



DEPARTMENT OF ENERGY  
AND PROCESS ENGINEERING



# ANNUAL REPORT 2022

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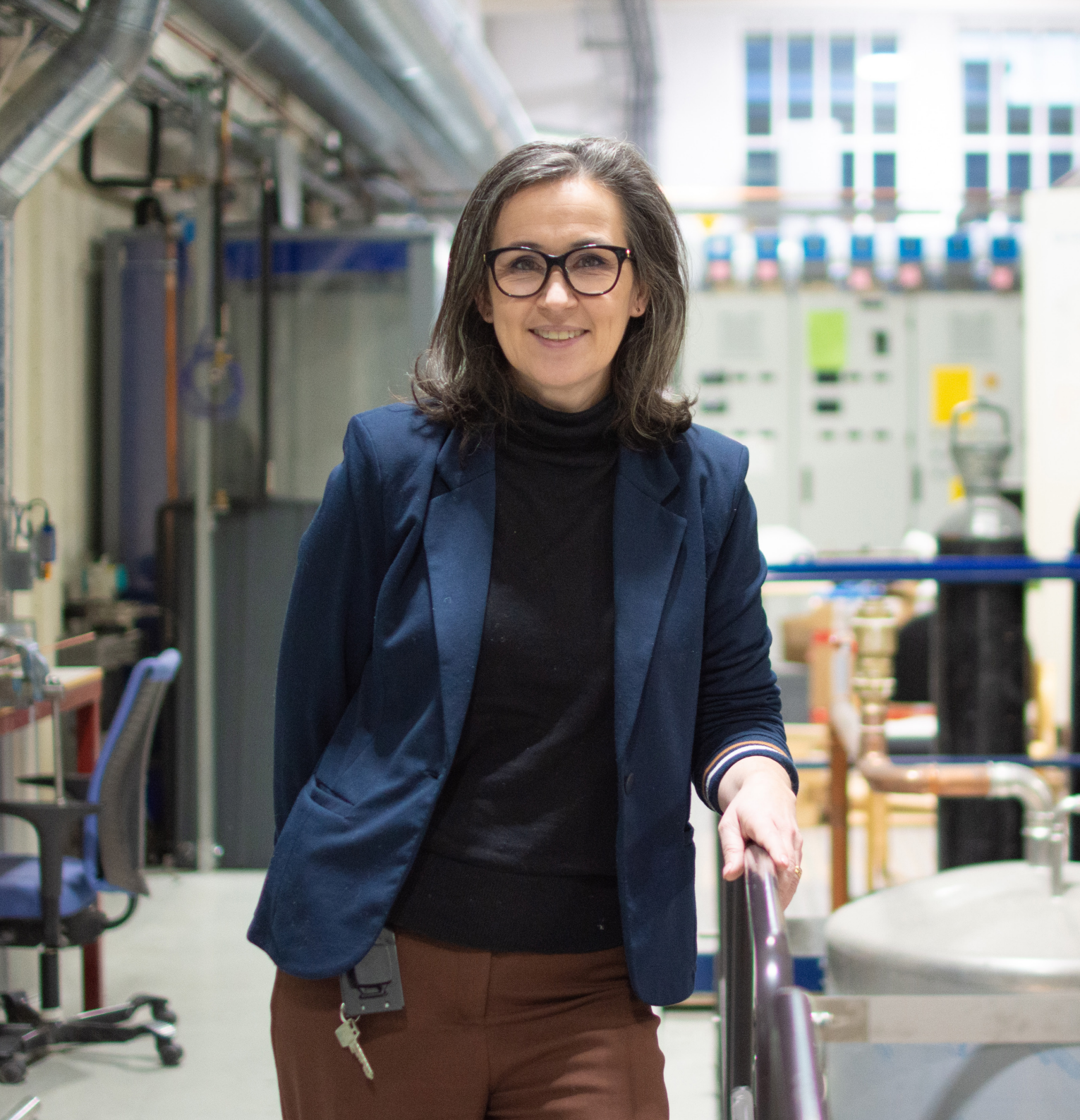
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# CONTENT

Looking back at 2022	5
The energy landscape	6
Our mission	9
EPT at NTNU	10
Department organization	11
2022 in numbers	12
Submitted and defended PHD Theses	14
Thermal energy and fluid mechanics	17
Thermo fluids (TF)	17
ERC Grant to Ellingsen to better understand the climate on Earth	18
Bridging technology and science - The industrial ecology programme (IndEcol)	19
Verones leads two more large EU projects on biodiversity	20
Hertwich appointed to EU's new advisory board on climate change	20
From hydrogen and batteries to buildings - Sustainable energy systems	21
Lab visit by the Serbian President	22
Awards for Best Master's theses in HVAC	22
From heating and cooling to hydropower and energy efficiency - Research group Processes and Power	23
Reducing greenhouse gas emissions with an offshore hybrid energy system	24
350 researchers within cooling and heating visited Trondheim	25
Organizational stories & moments	26
Gender and equality at EPT	26
First EPT Day	27
New members of permanent academic staff	27
Record-high participation from EPT at Researchers' Night	28
EPT training for 10 years	30
Kayak	30
St. Olavsloppet	30
Ski	31
Bicycle room	31
Outdoor dip sauna	31
EPT in 2 year's time	32



The annual report presents the highlights of the Department's activity in 2022 as well as an overview of key figures and statistics. The last two years have been very different in many ways due to the Covid-19 pandemic, but our employees' ability and willingness to adapt to changing environments and unforeseen challenges is impressive.

# LOOKING BACK AT 2022

**The Department of Energy and Process Engineering (EPT) is one of 55 departments at NTNU, and one of 8 at the Faculty of Engineering. The energy landscape is our research setting, covering sustainable energy transition in industrial processes, energy production, the offshore sector, buildings, and storage. We either lead or are a partner in 9 centres for renewable energy (FME), 2 centres for research-based innovation (SFI) and several other large national and international research centres.**

As part of our contribution to NTNU's mission, we are responsible for delivering basic and applied research as well as educating outstanding graduates. EPT has a strong profile in science and technology development within the energy and process sector and strives to have a significant impact internationally. This is reflected by our many international partners over the entire range of research. Furthermore, EPT's mission is to contribute to Norway's role in developing a sustainable foundation for society on the regional, national, and global level.

The annual report presents the highlights of the Department's activity in 2022 as well as an overview of key figures and statistics. The last two years have been very different in many ways due to the Covid-19 pandemic, but our employees' ability and willingness to adapt to changing environments and unforeseen challenges is impressive. This achievement will be an important characteristic of who we are, and which role we have ambitions to take in the future transition that will affect our society.

EPT has kept momentum on all dimensions of our core activities: education, research, innovation, and dissemination. In this report we present some highlights of the wide range of activities that has kept us extremely busy in the last year.

It is important for us to ensure that we graduate candidates ready to meet the societal and industrial challenges of the future. As a department we are involved in a large portfolio of IV Faculty's study programmes, as documented in this report.

I would like to thank all our employees for their continued efforts to maintain EPT's strong impact on all NTNU's important key performance indicators. I hope that this annual report brings back good memories of proud moments in 2022. I would also like to take this opportunity to thank all our research partners in the many ongoing and new projects.

We look forward to continuing this path in 2023!



Terese Løvås  
Head of Department  
NTNU Energy and Process Engineering

# THE ENERGY LANDSCAPE

The Energy Landscape spans the entire scope of energy research and competence development conducted at NTNU - Department of Energy and Process Engineering and SINTEF Energy.





Illustration: SINTEF/NTNU/Oxygen





# OUR MISSION

As part of our contribution to NTNU's mission, we educate outstanding graduates with strong analytical and practical abilities, and our research focuses on expanding knowledge in science and technology for a better world. Furthermore, EPT's mission is to contribute to Norway's role in developing a viable foundation for society at the regional, national and global level.

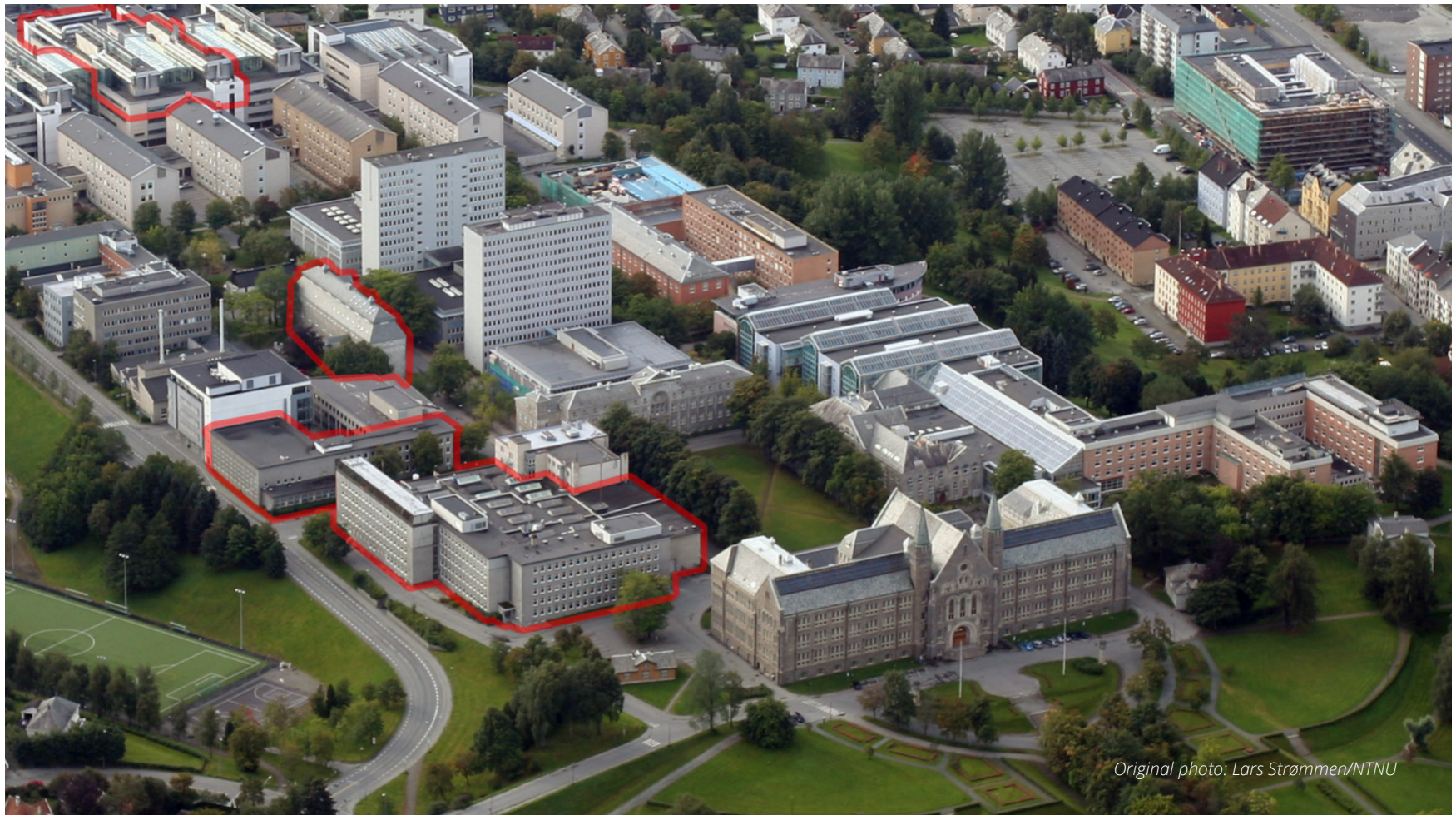
Through research and education, the Department shall contribute to the understanding of sustainable solutions, helping to solve complex problems and global challenges to assure effective resource utilization. In line with NTNU's goal to move from mission to action, we address the UN goals for sustainability (SDG's) ([ntnu.no/baerekraftmaal](http://ntnu.no/baerekraftmaal)) that are relevant based on the research and educational activity at the Department: 2, 3, 6, 7, 8, 9, 11, 12, 13, 15.

## SUSTAINABLE DEVELOPMENT GOALS



# EPT AT NTNU

EPT is one of eight Departments at the Faculty of Engineering. There are nine Faculties at NTNU – Norwegian University of Science and Technology.



EPT is located in four different buildings across NTNU Gløshaugen campus.

# DEPARTMENT ORGANIZATION

**Anne Borg**  
Rector

**Olav Bolland**  
Dean, Faculty of engineering



**Terese Løvås**  
Head of Department



**Surur Taso**  
Head of Administration



**James Dawson**  
Deputy Head of Research



**Natasa Nord**  
Deputy Head of Education



**Morten Grønli**  
Lab Manager

## SUSTAINABLE ENERGY SYSTEMS



**Oodne Burheim**  
Head of Group



**Natasa Nord**  
Deputy Head of Group



**Nicholas Worth**  
Head of Group



**James Dawson**  
Deputy Head of Group

## THERMO FLUIDS



**Trygve Eikevik**  
Head of Group



**Ole Gunnar Dahlhaug**  
Deputy Head of Group

## PROCESS AND POWER



**Francesco Cherubini**  
Head of Group



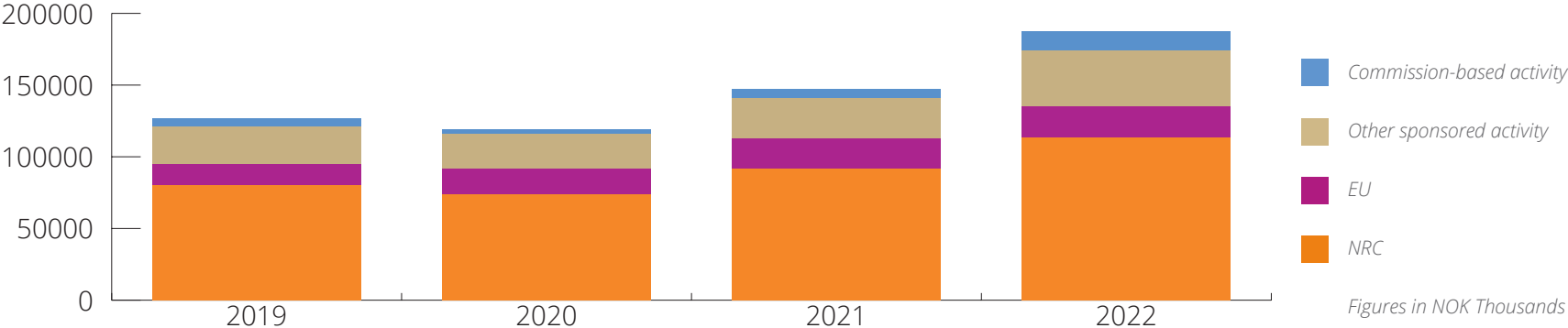
**Francesca Verones**  
Deputy Head of Group

## INDUSTRIAL ECOLOGY

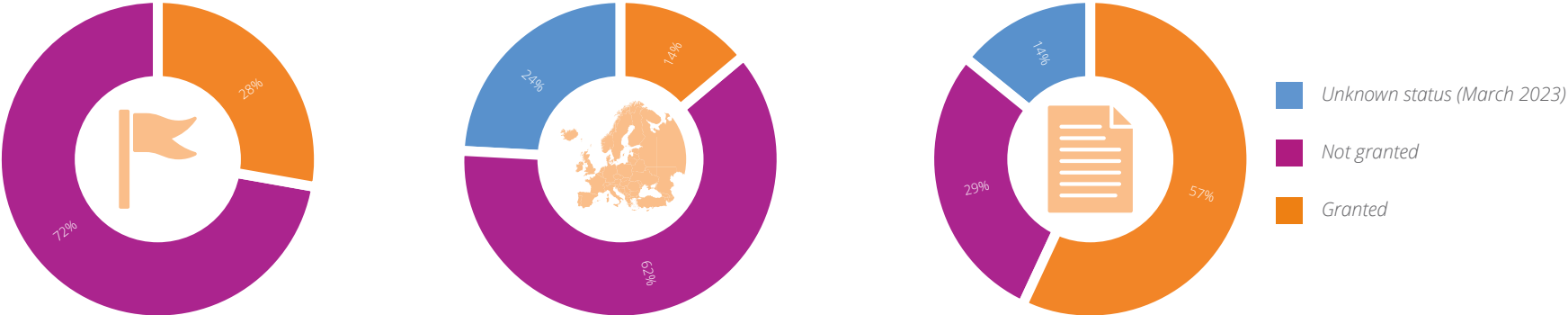
# 2022 IN NUMBERS

Projects where EPT gets funding from sources other than the grant from the Ministry of Education and Research will normally be defined as either sponsored activities ("bidrag" in Norwegian) or commission-based activities ("oppdrag" in Norwegian).

## DEVELOPMENT IN SPONSORED AND COMMISSION-BASED ACTIVITY - BOA (2019- 2023)



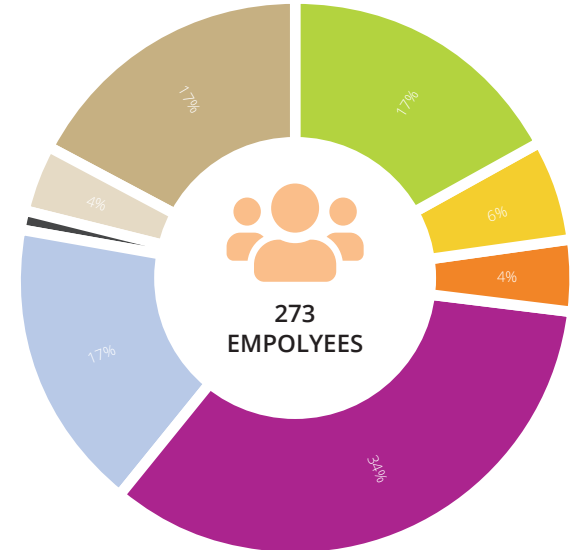
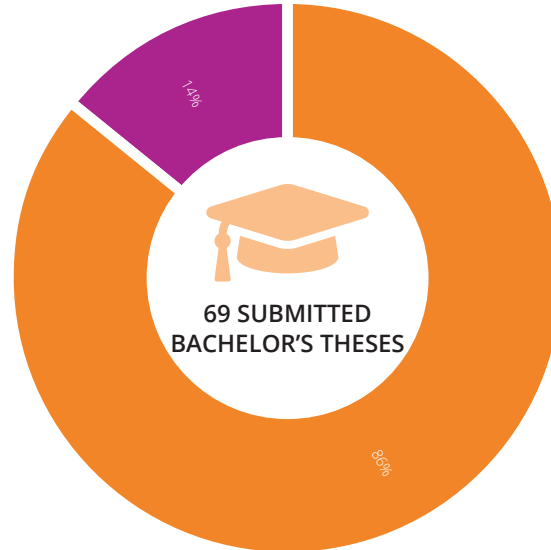
## PROJECT APPLICATIONS IN 2022



RCN proposals in total: 29

EU proposals in total: 21

Other proposals in total: 16



- Energy and Environmental Engineering (5yrs)
- Mechanical Engineering
- Industrial Ecology
- Energy Use and Energy planning (2yrs)
- Exchange students
- Mechanical Engineering (2 yrs)
- Innovative Sustainable Energy Engineering (2 yrs)
- Natural Gas Technology (2 yrs)
- Circular Economy
- Environmental Engineering (2 yrs)
- Mechanical Engineering and ICT

- Mechanical Engineering
- Renewable Energy

- Admin. and tech. staff
- Research Assistants
- Assistant Professors
- Postdoctoral Candidates
- PHD Candidates
- Researchers
- Adjunct Professors and Adjunct Associate Professors
- Professors and Associate Professors

## SUBMITTED AND DEFENDED PHD THESES

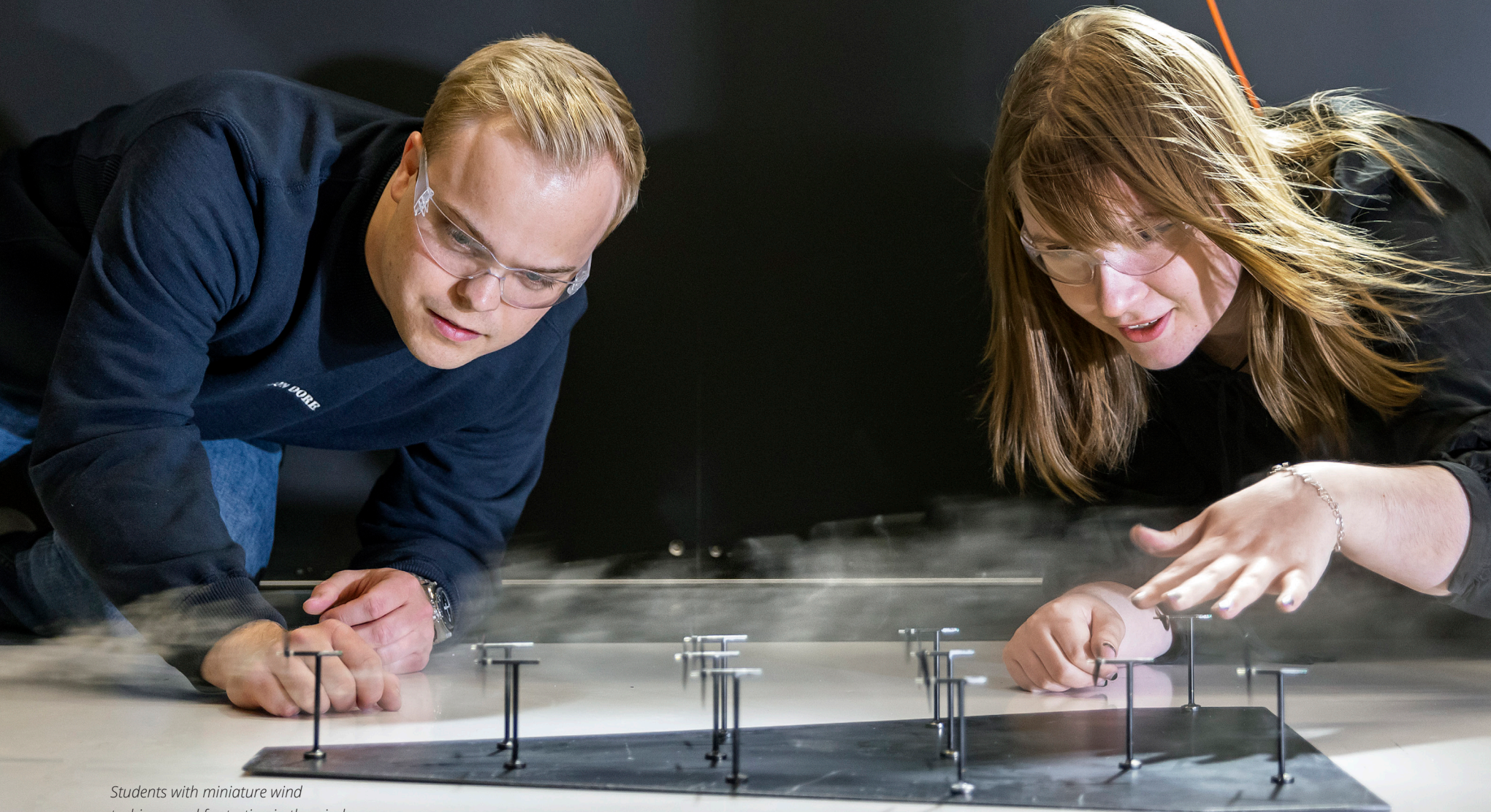
Research Group	Name	Title of Thesis	Supervisor
Industrial Ecology Programme (IndEcol)	Jan Sandstad Næss	Advancing sustainable land and water management strategies for deployment of bioenergy production systems	Francesco Cherubini
IndEcol	Jan Borgelt	Potentials of data science for advancing the modelling of biodiversity impact	Francesca Verones
IndEcol	Marta Roca Puigros	Exploring climate change mitigation scenarios through Socio-Economic Metabolism models and Simulation Games	Daniel Beat Müller
IndEcol	Zhuravchak, Ruslan	Variability of building energy performance at a scale: conformity of predictive and synthesis with explanatory modeling practices	Helge Brattebø
IndEcol	Alexandre Tisserant	Negative emission potentials, agronomic and environmental effects of biochar application to agricultural land	Francesco Cherubini
IndEcol	Billy, Romain	Monitoring and simulating material cycles and emissions at multiple scales - Case studies for aluminium	Daniel Beat Müller
Process and Power (PP)	Dagfinn Mæland	Wet gas compressor performance evaluation	Lars Eirik Bakken
PP	Giorgia Mondino	Assessment of Moving Bed Temperature Swing Adsorption Process for Post-Combustion CO2 capture	Lars O. Nord
PP	Hagen, Brede Andre Larsen	Gradient-based design optimization and off-design performance prediction of Rankine cycles and Radial Inflow Turbines	Petter Neksa
PP	Nirmal Acharya	Erosion in Francis turbines due to geometrical positioning of runner and guide vanes	Ole Gunnar Dahlhaug
PP	Yury Novoseltsev	Testing and Modelling of a Wax Control System for Cold Flow Transport of Waxy Oil	Ole Jørgen Nydal
PP	Zhongxuan, Liu	Performance Improvements of Standalone Liquid Air Energy Storage	Truls Gundersen
PP	Håkon Selvnes	Development of cold thermal energy storage for industrial refrigeration applications	Armin Hafner

Research Group	Name	Title of Thesis	Supervisor
Sustainable Energy Systems (SES)	Haoran Li	Economic optimization of heat-prosumer-based district heating systems in unidirectional heating market	Natasa Nord
SES	Hashemi, Sayed Ebrahim	Development and Optimization of Processes for Liquefied Biomethane Production	Bjørn Austbø
SES	Faranak Foroughi	Understanding the Effects of Power Ultrasound on the Hydrogen Evolution Reaction (HER) and the Oxygen Evolution Reaction (OER) on Polycrystalline Pt and Ni in Alkaline and Acidic Solutions	Jacob Lamb
SES	Hou, Juan	Investigation of Model Predictive Control Application in District Heating Systems with Distributed Sources	Natasa Nord
SES	YU, Xingji	Grey-Box Modeling of the Building Thermal Dynamics for MPC Applications: Guidelines for the space-heating of single-family houses	Laurent Georges
SES	Maria Justo Alonso	Improvements in Demand-Controlled Ventilation to Reduce Energy Use and Improve Indoor Air Quality	Hans Martin Mathinsen
Thermo Fluids (TF)	Eirik Æsøy	The Effect of Hydrogen Enrichment on the Thermoacoustic Behaviour of Lean Premixed Flames	James Dawson
TF	Philip Erik Buschmann	On the role of symmetry and degeneracy in nonlinear thermoacoustic eigenproblems with application to can-annular combustors	Jonas Moeck
TF	Zhaoyu Shi	Numerical studies of particle clustering in circular cylinder wake flows	Helge Andersson
TF	Leon Li	In the wake of turbulence: a study on the effects of freestream turbulence on the flow around simple and complex geometries	Jason Hearst
TF	Yannik Jooss	A Fluid Mechanic View on Urban Wind Energy	Tania Bracchi
TF	Jayaram, Rohith	Particle suspensions in evolving Taylor-Green vortex flow	Helge Andersson
TF	Harish Gopalakrishnan	Dynamics and stability of autoignition fronts in elementary reheat combustor configurations	Moeck, Jonas

Number of defended PhD theses: 26

NTNU

Department of Energy and  
Process Engineering



*Students with miniature wind turbines used for testing in the wind tunnel. Photo: Geir Mogen/NTNU*



# THERMAL ENERGY AND FLUID MECHANICS

## THERMO FLUIDS (TF)

“Our research group focusses on both fundamental and applied research in the general areas of thermal energy and fluid mechanics,” says Nicholas Worth, Head of Research Group. “We develop and use cutting-edge theoretical, experimental and numerical methods to help address major societal challenges in energy, sustainability, transport, health and the environment.” The SDG’s most relevant to this research area are no. 3, 6, 7 and 13.



**Nicholas Worth**  
HEAD OF RESEARCH GROUP

*Photo: Thor Nielsen/NTNU*

Ongoing major research projects and affiliated centres	Responsible
LowEmission – Research Centre for a Low-Emission Petroleum Industry on the Norwegian Continental Shelf	James Richard Dawson, Terese Løvås, Nicholas Worth, Andrea Gruber, Jonas Moeck
FME Bio4Fuels – Norwegian Centre for Sustainable Bio-based Fuels and Energy	Terese Løvås
Breaking through: The Impact of Turbulence on the Gas-Liquid Interface (GLITR)	Jason Hearst
Cardio Exosomes - Biomedical engineering platform for cardio exosomes	Carlos Dorao
Dyndrops - Mechanisms controlling droplet growth dynamics during condensation on micro-patterned surfaces	Maria Fernandino
Fire Research and Innovation Centre (FRIC)	Ivar Ståle Ertesvåg
Reheat2H2 - Towards clean and stable hydrogen reheat combustion in gas turbines	Jonas Moeck
Stability Through Asymmetry: Breaking vortical symmetry to enable zero-carbon combustion	Nicholas Worth

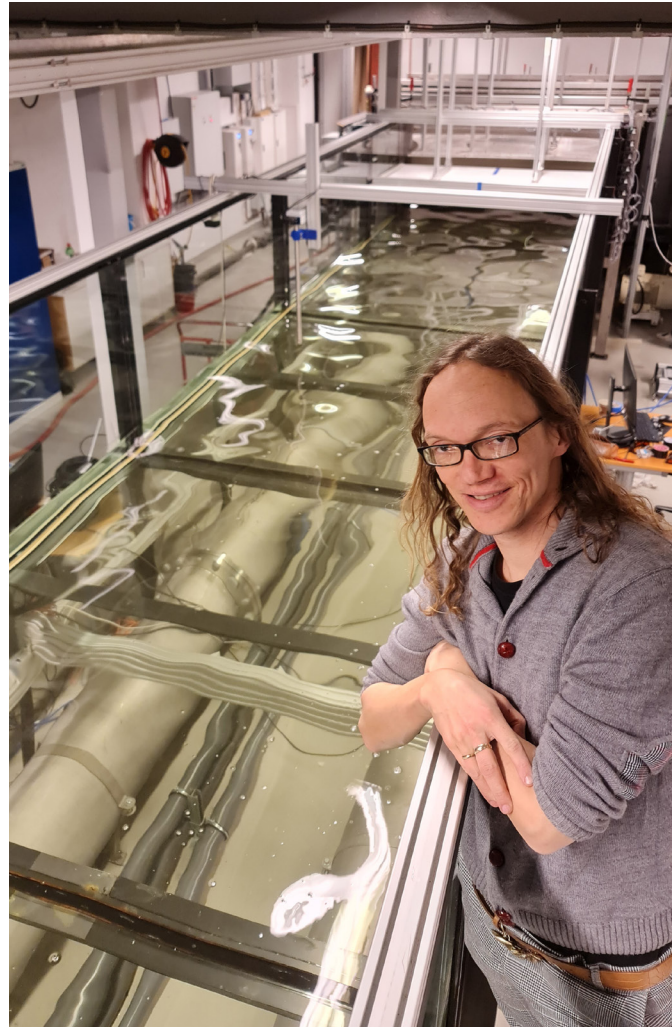


# ERC GRANT TO ELLINGSEN TO BETTER UNDERSTAND THE CLIMATE ON EARTH

**Professor Simen A. Å. Ellingsen has been awarded the prestigious Consolidator Grant from the European Research Council (ERC). He will investigate how ocean waves mix surface water into the deep, something that can improve climate simulations.**

Simen Ellingsen receives EUR 2 million from the ERC to investigate the physics where ocean and atmosphere meet.

“Compared to the ocean, surface waves are tiny, but they have large consequences for the globe. In climate simulations we get errors because we lack understanding about how the layers in the sea get mixed,” says Ellingsen. “Now I look forward to investigating this in the years ahead, both theoretically and experimentally in the water channel at NTNU.”



*The water channel at NTNU will play a part in the project. Photo: Astri Nore*

# BRIDGING TECHNOLOGY AND SCIENCE

## - THE INDUSTRIAL ECOLOGY PROGRAMME (INDECOL)

“Industrial Ecology is the study of the material side of the economy and society and investigate how resource use contributes to welfare, as well as how and where the environmental impacts occur,” says Francesco Cherubini, Head of the Industrial Ecology Programme. “Our teaching and research activities bridge technology and the social sciences.” The SDG’s most relevant to this research area are no. 7, 8, 9, 11, 12, 13 and 15.

Ongoing major research projects and affiliated centres	Responsible
FME NTRANS – Norwegian Centre for Energy Transition Strategies	Edgar Hertwich
Smart Maritime SFI – Norwegian Centre for improved energy efficiency and reduced harmful emissions	Anders Hammer Strømman
ATLANTIS – Whales, waste and sea walnuts: incorporating human impacts on the marine ecosystem within life cycle impact assessment	Francesca Verones
LASTING – Sustainable prosperity through product durability	Johan Berg Pettersen
Mind-P – opportunities and barriers to how the Norwegian bioeconomy can be transformed to achieve direct independence from imported mineral phosphorus by 2030	Daniel Beat Müller
MITISTRESS – Strategies to Mitigate Pressures on Terrestrial Ecosystems from Multiple Stressors	Francesco Cherubini
Ocean NETs – Ocean-based negative emission technologies	Helene Muri



**Francesco Cherubini**  
HEAD OF INDUSTRIAL ECOLOGY PROGRAMME

*Photo: Titt Melhuus/NTNU*



## VERONES LEADS TWO MORE LARGE EU PROJECTS ON BIODIVERSITY

**During 2022 two large project applications coordinated by Francesca Verones were granted funding via Horizon Europe.**

The first EU project, BAMBOO, is about biodiversity and trade of non-food biomass. "The global and interconnected trade network allows consumption in very different places, everything from the original production and the biodiversity impacts caused during the production are exported along with the goods," explains Professor Francesca Verones. "So far, we have limited and incomplete tools for assessing the impacts of trade on biodiversity, which hampers mitigating these losses for policymakers, retailers and other stakeholders." Verones assures us that NTNU and the research project partners will help remedy this.

The second EU project, RAINFOREST, is also on biodiversity. However, the focus is on food production. "The RAINFOREST project will contribute to enabling, upscaling and accelerating transformative change to reduce biodiversity impacts of major food and biomass value chains," says Verones. NTNU with research partners will work together with stakeholders, to co-develop and evaluate just and viable transformative change pathways and interventions.



## HERTWICH APPOINTED TO EU'S NEW ADVISORY BOARD ON CLIMATE CHANGE

**Professor Edgar Hertwich has been appointed to the EU's newly constituted European Scientific Advisory Board on Climate Change.**

Professor Hertwich will work with 14 other independent senior scientific experts from across Europe to "provide the European Union (EU) with scientific knowledge, expertise and advice relating to climate change. The Advisory Board's work will underpin the EU's climate action and efforts to reach climate neutrality by 2050," according to the EU. The term is for four years.



*Left:  
While the RAINFOREST project received almost EUR 3 million, the BAMBOO project received EUR 2.8 million. Photo: Lars R. Bang/NTNU*

*Right:  
Hertwich has previously had roles at the Intergovernmental Panel on Climate Change (IPCC) and the International Resource Panel (IRP). Photo: Titt Melhuus/NTNU.*

# FROM HYDROGEN AND BATTERIES TO BUILDINGS

## - SUSTAINABLE ENERGY SYSTEMS

“The Sustainable Energy Systems group works with integration of energy systems”, says Odne Burheim, Head of Research Group. “Our aim is to increase sustainability. We use diverse technologies such as hydrogen and battery, and applications such as energy supply and use in buildings.”



**Oodne Burheim**  
HEAD OF RESEARCH GROUP

*Photo: Thor Nielsen/NTNU*

Ongoing major research projects and affiliated centres	Responsible
FME ZEN – The Research Centre on Zero Emission Neighbourhoods in Smart Cities	Laurent Georges, Hans Martin Mathisen
ExPOSe - Transparent Energy Planning	Natasa Nord
ChiNoZEN - Key technologies and demonstration of combined cooling, heating and power generation for low-carbon neighbourhoods/buildings with clean energy	Vojislav Novakovic
Defreeze MEE Now - Development and demonstration of frost-free Membrane Energy Exchanger and reduced ice and frost in heat wheels for Nordic weather	Hans Martin Mathisen
DIGI - Digitalisation in the operation, monitoring and control of large-scale biogas plants	Jacob J. Lamb
ENERSENSE – Energy and sensor systems	Oodne Burheim
Iclimbuilt - Functional and advanced insulating and energy harvesting/storage materials across climate adaptive building envelopes	Guangyu Cao
NorGiBatF – Norwegian Giga Battery Factories	Oodne Burheim
POSired - Reduction of Post operative surgical site infections through development of XR tools	Guangyu Cao, Hans Martin Mathisen
UnDID – Understanding behaviour of District heating systems Integrating Distributed Stocks	Natasa Nord



## LAB VISIT BY THE SERBIAN PRESIDENT

**During his visit to Norway in November 2022, the Serbian President wanted to see what NTNU accomplishes within the energy field.**

Renewable energy is highly relevant for Serbia, a country that aims to shift from reliance on coal and other fossil fuels to greener alternatives. At NTNU the president has an opportunity to try battery production at first hand in the battery lab, followed by a tour in the Waterpower lab.



## AWARDS FOR BEST MASTER'S THESES IN HVAC

**Two EPT master's theses were honoured by the HVAC foundation**

During the annual HVAC days in Lillestrøm, prizes were awarded for the best HVAC Master's theses of the last three years. Due to the restrictions during Covid-19, the HVAC foundation combined the awards into one event. Two of the prizes went to NTNU theses, one to an Oslo Metropolitan University thesis.

Marius Aaslund Berge and Ola Eriksen at EPT wrote their master's thesis on improving the method to calculate heat rate needs for heating. Ingrid Jæger Landsnes received an award for her thesis on energy in buildings and digitalization. Ingrid analysed heat and power rate reduction of ventilation heat and how it affects ventilation heat, fan effect, indoor climate and costs for thermal and electrical energy.



*Left:  
Jacob J. Lamb, Associate Professor at EPT and Aleksandar Vučić, President of Serbia, with entourage.  
Photo: Amanda Schrøder/NTNU*

*Right:  
The HVAC foundation's chairman, Mads Mysen (to the left) and the general manager, Thor-Jostein Egeland (to the right) honoured the past three years' award winners Ole Martinus Harket Norbeck (OsloMet), Ingrid Jæger Landsnes (NTNU EPT) and Ola Eriksen (NTNU EPT). Photo: Georg Mathisen/Norsk VVS (printed with permission)*

# FROM HEATING AND COOLING TO **HYDROPOWER AND ENERGY EFFICIENCY**

## - RESEARCH GROUP PROCESSES AND POWER

Our research group works with power, processes, systems and components,” explains Trygve Eikevik, Head of Research Group. “We work with energy efficiency in all industrial processes, especially in the oil and gas, metal and food industry.” The SDG’s most relevant to this research area are no. 2, 7, 12 and 13.



**Trygve Eikevik**  
HEAD OF RESEARCH GROUP

Ongoing major research projects and affiliated centres	Responsible
FME HydroCen – Norwegian Research Centre for Hydropower Technology	Liv Randi Hultgreen
FME HighEFF – Centre for an Energy Efficient and Competitive Industry for the Future	Truls Gundersen
CoolCern – Large Hadron Collider detector cooling with R744 refrigeration technology (CERN project)	Armin Hafner
Coolfish: Energy efficient and climate friendly cooling, freezing and heating onboard fishing vessels	Armin Hafner
European Energy Research Alliance Joint Programme Hydropower	Ole Gunnar Dahlhaug
HydroFlex – Increasing the value of Hydropower through increased Flexibility (H2020)	Ole Gunnar Dahlhaug
Innovative hybrid energy system for stable power and heat supply in offshore oil and gas installation (HES-OFF)	Lars O. Nord
TRI-HP – Trigeration systems based on heat pumps with natural refrigerants and multiple renewable sources	Armin Hafner



# REDUCING GREENHOUSE GAS EMISSIONS WITH AN OFFSHORE HYBRID ENERGY SYSTEM

Gas turbines are widely used to cover the need for electricity and heat at today's offshore installations. The research project and concept HES-OFF can reduce CO2 emissions by up to 80 percent by using a hybrid energy system where hydrogen is a backup for renewable wind energy, without the need to use electricity from the onshore grid.

The Innovation project that finished in 2022 investigated this offshore energy system for stable power and heat supply that combines several energy sources, including gas turbines and offshore wind, and an energy storage concept with hydrogen. The project was a cooperation between Clara Venture Labs, NTNU and Lundin Energy Norway and was led by Prof. Lars Nord.



*The HES-OFF project aims to lower emissions of greenhouse gases.  
Photo and ill.: colourbox.dk*



# 350 RESEARCHERS WITHIN COOLING AND HEATING VISITED TRONDHEIM

*PhD Candidate Marcel Ahrens with an environmentally friendly ammonia/water heat pump designed for supply temperatures of 150°C, which was one of the topics addressed on the conference.*

**Climate and environmentally harmful fluorinated refrigerants can be replaced with natural working fluids in cooling and heat pumping systems. On 13-15 June, 350 researchers from all over the world were in Trondheim to share knowledge on the topic.**

The biannual Gustav Lorentzen Conference on Natural Working Fluids is an international conference that was organized for the 15th time. International researchers gather here to present the status and use of natural working fluids in all kinds of refrigeration and heat pumping systems. The conference is named after a former professor at NTNU's forerunner NTH, Gustav Lorentzen, who was the driving force behind the revival of CO<sub>2</sub> as a refrigerant as early as 1987.

"Here in Trondheim, we have world-class infrastructure and an established industry collaboration that has contributed to research breakthroughs," says Professor Armin Hafner. The conference is organized in different countries every two years, and this year the International Institute of Refrigeration (IIR), SINTEF and NTNU were hosts in Trondheim.



# ORGANIZATIONAL **STORIES & MOMENTS**

## GENDER AND EQUALITY AT EPT

Through a shared project between EPT and the Department of Interdisciplinary Studies of Culture (KULT), Martine Sletten, PhD student at KULT, will conduct research on gender and equality at EPT.

The EPT Women in Science initiative had more than 30 members in 2022. Among several meetings and workshops, they invited Dr Mirjam Röder from Aston University.



*Terese Løvås, Head of Department at EPT, Corinna Netzer, Postdoctor at EPT and active member of EPT Women in Science.*



*Dr Mirjam Röder lecturing in Sentralbygget.*

## FIRST EPT DAY

About 130 students, employees and external guests registered for the first EPT Day. A declared success, EPT Day is intended to be an annual event for students, alumni and employees.

*Kjel1 in Kjelhuset on EPT Day.*



*Alumni members in a panel on EPT Day: Sandra Asltad, Ask Ibsen Lindal, Kjersti Røkenes, Frida Sæther.*



## NEW MEMBERS OF PERMANENT ACADEMIC STAFF

**We welcomed two new members of the permanent academic staff at EPT in 2022: Juudit Ottelin and Thomas Alan Adams II.**

In August 2022, Juudit Ottelin began her position as Associate Professor at our department, within Environmental Sustainability Analysis of Urban Systems. Juudit holds a master's degree in Materials Engineering and Recycling from Aalto University and a PhD in Real Estate Business and Environmental Studies from Aalto University and the University of Iceland. She was a postdoctoral fellow at Aalto before joining the Finnish Environment Institute in the autumn of 2021.

Thomas Alan Adams II began his position as Professor within Process Systems Engineering (Process and Power Group) in October. Since gaining his PhD in Semicontinuous Processes with Chemical Reaction from University of Pennsylvania, USA, Tom was a Postdoctoral Associate at MIT, USA, and most recently, Associate Professor at McMaster University, Canada.



# RECORD-HIGH PARTICIPATION FROM EPT AT RESEARCHERS' NIGHT

More than 1000 pupils visited Researchers' Night 2022 on 30 September. The pupils met several EPT researchers in and outside the labs: Francesca Verones, Guangyu Cao, Pål-Tore Storli, Omer Babiker and Natasa Nord.



Top left:  
Natasa Nord in the HVAC lab.

Top right:  
Omer Babiker in the wind tunnel.



Bottom left:  
Pål-Tore Storli in the Waterpower lab.



Bottom right:  
Guangyu Cao explains experiments conducted in the Operation Room lab.



*Students with solar panels on the roof of Varmeteknisk. Photo: Geir Mogen/NTNU*

# EPTRAINING FOR 10 YEARS

## KAYAK

EPTraining is great for meeting up and having fun with colleagues while training and staying healthy. In the winter we normally have ski training sessions, which are very popular. Running sessions, the St. Olavsloppet relay race from Trondheim to Österstund in Sweden and kayak courses keep us active in the summer. In 2022, we marked the 10th anniversary of EPTraining.



Photo: Jørgen Røst/PadleNorge

## ST. OLAVSLOPPET



Photo: Ignat Tolstorebrov/NTNU

## SKI



## BICYCLE ROOM

*In 2022 we opened the new official indoor bicycle room for employees at EPT and SINTEF Energy.*



## OUTDOOR DIP SAUNA



*A dip in the cold followed by sauna is by no means obligatory at EPT, but fun for those involved. Photo: Emmy Andrea Håiseth/NTNU*

# EPT IN 2 YEAR'S TIME

EPT believes that the ongoing transition in society towards a sustainable future requires constant renewal of engineering knowledge, combined with interdisciplinarity, based on fundamental disciplines. To succeed in being relevant, for research partners and students, we must continue to improve and develop our core activities and support functions.

EPT also acknowledges the political change towards a more efficient university sector that is expected to deliver on the key performance indicators with less funding and resources. At the time of writing, it is still uncertain whether the Campus project of NTNU will go ahead, it is still uncertain whether tuition fees for international students will be implemented, and the push for open science may change the way we work and operate.

Despite these and other uncertainties, we are striving to reach our goals put forward in EPT's Strategy towards 2025. We believe we are resilient and are confident we can meet challenging times with innovation, creativity and new ways of managing our activity.



## WIDE RANGE OF RESEARCH

EPT is known for its wide scope of research. This can be a strength, fostering interdisciplinary activity and innovative research, but also a challenge to common identity and visibility. A common set of priorities form the basis of the Department's core activity, independently of fundamental or applied focus, with excellence in focus.

## STUDY PROGRAMMES

EPT provides a wide range of courses for bachelor's and master's/siv.ing study programs. In the years to come, we will put effort in maintaining a strong position and visibility in the study programmes. We must also focus on improving and modernizing our learning environments and stay relevant for further studies and career paths. We must ensure that our students succeed in the job market and prevent dropout and delays in the completion of studies.

## IDENTITY AS ONE DEPARTMENT

For historical reasons, EPT has several different locations on the Gløshaugen campus. This imposes organizational challenges in terms of both identity building and visibility as one Department. It requires attention to efficient communication, procedural structure for research and educational activities, as well as robustness of support functions.

## UPCOMING GOALS

EPT's vision is long-term. At the same time national and global societal changes are happening fast, with the need for a rapid and flexible response. The value of knowledge and understanding of the core principles governing our activity is crucial to increase competence, and to meet society's demands and expectations with state-of-the-art solutions.



## IN 2025, EPT

- is nationally and internationally recognized as a provider of excellent research and research-based education within its core areas of energy engineering, process technology and industrial ecology.
- is a preferred partner in collaborative research with academic and industrial partners.
- hosts internationally leading research groups fostering theoretical and lab-based fundamental and applied science.
- is a provider of high-quality learning environments for candidates to the private, public and academic sector, both in Norway and abroad.
- has a strong and unified, yet interdisciplinary, identity attractive to both employees and students.
- is a collaborative partner with the highest level of professionalism and integrity on all levels (scientific, education, administration and laboratory).
- is a visible and active actor in societal debate.
- offers a work environment embracing diversity and gender balance.

This is a summary of EPT's strategy for 2020 – 2025.

Read the whole document here:





*EPT's management group adopted a strategy for 2025, in 2020. It is based on NTNU's overall strategy.*

*Photo: Lars R. Bang/NTNU*