesting and process the marine raw ingredients into high-value products to form new biomarine value chains. Activities also aim to apply knowledge and technology developed at the centre to detect and collect plastic waste in the oceans.

The centre will contribute significantly to sustainable development in society and the business sector. Activities will focus on the entire value chain from detection/harvest to fully processed raw ingredients. This is important for developing products and value chains from new biomarine resources and realising them to help to increase global and national food production.

### **SFI PhysMet - Centre for sustainable and competitive metallurgical and manufacturing industry**

- Host institution: NTNU
- Research partners: SINTEF Industry, SINTEF Manufacturing and Institute for Energy Technology (IFE)

The centre's primary objective is to facilitate and accelerate restructuring of the Norwegian metallurgical industry towards more sustainable, cost-effective production, and to develop future material products and solutions and improved processing methods.

Transitioning to a circular economy requires enhanced knowledge about how to sort recycled metals and how to combine them into new structural and functional alloys. The centre will encompass a large industrial segment that has a critical role to play in reducing CO2 emissions and achieving a circular economy.

### **SFI Smart Ocean – Flexible and cost-effective monitoring for management of a healthy and productive ocean**

- Host institution: University of Bergen
- Research partners: Norwegian Research Centre (NORCE), Norwegian Defence Research Establishment (FFI), Institute of Marine Research (IMR), Western Norway University of Applied Sciences (HVL) and Nansen Environmental and Remote Sensing Center (NERSC)

The centre's primary objective is to create a wireless observation system for multi-parameter monitoring of underwater environments and installations. The system will be based on a robust, energy-efficient and cost-effective network of autonomous smart sensors. This system will make it possible to collect and analyse large volumes of information on marine environments and offshore installations.

Results will be highly relevant across a number of ocean-based industries (petroleum, energy, fisheries and aquaculture) as well as significant for enhanced sustainability and cost-effectiveness in offshore operations.

### **SmartForest: Bringing Industry 4.0 to the Norwegian forest sector**

- Host institution: Norwegian Institute of Bioeconomy Research (NIBIO)
- Research partners: Norwegian University of Life Sciences (NMBU), University of Oslo and a number of international

partners

The centre's primary objective is to improve the efficiency of the Norwegian forestry sector by facilitating a digital revolution to transform information and data about forest resources, forest management, forest operations, wood supply to industry, and the overall digital information flow within the entire forestry sector. This digital transformation will take place through a series of innovations laying the foundation for development of a strong "forest-tech" sector in Norway. The centre will also enhance the reputation of the forestry sector and promote better recruitment to forest-related research, management and industry.

Digitalisation and R&D efforts in the forestry sector have been too fragmented among individual actors. The sector is characterised by a large number of relatively small companies with limited R&D capacity. The centre will help to coordinate R&D activities relating to digitalisation of the sector as a whole.

### **Visual Intelligence**

- Host institution: UiT The Arctic University of Norway in Tromsø
- Research partners: University of Oslo and Norwegian Computing Center (NR)

The centre aims to develop the area of visual intelligence (deep learning from complex image data) beyond the limitations of today's technology. The centre's interdisciplinary approach will create value across innovation areas where automated analysis of complex image data will be of great benefit. Research and innovation activities will help to address important societal challenges related to health, resource management and environmental and climate monitoring. The centre will develop better tools for e.g. detecting heart disease and cancer, monitoring and detecting natural resources, monitoring the environment and climate, and monitoring risk and potential natural disasters.

The centre will help to generate important knowledge in the fields of artificial intelligence and visual intelligence and seeks to develop new innovations by drawing on synergies between innovation areas and collaboration with stakeholders from the private and the public sectors.

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