NORA.ai

NORA Annual Report 2022

NORA – Norwegian Artificial Intelligence Research Consortium

With the vision of international relevance and excellence in AI research, education and innovation for Norwegian universities and research institutions.

NORA´s vision

Disclaimer
The numbers and figures featured in this report are based on data collected from Jan–Dec 2022.
The data is correct and complete to the best of our knowledge.
All images used in this report were created using Dall-E.

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A Message from the CEO and Board Chair

1.1 Klas Pettersen, CEO

NORA as a network has grown in 2022. We now consist of sixteen of Norway's most prominent institutions collaborating in AI research, education and innovation. In close collaboration with the government, public sector and industry, we aim to bring Norway to the forefront of the most important technology of our time.

In 2022, NORA established several projects and initiatives to make Norway a leader in AI. Over the next few years, NORA will work with its partners to utilise these structures to their fullest potential.

With regard to education, we started the NORA Norwegian AI Research School, a national AI research school.

With regard to research, we enhanced NORA.EU, our EU network that supports consortium partner's EU applications. Both the research school and the EU network are projects supported by the Research Council of Norway.

To boost innovation, we have continued working with the strongest AI start-ups in Norway as part of the structure NORA.startup, an innovation ecosystem for AI previously supported by Innovation Norway, which we have also grown following the Innovation Norway project period. At the end of 2022, we established a European Digital Innovation Hub (EDIH) that will support the public sector and small and medium-sized businesses to deploy AI.

NORA has also become a strong network that hosts and supports a large number of conferences, workshops and meetings. I am especially proud of having created an important Nordic platform for young researchers, the Nordic AI meet conference, and I am excited that the

“AI has emerged as an interdisciplinary puzzle that greatly benefits from cooperation. Through national collaboration and coordination, the Norwegian AI community is carefully putting the pieces together. This report provides numerous examples of how national collaboration can create value and benefit researchers, students, businesses, and innovators in Norway. As a result of this collaboration, the Norwegian AI community has gained more visibility internationally, opening up new opportunities for collaborations with world-leading environments.”

Klas H. Pettersen, CEO of NORA

1860+

More than 1860 newsletter subscribers

40+

More than 40 of the most interesting AI Startups in Norway

CEO of NORA, Klas Pettersen

Pioneer Centre for AI in Denmark has taken the initiative to host this conference next year in Copenhagen, making it “truly Nordic”.

We have also created a diamond access journal, open, free of charge with no publication fee. In 2022, the journal *Nordic Machine Intelligence* became a level 1 journal in the Norwegian Register for Scientific Journals, Series and Publishers.

Internationally, we have established several strong international collaborations with the National Labs of Department of Energy (USA), with the Alan Turing Institute (UK) and with HIDA Helmholtz Information & Data Science Academy (Germany). Norway, as the first country outside the UK, will now be able to send Norwegian PhD students to the UK to participate in the Alan Turing Institute’s Enrichment Scheme. In 2022, we had several students from German institutions visiting Norwegian institutions through an exchange programme in collaboration with HIDA.

NORA is all about building a strong AI community in Norway; a vision shared by almost all leading universities and institutes. NORA is the sum of the research communities of our partners and their linked ecosystems. In this annual report we have, however, limited ourselves to focusing on work where the NORA secretariat has actively created value for the AI community in Norway.

Board Chair of NORA, Inge Jonassen

16

NORA has a total of 16 partners

AI

NORA is Norway’s leading AI research network

“2022 has been a year of great breakthroughs in the field of AI, bringing AI to the general population. This has made NORA’s efforts to connect and strengthen national centres of expertise even more important, and underline the importance of connecting with industry, government and the general population to provide knowledge based advice and guidance.”

Inge Jonassen, Board Chair of NORA

1.2 Inge Jonassen, Board Chair

NORA is the leading network for artificial intelligence research, education and innovation in Norway and therefore plays an important role in connecting researchers, improving the educational offerings, and stimulating innovation and industry connections. NORA is important for the owner institutions – 8 universities, 3 university colleges and 5 research institutes – and for the research and higher education sector in and of itself.

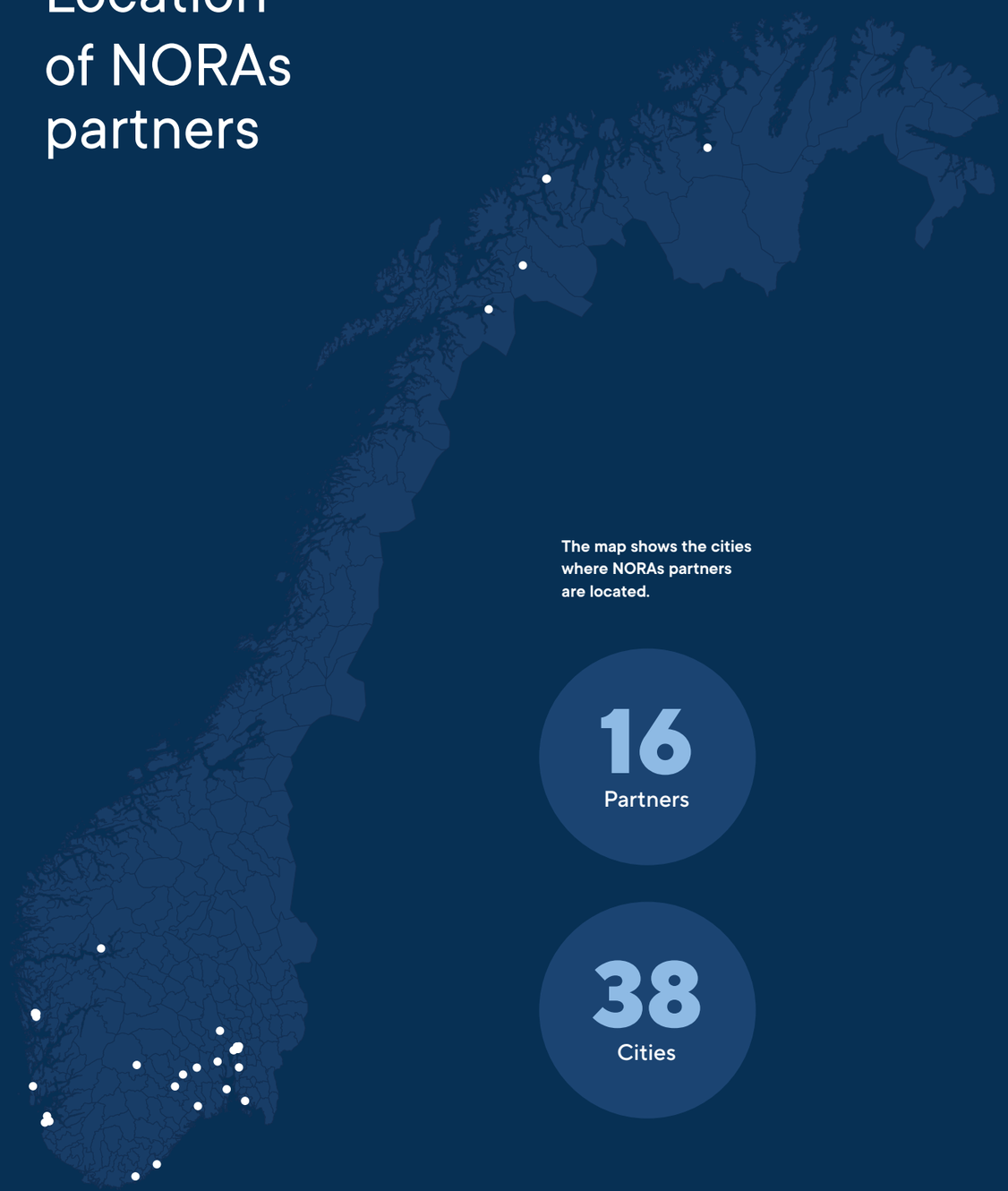
This is also recognised by national agencies and ministries who increasingly approach NORA for advice and collaboration. For example, NORA plays a coordinating role in the collaboration between Norway and the US Department of Energy; NORA has been funded to run a national AI research school and to set up a research infrastructure for AI (NAIC). NORA also receives funding from the European Commission to serve as a hub for innovation in the area of AI through the European Digital Innovation Hub projects.

All this – and much more – has been established over a short period of time since NORA’s establishment some four years ago.

I believe NORA is also well known in the research communities across our partner institutions, and it is important that NORA continue to share information about what NORA can offer and what role the consortium can play for research, educational and innovation activities. Especially when it comes to engaging and generating value for consortium partners and for Norway. With a research school, a research infrastructure, innovation and industry programmes, NORA is in a perfect position to make a difference – and will continue its hard work to do so.

The annual report reflects the high level of activities. I hope you find it an interesting read and also hope you feel inspired to engage with NORA – attend seminars, contribute to workshops, connect with new colleagues and collaboration partners through our events - so that we all can work together to enable AI to make a positive difference for NORWAY in the years to come!

Location of NORAs partners



The map shows the cities where NORAs partners are located.

16
Partners

38
Cities

2

About NORA

NORA was established on 21 November 2018 to strengthen Norwegian research, education, and innovation within AI, as well as other relevant fields that support the development of AI applications and has been operational since April 2019.

NORA contributes to the development of joint research projects among partners, collaborates closely with startup companies in the AI field, coordinates education, as well as strengthens the collaboration between the consortium partners' research communities and the business community.

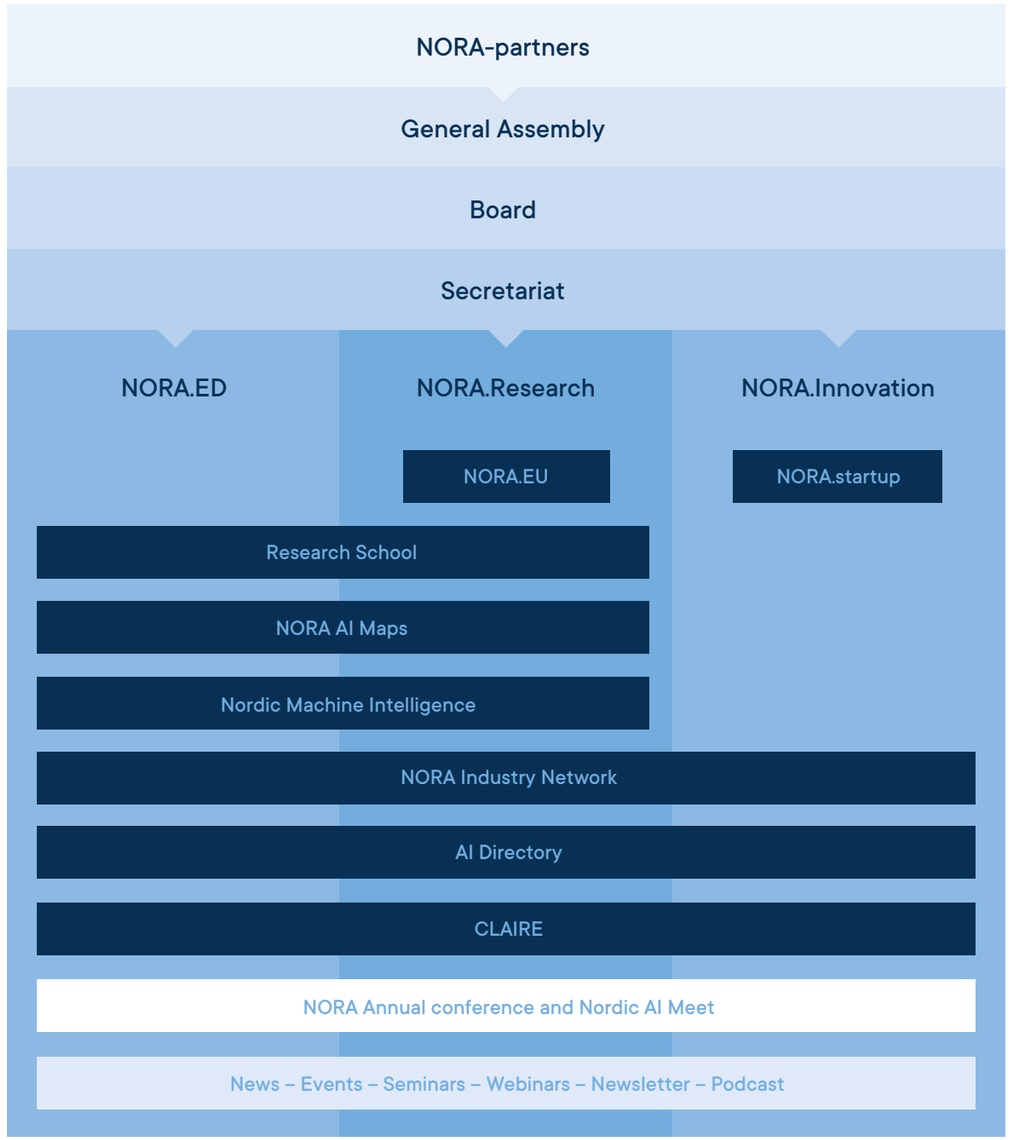
NORA further contributes to positioning Norwegian research in AI in the international arena and has a special responsibility for developing activities aimed at Horizon Europe. In addition, the NORA secretariat creates meeting places and hosts various events for researchers and students. NORA is also a member of CLAIRE – the Confederation of Laboratories for AI Research in Europe and serves as the CLAIRE office in Norway/Nordics.

In 2022, NORA welcomed the Norwegian Computing Center as a consortium partner, bringing the number of consortium partners to 16. The NORA consortium partners are:

1. BI Norwegian Business School
2. Kristiania University College
3. NORCE Norwegian Research Centre AS
4. Norwegian University of Life Sciences
5. OsloMet – Oslo Metropolitan University
6. Simula Research Laboratory AS
7. SINTEF
8. UiT – The Arctic University of Norway
9. University of Agder
10. University of Bergen
11. University of Oslo
12. University of South Eastern Norway
13. University of Stavanger
14. Western Norway Research Institute
15. Østfold University College
16. Norwegian Computing Center

NORA's Structure

The figure below provides an overview of NORA programmes and initiatives. Several of the initiatives have their own governance structure with their own boards and committees. NORA consortium partners refers to the universities, university colleges and research institutes that are members of NORA. NORA strategic partners refer to members of the NORA industry network, consisting of both public and private companies. NORA.ED, NORA.Research, and NORA.Innovation refer to NORA's education, research and innovation branches, respectively.



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The people at NORA

The NORA Consortium Board represents NORA consortium partners and is NORA's governing body. NORA had its first General Assembly in April 2022, where a new board was elected. The NORA Consortium Board consists of seven members and two deputy members. The NORA secretariat oversees the day-to-day management of NORA and is located at the University of Oslo.

NORA Board of directors

Inge Jonassen, Board Chair
University of Bergen

Ingrid Glad, Board Member
University of Oslo

Trond Runar Hagen, Board Member
SINTEF

Morten Irgens, Board Member
OsloMet – Oslo Metropolitan University

Cecilia Marie Futsæther, Board Member
Norwegian University of Life Sciences

Anders Andersen, Board Member
UiT - The Arctic University of Norway

Annette F. Stephansen, Board Member
NORCE

Kjersti Engan, Deputy Board Member
University of Stavanger

Stefano Nichele, Deputy Board Member
Østfold University College

NORA Secretariat

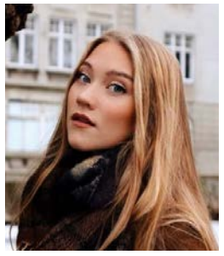
Klas H. Pettersen
CEO

Anam Javaid
Senior Communication Advisor

Alex Moltzau
AI Policy and Ethics

Birte Hansen
Innovation and Industry Coordinator

Sachin Gaur
Research Coordinator



Synne Svinsås Gjønnes
Communication Advisor

Kushtrim Visoka
Advisor

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Strategy Overview

In 2022 the board developed a new strategy for 2023–2026. The strategy will help NORA prioritise and structure its work, in order to achieve the tasks set by the NORA consortium partners. The new strategy will be published in early 2023. However, in 2022, NORA was governed by the old strategy, which is shown below.

NORA's mission as outlined in the strategy was to:

Facilitate national and international research cooperation in AI, contribute to greater collaboration between academia and businesses, promote ethical, transparent and inclusive AI, and become a national access point for AI competence and infrastructure

NORA's vision as outlined in the strategy was:

International relevance and excellence in AI research, education and innovation for Norwegian universities and research institutions

NORA's ambition as outlined in the strategy was to:

Become an internationally known AI research and education network

Overview of NORA's strategy 2020–2022

NORA outlined four strategic goals that helped us move closer to our vision, ambition and mission. These were:

1. Excellent AI research and innovation, through:

- Providing support for and coordinating research applications
- Creating arenas for interaction and cooperation
- Taking an active role in establishing startup companies in the field of AI

2. Excellent AI education and training, through:

- Increasing focus on AI in education and knowledge development, helping to create the workforce of tomorrow
- Conducting PhD seminars, conferences, and networking events
- Establishing a research school in AI, machine learning and robotics, supporting graduate students at the top international level
- Increasing knowledge about AI in general

3. Trust-based and transparent use of AI through ethical awareness, through:

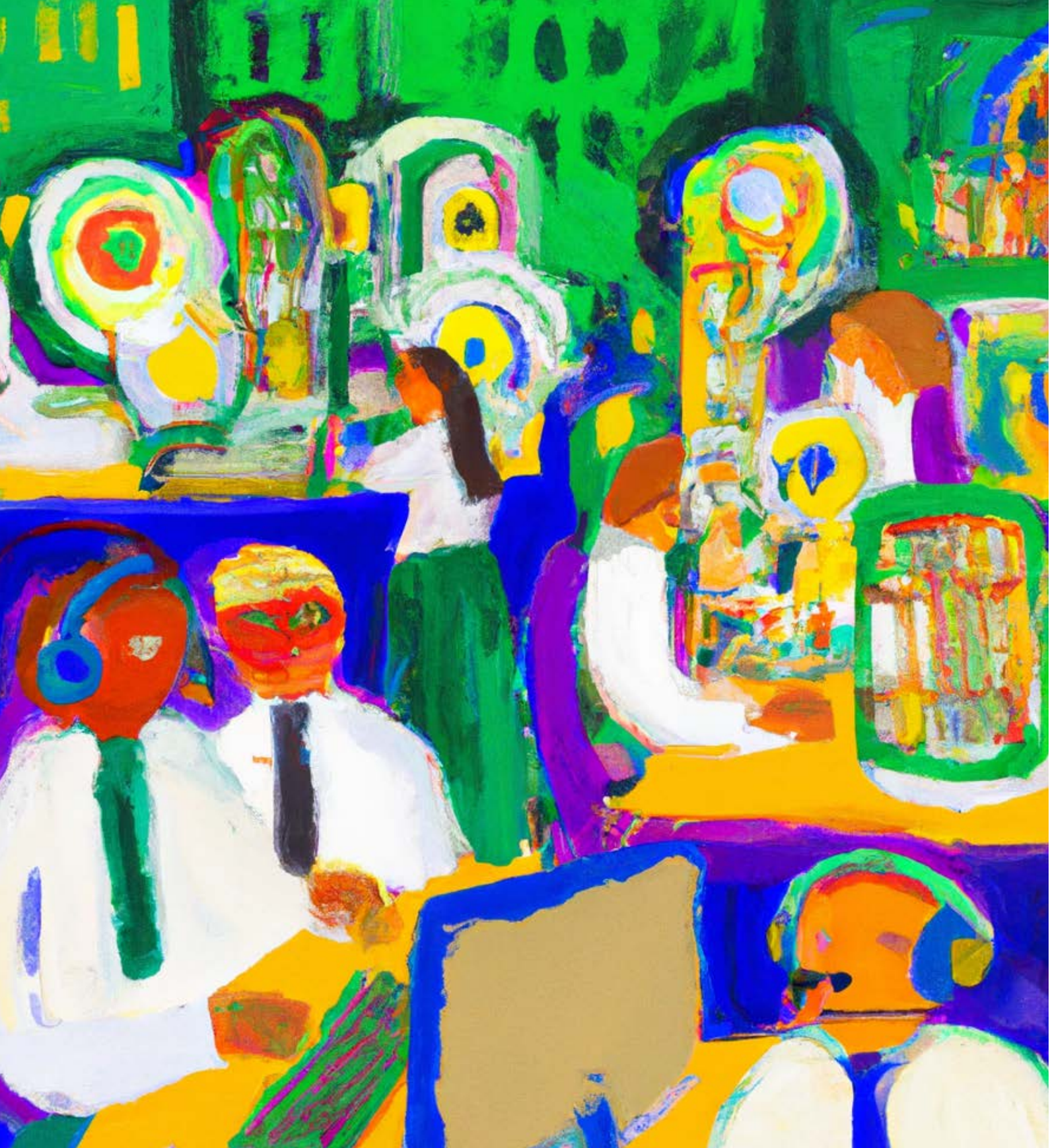
- Contributing to a more responsible and ethical framework for AI both nationally and internationally
- Promoting the use of fair algorithms to correct discrimination and human bias
- Raising awareness about AI among our partners and in society in general
- Creating NORA as a national brand and trademark in the area of trustworthy AI

4. Leading network for AI, machine learning and robotics, through:

- Formalise and streamline the cooperation between the NORA partners
- Become a prominent hub and research initiator in the Nordic countries
- Seek international cooperation and partnership with businesses

NORA team: Birte Hansen, Håvard Leren (intern), Alex Moltzau, Klas Pettersen, Sachin Gaur and Kushtrim Visoka

Nordic AI Meet



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Research

Research is one of NORA's core pillars. As laid out in the strategic plan, NORA aims to be an internationally known network for research and education. Norway has great potential to succeed in the field of AI research. To utilise this potential, NORA is working to offer platforms for both fundamental and applied research that reflects the complexity, interdisciplinarity and diversity characterising the field.

Two such important platforms are the NORA Annual Conference and the Nordic AI Meet. The NORA Annual Conference is an annual event that gathers the Norwegian research community within the field of Artificial Intelligence. The conference provides a meeting place where consortium partners, strategic partners, invited speakers and other participants can submit and share research, ideas, theories, models and new perspectives, as well as interact with peers in the field. The Nordic AI Meet is an annual conference where early career researchers from all the Nordic countries are invited to meet, submit and present research, discuss new ideas, methods and theories in AI as well as build professional networks. The Nordic Machine Intelligence Journal has encouraged the publication of articles submitted from both conferences.

In addition to the conferences, NORA has organised numerous research webinars and events where researchers from NORA consortium partners have been invited to share and promote their research with the wider AI community in Norway.

Furthermore, NORA has also actively promoted and supported calls for funding proposals and connected researchers relevant for calls and encouraged consortium building among consortium and strategic partners. NORA supported many successful research proposals in 2022. Amongst these proposals, the NORA secretariat will receive funding as a contributing partner for Norwegian AI Cloud (NAIC), ENACT and Nemonoor. Nemonoor will be described in Chapter 7. Many of NORA's consortium partners were also involved in the establishment of nine new Centres of Excellence (CoE) that will be supported for the next ten years with a total budget of NOK 1,4 billion. Among the nine centres, two will focus on AI and machine learning, namely Integreat and the Center for Digital Narratives. Integreat will be led by Professor Arnoldo Frigessi and Professor Ingrid Kristine Glad from the University of Oslo. The centre will be co-directed by Professor Lilja Øvrelid, University of Oslo (UiO), Professor Arild Waaler, UiO and Robert Jenssen from UiT – The Arctic University of Tromsø (UiT). The Centre for Digital Narrative will be led by Professor Scott Rettberg and Professor Jill Walker Rettberg from the University of Bergen.

NORA has also taken steps to actively engage with and coordinate meetings among Norwegian centres for research-based Innovation (SFIs) that involve NORA consortium partners, such as Visual Intelligence (UiT), Big Insight (UiO) and Media Futures (UiB).

5.1

NORA.EU – EU Network for AI

CEO of Digital Norway, Liv Dingsør and CEO of NORA, Klas Pettersen

> “NORA.EU is facilitating more and better applications for Horizon Europe from Norwegian researchers and is promoting Norway’s interests in a field in rapid development.”
>
> – Klas H. Pettersen, CEO of NORA

In 2022, NORA.EU organised three steering committee meetings to exchange important information within the network. In addition, NORA.EU organised two physical events with the Oslo Cancer Cluster and the Research Council of Norway specifically to target calls within healthcare and cancer research. The first event was organised as a hybrid event alongside the NORA Annual Conference which took place in June, and the second event was organised in November in collaboration with the Oslo Cancer Cluster. In May, NORA travelled to Brussels to attend an event organised by the Research Council of Norway where NORA was introduced to the participating stakeholders. While in Brussel, NORA organised an event with the Norwegian Artificial Intelligence Network for Europe (NAINE). The event discussed how the Norwegian AI community and stakeholders could better mobilise to participate in EU calls for AI and Robotics.

5.2

Nordic Machine Intelligence Journal

NMI was established in 2021 and is a Diamond Open Access Journal, which means it is a non-commercial, open-access, peer-reviewed journal with no publication fee. In 2022, the Nordic Machine Intelligence Journal (NMI) was promoted to a Level 1 Journal. The categorisation allows research institutions to be rewarded for publishing in the journal. The promotion is an excellent achievement and a testimony to the credibility that the NMI journal has achieved among AI and ML researchers in a relatively short period of time.

The aim of the NMI journal is to provide a high-quality journal with complete, accurate, and concise research papers of international and Nordic interest. The journal publishes original research articles, literature reviews, conference proceedings related to both Norwegian and Nordic conferences, articles related to the NMI Challenge, statements and other educational material in all aspects of artificial intelligence. The goal is to position the NMI journal on the second level Norwegian Scientific Index bibliographic database.

In 2022, the journal had (Vol.2) three editions. Two of them collected articles from dataset competitions, namely FishAI and MapAI. NMI is a collaborative project with Anne Håkansson (UiT) as NMI’s Editor in Chief. Morten Goodwin (UiA), Klas Pettersen (NORA) and Michael Riegler (Simula-Met) are the journal’s Associate Editors. Bjørn-Jostein Singstad from Akershus University Hospital is the journal’s General Manager.

> “2022 was a very successful year. Not only was the NMI journal accepted as a Level 1 journal in the Norwegian publication system, which allows Norwegian education institutions to be rewarded for publishing in the journal, we have also published high quality conference papers and articles related to the NMI Challenge in the journal. We are looking forward to an even more productive 2023 and we would like to invite all researchers to publish their work in our NMI journal.”
>
> – NMI’s Editor in chief Anne Håkansson

Anne Håkansson

FishAI Competition Team Poseidon.
The team: Jonas Dammen, Ludvig Løddesøl, Kristian Andersen Hole, Åsmund Brekke, Tomas Roaldsnes, Julia Ortheden.

NORA Competitions

In 2022, NORA launched two dataset competitions together with consortium partners, namely the FishAI competition and the MapAI competition. The FishAI Sustainable Commercial Fishing Competition was a competition hosted in collaboration with Simula, UiT – The Arctic University of Norway, Vekstlandet, Agenda Vestlandet, the Norwegian Cognitive Center and NORA. The competition invited teams from all over the world to take a deep dive into publicly available data collected from the fishing industry and transform them into a powerful decision-making tool for the captains in charge of the 1100 vessels operating across the Norwegian fishing zone.

The team behind the FishAI competition recommended an exploratory approach when solving the set tasks and encouraged innovation when developing solutions. All participating teams were asked to submit a 2–page paper describing methods and results. The competition saw great interest and over 30 teams from all over the world registered to compete for the winning prize. The winners of the FishAI dataset competition were announced at the NordicAIMeet on the 14th of November 2022. We congratulate Team Poseidon for winning the competition and Team Fishmaze for taking second prize!

The MapAI: Precision in Building Segmentation was a competition hosted in collaboration with the Centre for Artificial Intelligence Research at the University of Agder (CAIR), the Norwegian Mapping Authority, AI:Hub, Norkart, The Danish Agency for Data Supply and Infrastructure and NORA. The competition proposed two different tasks to segment buildings, where the first task utilised aerial images, and the second used laser data (LiDAR) with or without aerial images. The winners of the MapAI competition were announced during the Northern Lights Deep Learning Conference January 2023.

FishAI Competition Announcement of Winners at the Nordic AI Meet 2022.

Michael Riegler (Simula), Organiser and driving force behind the dataset competitions.

Keynote Ulrich Paquet, Researcher, DeepMind, Annual Conference 2022.

5.3

Research Conferences

NORA Annual Conference

On the 9th and 10th of June 2022, NORA held its second Annual Conference, this time at the Radisson Blu Hotel in Stavanger. More than 100 researchers from Norway gathered at one of Norway's most important meeting venues for the AI community.

The conference aims to bring together the Norwegian AI research community and create a platform where invited speakers and participants can share research, ideas, theories, models, and new perspectives and interact with peers in the field.

Knowledge sharing and interaction was the focus of the conference, fostering a strong community of researchers and practitioners while bridging the gap between researchers, startups and public and private actors. The conference consisted of speciality tracks for oral presentations, poster sessions, panel discussions, startup presentations, and keynote speeches from prominent researchers such as Ulrich Paquet, Research Scientist at DeepMind, Uli Sattler, Professor in the Information Management Group within the Department of Computer Science at the University of Manchester and Evandro Fei Fang, Associate Professor, Department of Clinical Molecular Biology from the University of Oslo.

The conference was open to all researchers from NORA consortium partners and strategic partners, as well as representatives from non-partner organisations, industry, and the public sector. The conference dinner was hosted at the beautiful island of Flor and Fjære, where participants were given a guided tour of the island before dinner.

NORA will continue to organise the annual conference, rotating between partner locations in Norway. Next year, the third edition of the NORA Annual Conference will be held in Tromsø on the 5th and 6th of June at Scandic Ishavshotell.


Srishti Gautam and Klas Pettersen.

Best poster
NORA Annual Conference 2022

Demonstrating The Risk of Imbalanced Datasets in Chest X-Ray Image-Based Diagnostics by Prototypical Relevance Propagation by Srishti Gautam, Marina M.-C. Hohne, Stine Hansen, Robert Jenssen, Michael Kampffmeyer.


Patrik Hammersborg, Andreas von Brandis and Inga Strümke.

Best oral presentation
NORA Annual Conference 2022

Comparing explanations from DNN-generated wine score predictions with expert opinions by Andreas von Brandis, Henrik R. Baumann, Aksel K. Borgmo, Eirik R. Solligård, Patrik Hammersborg and Inga Strümke.


Maximillian Reimer, Data Scientist, Factiverse, presents at the Annual Conference 2022.

NORA Annual Conference Startup Segment

During the NORA.startup segment of the conference, all members were invited to have a stand and to present their startup including the idea that inspired the startup, the specific service/product they offer, the team behind the startup and how research-based innovation has played a part in building the startup, and the benefits of research-based collaboration. Aiveo, Factiverse and Nablaflow all pitched technical aspects of their services and solutions, giving researchers insight and inspiration as to how AI can be applied to solve real life problems.

Morten Irgens and Klas Pettersen opens the Nordic AI meet 2022.

Nordic AI Meet

The Nordic AI Meet took place on November 14–15th, 2022, at the Clarion Hotel Oslo. The conference was hosted in collaboration with CLAIRE and the Research Council of Norway and was attended by more than 130 early career researchers. The conference's primary purpose is to provide a platform for AI researchers in their early careers to exchange ideas, build collaborative relationships and form a Nordic approach to building AI solutions for the societal good.

AI has received much attention from the Nordic countries. However, education and research in AI and AI-related areas need to be further strengthened. Increasing knowledge, building networks and exchanging experiences will be crucial in determining how to approach the development and use of AI. The Nordic AI Meet was conceived with these challenges in mind. The conference offered speciality tracks for oral presentations, industry presentations, academic posters, and a panel debate, combined with the opportunity to interact and socialise with other researchers. Keynote speeches were given by prominent professors and researchers, such as Anders C. Hansen, University of Cambridge, Professor Amy Loutfi, Örebro University and Professor Nitin Sawhney, Aalto University.

NORA believes that researchers, especially those in their early careers, should have a platform where they can present, discuss, promote their research, and build future collaborative relationships. Therefore, a set of short oral presentations from selected PhD students/Postdocs were an integral part of the programme. Each PhD/young researcher received 15 minutes to present their PhD project/current research. The winning oral presentation was given by *Maxim Khomiakov, DTU - Learning to Generate 3D Representations of Building Using Single-View Aerial Imagery.* Several young researchers also participated with posters illustrating their ideas. The posters stimulated discussion and exchange of ideas during the breaks. The winning poster was developed by *Andrea Storås, Inga Strümke, Michael Riegler and Pål Halvorsen - Explainable Artificial Intelligence in Medicine.*

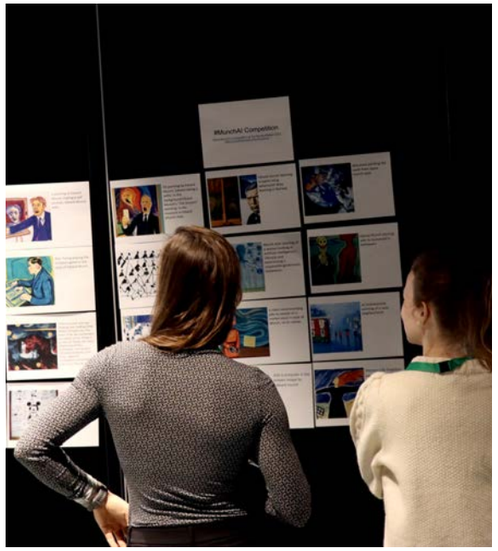
In 2022, the Nordic AI Meet also hosted a Munch AI Generative Art Competition. New image generation tools such as DALL.E, Stable Diffusion and Midjourney have become more commonplace as well as open. The competition encouraged participants at the Nordic AI Meet to use tools with both a critical and creative mind to create images inspired by Munch. The winner of the competition was Aurora Grefsrud, HVL, for the text prompt, *"A female scientist sitting inside the ATLAS detector watching particles collide in bursts of colour, painted in the style of Edvard Munch"*.

The conference revealed a necessity for more communication and exchange between the Nordic countries. The Nordics have a long tradition of trustworthy cooperation and collaboration, which should be the fundamental values in future efforts to build responsible and trustworthy AI solutions.

In 2023, the Nordic AI Meet conference will be hosted in Denmark in collaboration with the Pioneer Center, CLAIRE, the Research Council of Norway and NORA.

Anders Hansen, University of Cambridge, presents at the Nordic AI Meet 2022.

Munch AI Competition.



Best poster
Nordic AI Meet 2022

Andrea Storås, Inga Strümke, Michael Riegler and Pål Halvorsen
Explainable Artificial Intelligence in Medicine

Best Oral Presentation
Nordic AI Meet 2022

Maxim Khomiakov
Learning to Generate 3D Representations of Building Using Single-View Aerial Imagery

Winner of Munch AI Competition
Nordic AI Meet 2022

Aurora Grefsrud, HVL for the text prompt, *"A female scientist sitting inside the ATLAS detector watching particles collide in bursts of colour, painted in the style of Edvard Munch"*

5.4

Selected Research Proposals

Inger Nordgard and Bente Bakos, the Norwegian Research Council

CLAIRE presentation

NORA supported many successful research proposals in 2022. Amongst these proposals, the NORA secretariat will receive funding as a contributing partner for Norwegian AI Cloud (NAIC), ENACT and Nemonoor. Nemonoor will be described in Chapter 7.

Norwegian AI Cloud

As AI progresses rapidly, so does the need for better computing infrastructure and greater competence. Access to academic High-Performance Computing (HPC) infrastructure is crucial for the AI research community, mainly because it enables researchers to run large and complex mathematical simulations that would otherwise be impossible with simple personal computers. Ultimately, the goal is to produce new scientific discoveries that will benefit society.

In 2022, many research institutions in Norway, namely USIT at UiO, Sintef, UiB, NTNU, UiT, Uninet Sigma2, UiA, Simula, NORCE and NORA, with the support of the Research Council of Norway initiated the Norwegian AI Cloud project to create smart e-infrastructure enabling Norwegian universities, research institutions, and businesses to perform data-driven AI research and innovation. This infrastructure will allow the Norwegian AI research community to conduct research more efficiently and effectively, eventually leading to significant advances in AI technology. Finally, this project will help position Norway as one of the leading countries in the field of AI and allow Norwegian researchers to stay at the forefront of this rapidly evolving technology.

ENACT (Ethical risks assessmeNt of Artificial intelligenCe in pracTice)

In 2022, NORA supported the successful bid of ENACT (Ethical risks assessmeNt of Artificial intelligenCe in pracTice) that received NOK 12 million from the Norwegian Research Council. The project group includes SINTEF Digital (owner), Østfold University College, University of Oslo and University of Agder. In addition, it is supported by the NTNU Norwegian Open AI Lab as well University College London and Imperial College London. The innovation network Cluster for Applied AI (Smart Innovation Norway) is also a collaborator in the project together with NORDE. The project also includes stakeholders from the public and private sector, namely NAV, Posten AS, DNB, Medsensio and Hypatia Learning. Both Hypatia Learning and Medsensio are members of NORA.startup.

ENACT aims to design, develop, evaluate, revise, and establish a methodology as a tool for efficiently translating and integrating ethical principles/guidelines in AI-based systems for mitigating ethical risks when implementing such systems. To achieve this, ENACT will exploit a novel, multidisciplinary and participatory approach for digital ethics training at all levels, setting the foundation for a new cross-functional AI-governance structure that relies on professional accountability mechanisms and ethical AI literacy of all stakeholders in the organisations. ENACT will run from July 2023 to December 2025.

6

Education

Currently, the Norwegian higher education system offers AI-related courses at most universities and university colleges. However, the courses are fragmented and not easily available to a larger number of students and early-stage researchers, and some subtopics of AI are not covered at all in Norway's higher educational system. There is not enough available funding in the educational system to set up courses to cover all AI-related topics. As a result, there are inconsistencies between Norway's ambitions in the field of AI and relevant education to support national goals. Therefore, NORA aims to enable access to courses amongst universities whereas students at one university can access courses at other universities and ensure that courses are available on a national level.

To support this aim, NORA has created an overview on the Norwegian AI Directory of available courses in the field of AI at all NORA consortium partners (read more about the Norwegian AI Directory in Chapter 10). NORA has also made considerable progress with the NORA Norwegian AI Research School.

6.1 NORA Norwegian AI Research School

The NORA Norwegian AI Research School was established to provide access to specialised education in AI and intersecting fields to ensure broad coverage of the field. A strategic objective of the research school is to increase the overall level of AI education offered in Norway.

A national research school for AI is an important and effective tool for sharing national resources that exist in AI in terms of research and education. By interlinking parts of the PhD programmes, Norwegian universities will be able to provide a significantly better education than they can provide separately, while at the same time contributing to the development of a nationwide educational ecosystem for AI talent.

NORA started the work of establishing a research school for AI as early as 2020, and the first PhD symposium was held in February 2020. In 2021, the Research Council of Norway (RCN) announced a call for "Research School for Quality and Relevance". As one of twelve successful applicants, NORA received funding to

67%

67 % women in the board

2M

2 million NOK in funding per year from The Research Council of Norway

establish a NORA Norwegian AI Research School from 2022. The grant provides funding to the school for a duration of 8 years (2022 – 2029). Since the grant announcement, NORA has successfully executed many of the activities outlined in the NORA Norwegian AI Research School annual calendar.

The NORA Norwegian AI Research School has already achieved high visibility in Norway, thanks to its consortium and strategic partners. In 2022, the research school had 171 PhD students enrolled, making great progress towards reaching the desired goal of 200 members as outlined in the research school application.

The NORA Norwegian AI Research School will focus on providing education that is relevant for the Norwegian labour market and will have a broad focus, covering both fundamental and applied AI. The primary objective of the research school is to raise the quality of the PhD education offered within the field of AI in Norway to a leading European level, with a high degree of relevance for the labour market.

The secondary objectives are:

1. Enhancing and filling gaps in the PhD education by commissioning new PhD courses and upgrading existing courses for wider participation.
2. Creating added value for the Norwegian AI community by connecting the research school to the NORA research and innovation ecosystems.
3. Bringing the stakeholders (industry, public sector, and others) together through industry days, workshops, internships, startup activities and innovation projects.
4. Empowering students by giving them responsibilities to organise technical tutorials and include them in the programme agenda of top-quality scientific events.
5. Facilitating student access to national high-performance computing infrastructure.
6. Enhancing international collaboration and increasing the attractiveness of Norway as a destination for AI talent.

The organisation of the research school includes a research school board and several councils. Gender equality is a primary objective in NORA, and we are proud of the fact that the research school board and all advisory councils are led by women. The board chair is Cathrine Phil Lyngstad, director of Data and AI at NAV. Marija Slavkovic (UiB) leads NORA's Education Council, Mari Serine Kanneløn-ning (OsloMet) leads the PhD Student Council and Signe Riemer Sørensen (SINTEF) leads the Innovation Council. Of the nine persons on the board, six are women (67%).

The project manager of the research school is Professor Arnoldo Frigessi (UiO), and the project administrator is the CEO of NORA, Klas Pettersen, who in turn is supported by the NORA secretariat, especially Sachin Gaur. The available funding for the research school is NOK 2 million per year, starting in 2022. In addition, NORA consortium partners will further contribute NOK 1 million annually.

Research school goals:

200

200 PhD students by the end of the project period

25%

25% industrial and public sector PhDs by 2029

1M+

More than 1 million NOK annually from NORA's partners

171

Has 171 research school members

The research school board consists of NORA consortium partners, Norwegian companies and the public sector. The board chair is Cathrine Pihl Lyngstad, who heads Data Science and AI at the Norwegian Labour and Welfare Administration (NAV). Other board members are Robert Jensen (UiT), also head of SFI Visual Intelligence; Marija Slavkovik (UiB), a driving force of AI education at UiB, Liv Dingsør, CEO of Digital Norway, one of the key industryfocused AI bodies in Norway, who contributes with her strong industry insights and perspectives; Kjersti Engan (UiS) and Nils-Olav Skeie (USN) who bring strong experience from AI research and education; Hans Ekkehard Plesser (NMBU) who was the past board chair of the RCN supported Norwegian Research School in Neuroscience and therefore has solid experience in running and managing a research school; Signe Riemer-Sørensen (SINTEF) who enables important industry links with her experience and connections to a large number of industry facing projects within AI; and Mari Serine Kannelønning (OsloMet), the leader the PhD student Council. Riemer-Sørensen, Slavkovik and Kannelønning will lead, respectively, the Education, Innovation and PhD Student Council.

The Education Council expands on an existing framework within NORA. The council provides advice on education and has been pivotal in the RCN application for the research school. The education committee acts as the scientific resource pool for advising on topics for new PhD courses to be initiated, provide technical input for the scientific programmes and evaluate student applications that may be relevant for the activities of the research school described above, such as a student exchange with our international collaborators.

The Innovation Council is a new council at NORA that will collaborate with the NORA Industry Network (read more about the Industry Network in Chapter 7). It will serve as a council for industry and public actors. NORA's research institutes SINTEF, NORCE, Simula and Vestlandsforskning together with the SFI Visual Intelligence, SFI Big Insight, and SFI Media Futures will be essential in bridging the NORA consortium partners with industry. Several industry clusters will be represented on the council, among them Norway's three industry clusters for AI namely Smart Innovation Norway, Oslo Cancer Cluster and the Norwegian Cognitive Center. Selected companies and public organisations will also have representatives.

The PhD Student Council is a council newly formed by NORA, composed of PhD students from various NORA consortium partners. NORA considers young researchers at NORA's consortium partners an important target group for our activities. Until the establishment of the research school, NORA did not have a formal structure to collect the input of young researchers in shaping NORA's activities. Hence, NORA reached out to the PhD Students who previously participated in NORA Research School programme in 2020 and invited them to join a student advisory committee. Mari Kannelønning from Oslomet was appointed as the leader of the student committee for the 2021–2022 period. Mari has been very active in the committee, sharing input on behalf of the student committee for future work.

The International Advisory Council will connect NORA to prominent international European AI networks and provide valuable input and insight based on their experience with their respective research schools and doctoral programmes. Members of the International Advisory Council will include representatives from WASP (Sweden), HIDA (Germany), the Alan Turing Institute (UK), FCAI (Finland), Pioneer Centre for Artificial Intelligence (Denmark) and CLAIRE (Europe).

Alise Midtfjord, PhD Fellow, UiO, gave a talk on "Presenting your AI Research. Tips & Tricks".

Research School Structure

Overview of the NORA Norwegian AI Research School Structure

Strategic partners

Centre for Digital Life Norway
Uninett Sigma 2

NORA Research School Board
Chair: Cathrine Phil Lyngstad (NAV)

Project Manager
Arnoldo Frigessi (UiO)

International Advisory Council

The Alan Turing Institute
Helmholtz Association
CLAIRE

NORA Secretariat (Executive body)
CEO: Klas Pettersen (NORA)

PhD Student Council
Leader: Mari Serine Kannelønning (OsloMet)

Innovation Council
Leader: Signe Riemer-Sørensen (SINTEF)

Education Council
Leader: Marija Slavkovik (UiB)

Partners

Universities / University colleges

Universities / University colleges

University of Stavanger, University of Oslo, Norwegian University of Life Sciences, NORCE Norwegian Research Centre AS, University of Agder, Simula Research Laboratory AS, SINTEF, UiT The Arctic University of Norway, University of Bergen, Kristiania University College, Østfold University College, University of South-Eastern Norway, BI Norwegian Business School, Oslo Metropolitan University

Research institutes / SFIs

Research institutes / SFIs

Visual Intelligence, BigInsight, Simula Research Laboratory AS, Media Futures, NORCE Norwegian Research Centre AS, SINTEF, Western Norway Research Insitute

Industry / Public Sector

Industry / Public Sector

Norway Health Tech, Norwegian Cognitive Center, Oslo Cancer Cluster, Digital Norway, Oslo University Hospital, Cluster for Applied AI, NAV, Norges Bank Investment Management, Telenor, DNB, Skanska, Graphcore, NORA.startup, NORA strategic partners

Research School Conference

NORA Norwegian AI Research School Annual Conference

On the 16th of November 2022, the research school organised the first annual research school conference at the Kristiania University College campus. The programme included contributions from PhD students, Norwegian companies and startups and four student-led parallel workshops. The participating students were clustered in six special interest groups covering various topics such as computer vision, language models, machine learning, scientific deep learning, ethics and SDGs, and reinforcement learning. 50 PhD students from all over Norway participated in the conference.

Research Exchange Programs

In 2022, NORA launched an exchange program with the Alan Turing Institute and Helmholtz Information & Data Science Academy (HIDA). Three selected candidates will travel to London to attend the enrichment programme at the Alan Turing Institute in January 2023 for six months. The three selected students for the Alan Turing Institute Enrichment Programs are Davor Dundovic, Doctoral Research Fellow, Section of Physical Geography and Hydrology, UiO, Mariyam Khan, Doctoral Research Fellow, Department of Informatics, UiB and Roxanna Pop, Doctoral Research Fellow, Center for Scalable Data Access, UiO. A new call for open applications for the exchange programme will be announced in January 2023.

As part of the exchange agreement with HIDA, the NORA consortium partners will also host four students from Germany. Three of the students, namely Sebastian Guido Bieringer, Melissa Lober and Mariel Dirscherl have already completed their exchange, while Felix and Tobias will start their exchange in 2023.

The selected candidates for the HIDA exchange from Germany and their host researchers in Norway are:

PhD Students

Felix Simon Reimers
Doctoral Research FellowAlfred Wegener Institute, Helmholtz Centre for Polar and Marine Research

Tobias Ziolkowski
Doctoral Research Fellow, GEOMAR Helmholtz Centre for Ocean Research Kiel

Sebastian Guido Bieringer
Doctoral Research Fellow, Hamburg University

Melissa Lober
Doctoral Research Fellow, Forschungs-zentrum Juelich, Germany

Mariel Dirscherl
Doctoral Research Fellow, DLR, the German Aerospace Center

Host Supervisors

Stefano Nichele
Professor, Østfold University College (Halden), Norway

Tom Michoel
Professor, Institutt for informatikk, University of Bergen

Arnoldo Frigessi
Professor, University of Oslo

Susanne Kunkel
Researcher and Hans Ekkehard Plesser, Professor, NMBU

Robert Jenssen
Professor / Centre Leader Visual Intelligence, UiT – The Arctic University of Norway

The research school has also agreed to send Norwegian students to Germany. **Below is the list of selected students from Norway along with their German hosts.**

PhD Students

Kenneth Langedal
Doctoral Research Fellow, University of Bergen

Leonardo Rydin
Gorjão, Postdoc, Oslomet

Pedro Rego Lencastre e Silva
Doctoral Research Fellow, Oslomet

Johan Manuel de Aguas Pérez
Doctoral Research Fellow, University of Oslo

Host Supervisors

Prof. Dr. rer. nat. Peter Sanders
Department of Informatics, Karlsruhe Institute of Technology

Dr. Benjamin Schäfer
Institute for Automation and Applied Informatics (IAI), Karlsruhe Institute of Technology (KIT)

Dr. Christoph Räth
German Aerospace Center (DLR) Faculty of Physics, LMU, Munich

Prof. Dr. Martin Frank Steinbuch
Centre for Computing, Karlsruhe Institute of Technology

In 2022, the board and councils started planning the first winter school, which will be hosted from the 9–13th of January 2023 in Tromsø in partnership with the Northern Lights Deep Learning conference (NLDL). The research school will sponsor the participation of up to 30 PhD students to attend the winter school. The winter school will include technical tutorials in addition to special events focused on diversity in AI and industry and AI.

Furthermore, in 2022 the research school published a call for courses for the summer school. The board received 10 quality proposals for courses from the NORA consortium partners. Four proposals were selected for the summer school and will be organised as intensive courses. The research school will host its first summer school in partnership with the NORA Annual conference and the National Conference on Image Processing and Machine Learning 2023 (NOBIM) from the 12–16th of June 2023.

Melissa Lober
Exchange Stay

Melissa Lober, Doctoral Research Fellow, Forschungszentrum Juelich, Germany spent three months at REALTEK at NMBU under the supervision of Susanne Kunkel, Researcher and Hans Ekkehard Plesser, Professor, NMBU. During her stay, she worked to further develop the simulation software NEST, so that it can create more resource-efficient brain simulations.

Source: https://www.nmbu.no/fakultet/realtek/om/aktuelt/node/45729

6.2

PRESIMAL Autumn Research School

On the 14–16th of September 2022, NORA partnered with PRESIMAL to organise an autumn research school for PhD students working with AI in healthcare. PRESIMAL brings together several of Norway's leading research environments in precision imaging and machine learning.

PRESIMAL is managed and coordinated by the Mohn Medical Imaging and Visualization Center (MMIV). More than 30 PhD students from different regions of Norway and the Nordic countries participated and deliberated on AI in healthcare, especially the challenges of deployment.

Autumn Research School Presimal 2022

Image created by Aurora Grefsrud, HVL, using the text prompt, "A female scientist sitting inside the ATLAS detector watching particles collide in bursts of colour, painted in the style of Edvard Munch".

7

Innovation

NORA aims to establish itself as a leading network facilitating collaboration among consortium partners, start-ups, Norwegian companies, and public actors in Norway. To achieve this goal, NORA has developed and launched various initiatives aimed at supporting and strengthening innovation within the field of AI in Norway, namely NORA.startup, the NORA industry network and the NORA Norwegian AI Research School. The Research School focuses on delivering quality education relevant for the Norwegian labour market. In addition, NORA has played a central role in acquiring funding for and establishing new initiatives aimed at supporting both public and private sector, namely the European Digital Innovation Hub, Nemonoor, the Norwegian AI Cloud (NAIC) and ENACT (Ethical risk assessment of Artificial Intelligence in Practice).

Throughout 2022, NORA has focused on creating meeting places between the consortium partners, public actors, startups and business, such as the NORA Annual Conference 2022, the Nordic AI Meet 2022, NLDL Industry Day, NORA.startup events, while also supporting other important events such as the AIM North conference in Oslo, the AI+ conference in Halden and the Northern Lights Deep Learning Conference in Tromsø. Through NORA.startup, NORA has taken an active part in supporting startup companies in the field of AI, while establishing forums for collaboration and research.

7.1 NORA.startup

NORA.startup was created with the aim of building a national network for research-based innovation. Since its inception in September 2020,

NORA.startup | Key figures

40+

NORA.startup consists of 40+ companies

50+

NORA.startup consists of 50+ researchers and students

NORA.startup has been an active supporter of startups who wish to connect with the research community across Norway and has since become known as NORA's innovation platform.

In 2022, the community grew its membership and advanced national activities across partner institutions. Currently, NORA.startup consists of more than 40 startup companies and 50 researchers. The network is continuously growing and has become recognised as a national network for AI startups.

NORA.startup focuses on creating an arena for research-based innovation, where members can exchange experience, knowledge and disseminate results from innovation projects. Through networking events, conferences and workshops spread across the country, NORA.startup aims to facilitate and strengthen collaboration mainly between startup companies and academic institutions, while also facilitating connections to industry, public actors and relevant stakeholders through other initiatives within the NORA consortium, such as the NORA Norwegian AI Research School and the NORA Industry Network.

> Currently, NORA.startup consists of more than 40+ startup companies and 50+ researchers.

The network facilitates opportunities for research collaboration in the field of AI, machine learning and robotics, and supports startups and aspiring entrepreneurial researchers by helping them navigate and connect to relevant actors in the Norwegian AI Innovation ecosystem.

In 2022, NORA.startup hosted numerous activities for members including themed hybrid events and workshops, in person meet and greets, match-making sessions, events exploring funding opportunities and other networking events. Activities included an event exploring funding opportunities from the Research Council of Norway, such as the Innovation project in the Industrial Sector, events exploring how to launch an AI startup as an AI researcher and two events exploring the process of how to commercialise research. Two members of NORA.startup were awarded funding for their applications to the Innovation Project in the Industrial Sector scheme in 2022, namely Factiverse and Soundsensing. Of members in NORA.startup, a total of 5 companies have received IPN funding since 2020, including Mobai, Solgt.no, Voca AS, Factiverse and Soundsensing. In 2022, Digifarm, a longstanding member of NORA.startup, was granted funding from the European Council Innovation (EIC) Accelerator scheme. Digifarm received NOK 60 million in funding from the EIC Accelerator for further expansion and development.

During the NORA Annual Conference 2022 in Stavanger, NORA.startup hosted an important session where members

1. NORA.startup event in Oslo, Panel Discussion "Innovation Project in the Industrial Sector" with Paul Torkil Fjuk, Senior Advisor, ICT and Digitalisation, Norwegian Research Council, Erlend Øverby, Founder, Hypatia Learning, Ulf Jakob Aarsnes, Head of Research and Development, Solgt.no, Bjarte M. Østvold, Chief Research Scientist, Norwegian Computing Center, Signe Riemer-Sørensen, Research Manager, SINTEF and Morten Goodwin - Professor, University in Agder (Moderator). | 2. NORA.startup event in Tromsø "Founding an AI Startup as an AI Researcher" | 3. NORA.startup event in Tromsø, Presentation by Rahmi Lale, Co-founder and CEO, Syngens | 4. NORA.startup event in Tromsø, Panel discussion. Freyja Jørgensen, Grundergarasjen, Jon Marius Aareskjold-Drecker, CEO - Unifractal AS, Lars Ailo Bongo, Co-founder Medsensio and Professor in Computer Science at UiT and Rahmi Lale, Co-founder and CEO, Syngens | 5. NORA.startup event in Kristiansand, Commercialisation of AI in the European marked, Patrick Penninckx, Head of the Information Society Department at the Council of Europe | 6. NORA.startup event in Kristiansand, Panel Discussion. Morten Goodwin, Jeanette Tharaldsen, Aiveo, Kristoffer Liland, UiA Nyskapning, Karianne Ormseth, AI:Hub, Haavard Ostermann, Juss.ai

> “I’m proud to see how NORA.startup has become a nationally known and acknowledged network for research-based innovation, with over 40 startups and 50 students and researchers, all eager to learn from and challenge each other and help push the field forward. 2022 became the year we finally were able to meet and interact fully in person, and there is no doubt how important such meeting arenas across different but mutually talented environments are. I look forward to seeing the continuation of our work and would like to thank all of those who have contributed to NORA.startup’s successful growth and value so far”.
>
> – Freyja Jørgensen, Leader of the NORA.startup Steering Group

presented scientific contributions acquired through innovation projects or from developing their services and products. Members of NORA.startup were also invited to present at the Nordic AI Meet 2022 where Soundsensing and Findable presented interesting use cases of applied AI.

In 2021, NORA.startup became recognised by Innovation Norway as an important entrepreneurial ecosystem for innovation and AI. The recognition was an important milestone for NORA.startup, which acknowledged the work NORA has done for entrepreneurs who are driving the creation of startups in the field of AI.

NORA.startup is an innovation arena which facilitates networking and collaboration between existing actors in the Norwegian ecosystem, including universities, university colleges, research institutions, incubators, accelerators and startups. The network facilitates opportunities for collaboration in AI, machine learning and robotics, and supports startups or entrepreneurial researchers through a network of competence within the above-mentioned fields.

NORA.startup is governed by a steering group consisting of representatives selected by the NORA Board. The members of the steering group have a broad professional span such as academic researchers, founders, representatives of incubators and accelerators.

NORA.startup has become an arena for interaction and collaboration between NORA partners and startups, where NORA has taken an active part in supporting startup companies in the field of AI.

Steering group NORA.startup

Jørgen Veiby
Business Development Manager, Startuplab and the Leader of the Board

Anita Schjøll Brede
CEO and Co-founder of IRIS.ai

Lars Selsås
CEO and Founder of Boost.ai

Sondre Pedersen
Co-founder of Findable

Lars Ailo Bongo
Professor at UiT - The Arctic University of Norway

Morten Goodwin
Professor at the University of Agder

Annette Fargerhaug Stephansen
Research Director Digital Systems at NORCE

Freyja Jørgensen
Innovation Manager Grundergarasjen

Gro Herredsvela Rørvik
Senior Research Advisor, Fjong

Klas Pettersen
CEO of NORA

Birte Hansen
Innovation and Industry Coordinator, NORA

NORA.startup members

boost·ai · IRIS.AI · LEXPLORIA · JUSS.AI · NablaFlow · Skyfri · MAIGON · Holberg EEG · LOOK For equal oppertunities · mobai multimodal biometric authentication · NOVATECH · aims · propell · Bineric Data made easy · Smart Inspection · disputas · AREALIZE · DigiFarm · neddy · BERGEN ROBOTICS · Enernite · Findable · FUTURE READY · syngens · MEDSENSIO · HANCE · HYPATIA LEARNING · In-Virtualis CREATE YOUR EXTENDED REALITY · soundsensing · Solgt.no · Vitroscope WE BRING VIVO IN VITRO · VAKE · VOCA · Oivi · PULSR · AGAIN X · AIVEO · eventwood · FORESTSAT · FactiVerse · FJONG

Industry Event
Connecting Norwegian AI Research to Industry – Northern Lights Deep Learning Conference 2022

On January 10th, 2022 NORA hosted the first Industry Day as a special event for the Northern Lights Deep Learning Conference. The conference is organised by the SFI Visual Intelligence and is hosted by the UiT - The Arctic University of Norway. The event featured four keynote speakers from Kongsberg Satellite Services, Graphcore, SINTEF Digital and Equinor. The event concluded with a panel discussion addressing important subjects such as the value of industry to academic collaboration and how academic researchers can connect with industry to advance academic collaboration.

Bjørn Hoxmark, Finn.no, presenting at the NordicAIMeet 2022.

Jon Nordby, CTO Soundsensing presenting at the Nordic AI Meet 2022.

7.2 NORA Industry Network

The NORA Industry network was launched in January 2022, which was a central accomplishment for NORA. The NORA Industry network is a network for and of research-based innovation projects in the business and public sector. In 2022, NORA welcomed Ruter, Posten AS and Norsk Helsenett as strategic partners to the Industry Network. The partnership will contribute to strengthening Norwegian collaboration within artificial intelligence, machine learning and robotics between academia and the public sector.

The members of the NORA Industry Network benefit from the experience and competence present in the NORA consortium partners. Through the Industry Network, NORA will build strong platforms for knowledge and technology exchange, education and training and provide access to talent and student collaboration. Most importantly, the Industry Network will provide access to the top leading AI scientists, research labs and research institutes in Norway. The mission is to substantially increase AI based research, innovation, and uptake in Norway through open and shared knowledge and technology exchange.

The NORA Industry Network aims to facilitate and strengthen collaboration between industry, researchers, students, research institutions and public actors. One important method in strengthening collaboration between the mentioned actors is to create meeting places where knowledge exchange and dissemination can take place and where industry and public actors can be introduced to relevant research projects and research communities.

NORA has created and launched many initiatives and arenas for interaction amongst consortium partners, business, public sector, startups and students, such as the NORA Annual Conference, the NORA Norwegian AI Research School, the Nordic AI Meet and the Industry Day. For example, the industry segment is an important session topic at the Nordic AI Meet where private and public actors are invited to present projects where AI is used to produce innovative products and services. At the Nordic AI Meet 2022, the industry segment saw scientific presentations about AI in practice from Chronos.ai, NORCE, Soundsensing, Findable and Finn.no.

Jawad Saleemi, Ruter AS, presenting at the Research School Annual Conference 2022.

NORA Norwegian AI Research School

The NORA Industry Network also collaborates closely with the NORA Norwegian AI Research School. One of the aims of the research school is to collaborate with industry, the public sector and startup companies. Through the research school, industry will have the opportunity to provide input on the development of courses in AI, by contributing with their perspectives on current educational gaps that need to be addressed to meet future demands. The NORA Industry Network actively contributed with planning the first Research School Annual Conference, which took place in November 2022. Ruter AS, Vake.ai and Earth Science Analytics delivered keynote speeches and talks during the conference.

7.3 European Digital Innovation Hub (EDIH)

In 2022, the EU Commission announced that they will financially support two European Digital Innovation Hubs (EDIH) in Norway, namely Nemonoor and Oceanopolis. The EDIHs are one-stop shops supporting companies and the public sector to apply AI and become more competitive. NORA is one of eight core partners in the EDIH Nemonoor. NORA is also part of the EDIH Oceanopolis, led by NORCE. The two EDIHs will have a close collaboration through NORA and the NORA consortium partners. The EDIHs are seven-year projects, operational from the beginning of 2023, with funding from the Digital Europe programme.

Nemonoor is led by Digital Norway (Toppindistrisenteret), with Smart Innovation Norway, the Institute for Energy Technology (IFE), Norway Health Tech, NTNU, SINTEF, and ÅKP and NORA as partners. Nemonoor started on the 1st of November 2022 and aims to help private and public companies in Norway to gain access to knowledge about applied AI based on many years of research, development, and innovation. The goal of Nemonoor is to offer a comprehensive set of services supporting AI adoption for startups, public entities and SMBs, supported by ethical guidelines and grounded in principles fostering sustainability. In particular, the consortium will contribute to SMEs and the public sector working within manufacturing, health, smart cities and communities, as well as the maritime industry, focusing on solutions based on prediction, machine vision, and language models. NORA, together with Norway Health Tech, will have a special focus in the health field. Within Nemonoor, NORA will lead Work package 8 “Sustainable and Trustworthy AI”.

During 2022, NORA met with the Norwegian Directorate of Health to discuss how Nemonoor can work over the coming years to assist with prequalification of companies interested in applying for the Norwegian Directorate of Health’s multi-agency advisory service on AI and other opportunities for collaboration with regard to ensuring trustworthy AI in health. NORA also contributed to the Artificial Intelligence in the Norwegian Health Services (KIN-network) through participating in their network meetings and including their projects in the overall AI mapping effort in the public sector with the Norwegian Digitalisation Agency.

Eirik Andreassen, Head of Nemonoor.

> “This is a prestigious assignment and a fantastic opportunity for Norwegian companies to increase their investment in artificial intelligence through access to both the best resources in the country and a close link to strong professional environments in the EU.”
>
> – Eirik Andreassen, Head of Nemonoor.

8

International Cooperation

International cooperation will be fundamental for bringing Norwegian AI research to the forefront and making NORA consortium partners' research internationally visible.

To strengthen international collaborations, NORA has entered into agreements with renowned institutes like the Alan Turing Institute in the United Kingdom and the Helmholtz Information & Data Science Academy (HIDA) in Germany. The agreements offer opportunities for research exchange with the Alan Turing Institute and HIDA for Norwegian researchers. In 2022, seven Norwegian researchers were selected for the exchange programmes.

In 2022, NORA hosted the second Nordic AI Meet conference in Oslo, with the support of the Research Council of Norway and CLAIRE. The Nordic AI Meet presents an excellent opportunity for NORA to collaborate with prominent Nordic partners in the field of AI. The programme and organising committees for the Nordic AI Meet include members from the top AI organisations from the region, such as:

- WASP, Sweden
- AI Sweden
- RI.se
- Pioneer Centre for Artificial Intelligence, Denmark
- Science AI Center, Denmark
- Finnish Center on Artificial Intelligence
- Icelandic Institute for Intelligent Machines

The active participation of committee members from these organisations and networks enables a strong Nordic collaboration and creates many opportunities to promote Norwegian research and increase visibility at the regional level. The Nordic AI Meet provides a platform for early career researchers from the Nordic region to disseminate research and presents an opportunity for research leaders to interact and inspire the community collectively. Next year, the Nordic AI Meet will take place in Copenhagen, hosted by the Pioneer Centre, further entrenching the conference as a Nordic event.

Furthermore, NORA is responsible for running the Norwegian CLAIRE office which again strengthens the pan-European link with a strong regional focus. The NORA secretariat interacts with other CLAIRE offices on a weekly basis to explore synergies and exchange notes on ongoing events, calls and activities. Through the NORA Norwegian AI Research School, NORA has in addition established strong links with both

Nordic AI Meet Group Photo.

Germany and the UK through exchange agreements between HIDA and the Alan Turing Institute.

8.1 CLAIRE

NORA started collaborating with the Confederation of Laboratories for AI Research in Europe (CLAIRE) in 2019. To support CLAIRE's efforts in Norway and Europe, NORA dedicates resources towards hosting activities and events in Norway both independently and in collaboration with the other CLAIRE offices. As the largest network for AI research, CLAIRE represents an important platform for crossborder collaboration and promotes Norwegian research in Europe.

NORA actively assists with planning and executing CLAIRE events in Norway such as the Nordic AI Meet. NORA also contributes to the CLAIRE Innovation Network which aims to strengthen the relationship between researchers, industry and startups in Europe.

In 2022, CLAIRE launched the Rising Researchers Network, which is a European community of master students, PhD fellows and postdoctoral researchers in the field of AI. The aim of the network is to connect students affiliated with AI research across Europe, facilitate mobility and exchange, organise events and provide a platform where early career researchers can influence the future of AI research in Europe.

In March 2022, NORA and the CLAIRE office in Norway contributed to the European AI Week, which was organised by AI4Belgium. The event lasted for a week and included numerous talks, workshops and discussions about the potential of AI in society. The CLAIRE office in Norway contributed with talks about AI and innovation, and how AI startups and research can and should collaborate.

8.2 Alan Turing Institute

In 2022, the NORA Norwegian AI Research School signed an Operational Alliance Memorandum agreement with the Alan Turing Institute. The agreement provides the opportunity for Norwegian PhD students to be hosted every year at the Alan Turing Institute under the enrichment programme. The agreement was signed by Klas Pettersen, CEO NORA and Allaine Cerwonka, Director of International and Associate Director, AI for Science & Government Programme (ASG).

The agreement was signed during a delegation visit to London organised by the British Embassy in Oslo and NORA. The AI delegation to the UK included several leaders of Norwegian research communities together with representatives from the Norwegian government involved in governance of AI. In addition to the Alan Turing Institute the delegation visited Digital Catapult, UCL, Imperial College London and Graphcore. The visit also included meetings with government representatives from the UK Office for AI, Centre for Data Ethics and Innovation as well as NHS. During the visit, the NHS shared draft ideas for the new AI strategy and the Center for Data Ethics and Innovation in the British Government and the UK Office of AI presented their work on transparency as well as coordinated efforts towards building an assurance ecosystem for artificial intelligence.

Since the visit, NORA has built a strong collaboration with the Alan Turing Institute. NORA and the Alan Turing Institute have introduced researchers from the UK to researchers from Norway and vice versa, and have strengthened initiatives for knowledge exchange. In May 2022, NORA hosted a visit by Allaine Cerwonka, Charlie Thomas and Erin Young from the

NORA organises the Nordic AI Meet Conference

NORA has signed an agreement with the Alan Turing Institute

NORA hosts the Oslo CLAIRE Office

Alan Turing Institute where projects and opportunities for collaboration were discussed. In 2022, the Alan Turing Institute and NORA agreed to plan and co-host a workshop on Trustworthy AI, which will take place at the British Library in London in December 2023.

In October, representatives from the National Institute for Health and Care Excellence (NICE) and Digital Catapult visited Oslo as part of NORA's growing collaboration with the United Kingdom. During the meeting the Norwegian Directorate of Health presented their multi-agency advisory service on AI. Allison Gardner from NICE presented her work with the NHS Multi-Agency Advisory Services and the new guide they were preparing to assist development of AI. Discussions about bilateral collaboration were held and it was agreed that the British Embassy in Oslo would help host a follow-up event in 2023.

Visit to the Alan Turing Institute.

8.3 The Helmholtz Information & Data Science Academy

HIDA – the Helmholtz Information & Data Science Academy – is Germany's largest postgraduate training network in the field of information and data science. HIDA is a hub for the exchange of knowledge and methods in the field of information & data science at the Helmholtz Association, Germany's largest research organisation. It serves as an umbrella organisation for six newly founded Helmholtz Information & Data Science Research Schools. They are linked by a network of 14 national research centres and 17 toptier universities across Germany. Over the next five years, these data science research schools will train over 280 fully funded doctoral researchers.

NORA has signed two agreements with HIDA, namely the "Friends of HIDA"

7

7 early-career researchers approved to go on student exchange to the UK and Germany in 2023

5

5 foreign early-career researchers approved for exchange program to Norway in 2022-2023

2

NORA signed two agreements with HIDA

agreement, which aims to cross promote opportunities of mutual interest in each other's network and an agreement to pilot student exchange programs. NORA has continuously shared news and information from HIDA about opportunities relevant to NORA researchers through the newsletter and through other channels.

In 2022, NORA published a call for applications for research exchange with HIDA, which garnered much interest. Four PhD students from Norway were selected for the research exchange. The students will start their exchange programme in 2023. For more details about the candidates, see Chapter 6.2.

NORA's collaboration with HIDA continued to grow and NORA participated in the office launch of HIDA in Berlin. HIDA presented their activities to the audience – first and foremost its six Helmholtz Information & Data Science Schools. In addition, NORA was invited to attend the Helmholtz Imaging conference. HIDA and NORA have also started planning a medical imaging workshop which will take place in 2023. The workshop will invite leading researchers from the DKFZ/Helmholtz Imaging platform.

8.4 US Department of Energy

NORA took part in shaping the document that became the Memorandum of Understanding between the US Department of Energy (DoE) and the Royal Ministry of Education and Research (KD) on the collaboration on AI. The agreement was signed in March 2022 and has resulted in joint activities assembling researchers and government administrators from both Norway and the US. The NORA secretariat has been a central contributor to the organisation of these activities and is a key coordinator, in collaboration with the Ministry of Education and Research, to achieve the goals stated in the agreement.

The MoU was written with the intention to enhance relations within the field of AI and increase research supporting the development of AI between the two nations. The MoU includes activities across a broad range of fields, with impacts on science, energy, climate, and health. The activities are outlined to include:

- information exchange in basic and applied AI research, effective study programmes and competence building through courses and further education programmes at all levels
- development of world-class computing power for AI research and applications, including advanced alternative AI accelerator technologies, quantum computing, neuromorphic computing and other emerging technologies
- the facilitation of data access for AI development in selected areas within and across industries and sectors through fast, robust, and state-of-the-art secure networks.

Presentation by the US Department of Energy.

To facilitate progress, partners will meet regularly, alternating between locations in the US and Norway. In June 2022, NORA and NORA researchers went to a bilateral meeting between DoE and KD at the Norwegian embassy in Washington DC. NORA was actively involved in organising the meeting. In October, KD invited a delegation from DoE for a visit to Oslo. NORA also actively participated in organising this meeting. The visit included sessions on infrastructure, capacity building, hybrid systems, ethics and law, pandemic/health/cancer, and climate/energy. The visit included a meeting in the bilateral government group to plan activities for 2023 and a session to set joint goals for the coming year. In addition, representatives engaged in discussions regarding emerging scientific collaborations and future directions in terms of funding structures that could support the broader effort among both countries.

Ketil Widerberg, Trym Holter and Klas Pettersen.

Norwegian Delegation visit to Washington DC.

9

Promote Ethical, Transparent and Inclusive AI

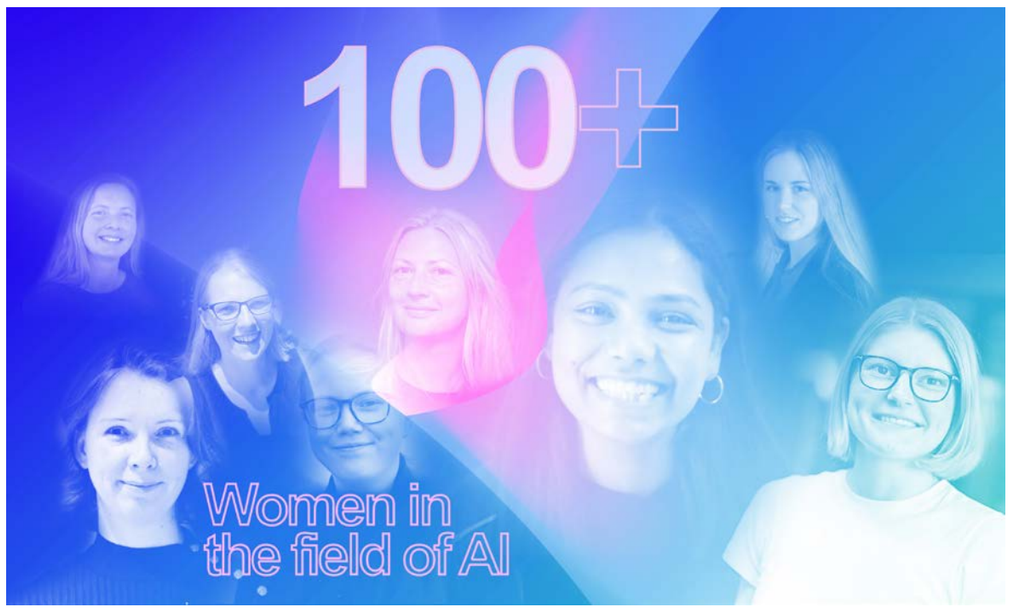
9.1 Ethics

NORA has a mission to promote ethical, transparent, and inclusive AI. To achieve the mission, NORA has worked extensively across ethics, policy and regulatory frameworks. During 2021–2022, the EU moved to develop a large and comprehensive regulatory framework on AI, namely the EU AI Act. The EU AI Act is likely to have considerable consequences for the implementation of AI across Europe.

In 2022, NORA made a coordinated effort together with the Ministry of Local Government and Regional Development to gather and assemble comments from consortium partners towards the EU AI Act. In addition, NORA focused efforts on disseminating information about the EU AI Act, including an article summarising the proposal by the EU and discussing the Act in a podcast organised by the Norwegian Council for Digital Ethics (NORDE). Furthermore, at the request of the British Embassy, NORA submitted comments on the development of AI regulations in the United Kingdom, specifically to the whitepaper *Establishing a pro-innovation approach to regulating AI.*

NORA has strengthened collaboration with important actors such as the Data Protection Authority and have kept open dialogues and hosted webinars with the Norwegian Sandbox for Responsible Artificial Intelligence where concerns regarding privacy and AI have been the focus.

NORA also participated in the AI Athens, *AI and the Rule of Law*, in Brussels at the European Parliament, where important actors and stakeholders met and discussed the development of AI. Klas Pettersen, CEO of NORA, has, together with several Norwegian researchers, contributed to Standard Norway's committee work in the Norwegian working group SN/K 586 on artificial intelligence. The work is led by Arne J Berre, Cheif Scientist in SINTEF.



100+ women in AI.

9.2 Transparency and Sustainability

NORA has consistently worked towards increasing transparency, accountability and sustainability in the field of AI. To ensure transparency in AI in Norway, NORA has pushed to make algorithms and AI models more accessible within research, education and innovation. For example, the AlphaFold and RosettaFold models for protein folding are now hosted on Norwegian digital infrastructure and made accessible to researchers as well as companies. In addition, NORA has encouraged transparency by sharing datasets and engaging a wide range of actors in dataset competitions leading to contributions to the open-access Nordic Machine Intelligence journal.

Norway currently needs a more coordinated approach to AI transparency in the Norwegian public sector on a project level. In 2022 NORA therefore started collaborating with the Norwegian Digitalisation Agency (DigDir). NORA has since mapped and developed a list of AI projects across the Norwegian public administration with the support from DigDir. The project aligns with the Norwegian national strategy on AI as public administration is one of several prioritised areas and the resulting project overview may be used to inspire more coordination for research, education, and innovation on AI in the Norwegian state with more targeted activities. To take one example, NORA has been in discussions with the Equality and Anti-Discrimination Ombud on how the overview in the public sector could contribute to more transparency and better coordination regarding equality and discrimination related to AI projects.

In 2022, NMBU launched their Green Data Lab. NORA supported the establishment of the Green Data Lab, and Klas Pettersen delivered an opening talk at the NMBU Green Data Lab kick-off seminar. Together with NMBU, the NORA secretariat has started planning the Green Data Lab Conference which will take place in 2023 and that will focus on sustainability and AI.

9.3 Equality and Diversity in AI

NORA aspires to increase diversity and the visibility of women in the field of AI. By encouraging diversity in AI, NORA aims to improve the position of marginalised groups and inspire a more inclusive agenda in the field of AI to ensure equality for future generations.

On the 8th of March 2022, NORA launched a new edition of the *Female Role Models changing the field AI in Norway* campaign, namely *NORA Women in AI 2022*. The goal of the campaign was to raise awareness by promoting female role models from all backgrounds and employment, and to portray the range of opportunities for AI in society at large. In

Cluster for Applied AI and Institute for Energy Technology
Women in AI initiative

NORA supports and participates in a new initiative launched in 2022 by Smart Innovation Norway and Cluster for Applied AI, namely Women in AI. The project aims to work towards developing a more inclusive and competitive business life and to strengthen conditions for the ethical development and application of artificial intelligence. The project will investigate how Norway can ensure the best conditions for working with inclusion and gender equality in AI. The project will survey the needs and barriers linked to the employment of women in AI in Norway, establishing an extended consortium, as well as looking at which instruments can be effective in supporting increased recruitment of women into AI-related activities. The goal is to pave the way for stronger companies, better innovations and technology with a broader appeal and adoption. Partners in the project include Cluster for Applied AI, Institute for Energy Technology and Inspiria Science Center.

Women in Tech Event British Embassy.

NORA pushes for gender balance in all initiatives

NORA promotes inclusivity and diversity

Identified 100+ women in AI in Norway

NORA is engaged in many diversity & gender in AI initiatives

honour of the International Women's Day, NORA published a new list of 100+ women working in the field of AI in Norway. The list includes short biographies, videos and quotes from the women featured. The relevance of the campaign has become abundantly clear as the list has been used as a reference tool by various organisations who wish to include more female experts in discussions and on panels, to ensure that gender and diversity is reflected in debates.

Through the Women in AI campaign, NORA has dedicated efforts towards supporting universities, university colleges, research institutions, startups, companies and individual researchers who wish to discuss and address the diversity and gender gap in AI education and in industry. By focusing on the topic and by providing a platform for open discussion, NORA aims to develop and support initiatives that can increase the inclusion of a more diverse workforce in AI. In January 2022, NORA hosted a special session on the topic of Women in AI at the Northern Lights Deep Learning Conference (NLDL). The Women in AI Event was organised as a side event to the NLDL, which is a conference organised by SFI Visual Intelligence, hosted by UiT - The Arctic University of Norway.

NORA is also a supporting partner in the British Embassy in Oslo's *Women in Tech initiative*. The initiative aims to create an inclusive platform for women in tech, be they students, researchers, founders, or practitioners. The platform will offer events and activities for women in tech, and will be a community for networking, advice, and support. The initiative hosted two events in 2022, namely the launch of the network hosted at the British Embassy, and an event hosted at the Microsoft Office focusing on Women in AI. Each event had keynote speeches from prominent researchers and practitioners, such as Erin Young, Research Fellow at the Alan Turing Institute, Allaine Cerwonka, Director of Turing International and Associate Director of the AI for Science & Government Programme, Mia Ryan, Head of Global Platforms, Lendo Group, Cecilia Nunn, Responsible AI manager @Connected Places Catapult, Allison Gardner, Founder of Women Leading in AI and Senior Scientific Adviser for AI for the Multi-Agency Advisory Service, NICE, Heidi Dahl, Senior Data Scientist Posten AS and Hoa Ngyen Le, Founder Dutycast.

In NORA, we are continuously pushing for diversity and gender balance in all our initiatives. We strive to have gender balance in our webinars, conferences, and panels and on our board and elected committees. Inclusivity and diversity in AI form a vital part of the vision and mission of NORA and of our consortium partners, and we will continue to promote these principles in our agenda going forward.

Women in Tech event Microsoft, Cecilia Nunn, Catapult, Allison Gardner, Founder of Women Leading in AI, Stine Saatvedt, Microsoft, Ane Birkeland, British Embassy Oslo, Katarina Halkinrud, Microsoft, Marit Wetterhus, Capassa, Birte Hansen, NORA.

Women in Tech Initiative

The Women in Tech initiative was created to build meaningful connections between like-minded women through digital and physical spaces, driving change for women in business and academia.

The aim? To provide an open and inclusive community which supports ambitious women in building skills, confidence, and networks, at every stage of their career, in a trusted community that shares ideas, challenges and celebrations.

This initiative was created by the British Embassy in Oslo in partnership with BI Business School, Capassa, Digital Norway, Microsoft Norway, NORA and the Oslo Business Region.

10

Mapping the Norwegian AI Landscape

Part of NORA's mission is to become a national access point for AI competence. To achieve this mission, NORA has made it a priority to provide a comprehensive overview of ongoing research, education and innovation in the field of AI in Norway. NORA's list of academic AI entities are available online both through the NORA website and the Norwegian AI Directory.

The Norwegian AI Directory was created specifically to provide accessible overviews over Norwegian AI labs (including groups and centres), AI projects, educational courses, AI startups, AI conferences and funding opportunities.

10.1 Norwegian AI Directory

The AI Directory was developed to provide an easily accessible repository of information to help navigate AI-related data on projects, AI Labs, educational courses, AI startups, and research funding opportunities in Norway. The aim of the directory is to help connect different actors within the Norwegian AI ecosystem. The AI Directory is open to all, and anyone can submit data and information to the directory. The AI Directory currently contains information on over 1400 AI-related projects, 20 AI Labs, over 150 university courses, and many funding opportunities. All data are searchable by keywords, and users can browse details for each entry. The directory is a valuable resource for anyone interested in AI in Norway and is a great way to stay up to date on the latest developments in the field.

The AI Directory contains information about:

19
19 AI Labs

1463
1463 AI Projects

156
156 University Courses

250
AI startups

10.2 Norwegian AI Startup Landscape

AI is developing rapidly and is being increasingly used in a wide variety of applications and industries. Understanding the startup landscape in Norway is essential for research, industry and government, as startups represent a crucial segment of pioneering invention and innovation. NORA is dedicated to promoting Norwegian AI startups. Therefore, in 2022, NORA established a consortium, *AI Norway*, together with Smart Innovation Norway and the Norwegian Open AI Lab and became members of the European AI Startup Landscape. The European AI Startup Landscape aims to map the AI startup ecosystem in Europe and to include partners from Sweden, Germany, France and the Netherlands. AI Norway launched the Norwegian AI Startup landscape in September 2022. The launch included keynote speeches from Siw Andersen, CEO of Oslo Business Region, Joachim Thorsen from Innovation Norway and presentations from Norwegian AI startups. The launch was attended by over 40 founders, researchers, students and other practitioners.

In addition, NORA has dedicated efforts towards mapping AI startups in Norway. As a result, NORA has developed the Norwegian AI Startups Landscape as part of the AI Directory. The landscape displays over 250 AI startups in Norway.

Through this directory, users can become acquainted with the growing landscape of Norwegian AI startups and the many new solutions and services produced with artificial intelligence. Furthermore, by showcasing the startups on the European AI Startup Landscape, NORA aims to promote the great innovators in Norway to each other, as well as colleagues in Europe, early investors, and potential customers.

Launch of the Norwegian AI Startup Landscape. Trym Holter, NTNU, Klas Pettersen, NORA and Marianne Bjerkmann, Smart Innovation Norway.

11

Communication and Dissemination

NORA strongly believes in the power of collaboration and interaction. The right type of communication, meeting venues and arenas must be created to achieve this. To provide a platform for NORA's members, NORA frequently organises conferences, seminars, webinars and workshops. NORA's webpage, www.nora.ai, and the newsletter are NORA's primary communication and dissemination channel. In addition, NORA has a strong presence on social media, such as LinkedIn, Twitter and Facebook.

11.1 NORA Annual Awards

In 2022, NORA launched a new initiative, namely the NORA Annual Awards. The NORA Annual Awards were created on an initiative from Professor Stefano Nichele, Professor at Østfold University College. The NORA Annual Awards aims to acknowledge and celebrate excellent contributions towards AI in Norway, both on an individual level and on behalf of partners. The nominations for the awards were collected from the AI Community in Norway and reviewed by the Program Committee of the NORA Annual Conference 2022 and the NORA Board. The winners of the NORA Annual Awards 2022 were announced at the conference dinner at Flor and Fjære.

The NORA Annual Awards will be given out every year at the NORA Annual Conference.

“The Norwegian AI community is a vibrant environment of dedicated people actively contributing to the advancement of the AI field. I am very proud to have initiated and to be the coordinator of the NORA Annual Awards, an initiative which recognises and celebrates the hard work of individuals that have made a difference in AI and who motivates others to push the boundaries. The NORA Annual Awards not only acknowledge the achievements of the recipients, but they also foster a sense of community and collaboration that is essential for a healthy, diverse, and innovative AI ecosystem in Norway.”

Stefano Nichele, Professor, Østfold University College and member of NORA Annual Conference Program Committee

Winners of the NORA Annual Awards 2022

NORA Award for Lifetime Achievement
Winner: Agnar Aamodt, Professor Emeritus, NTNU, SINTEF

NORA Award for Distinguished Early Career Investigator
Winner: Andrei Kutuzov, Postdoc, UiO

NORA Award for AI Community Building
Winner: Pinar Heggernes, Deputy Rector, UiB

NORA Award for Diversity in AI
Winner: Catherine Bui, Bui Consulting

NORA Award for Outstanding Publication of the Decade 2011 – 2021
Winner: Ole-Christoffer Granmo, Professor at UiA and Director of the Centre for Artificial Intelligence Research (CAIR), «The Tsetlin Machine” 2018

NORA.startup Award
Winner: NablaFlow

11.2

AI Conferences

AI+ Ruth Astrid Sæter. Photo: Stein Johnsen.

AIM North 2022

In 2022, NORA collaborated with OsloMet and Xplorico Communities to host the AIM North Symposium 2022. AIM North 2022 (Artificial Intelligence MIND + MACHINE) took place at Oslo Metropolitan University and assembled over 20 researchers, 15 startups, 300 companies and 60 keynote speakers. Klas Pettersen, CEO of NORA opened the conference together with Tale Skjølsvik, Vice-Dean at the Oslo Metropolitan University, Stefan Petersson and David Holm, Co-founders of Xplorico. AIM North aims to become the leading community of Artificial Intelligence professionals, academia and companies along with public actors, and focus on supporting and develop the Norwegian AI startup ecosystem for global growth.

AI+ Conference

NORA was an associated partner for the AI+ Conference on Applied AI that took place in Halden on the 3–4 of May, 2022. AI+ is an international conference focused on applied artificial intelligence. Klas Pettersen, CEO of NORA, participated in a panel discussion. AI+ demonstrates the latest within AI technologies presented by leading national and international tech companies.

The purpose of AI+ is to offer Norwegian as well as international communities a platform for knowledge sharing and interaction within the field of artificial intelligence. AI+ aims to strengthen AI competence and awareness in Norway, encourage sustainability in AI and to drive commercialisation in the field of AI. By deeply integrating AI technology, the conference aims to create value for society and for businesses.

Norway Summit 2022 “Diversity as a necessity for innovation” Marte Cecilie Wilhelmsen Solheim Associate Professor and Head of the Stavanger Centre for Innovation Research, University of Stavanger.

Norway Summit

In 2022, the NORA Annual Conference partnered with Norway Summit, which was held on the 8th of June in Stavanger. The Norway Summit focuses on the intersection of new technology, innovation and the economy. Klas Pettersen, CEO in NORA, participated as a speaker in a panel discussing how AI will influence lives and the ethical challenges behind algorithms. Joining him on the panel was Ulrich Paquet, Research Scientist at DeepMind, England and Inga Strümke, Researcher, Norwegian University of Science and Technology (NTNU). Anita Krohn Traaseth moderated the discussion. The Norway Summit invites entrepreneurs, investors, business leaders, public actors, politicians and researchers to engage on important topics such as finance, new technology, strategy, leadership and politics.

Computer World Conference/ CIO Forum on Artificial Intelligence in Practice

Artificial intelligence in the company is perhaps still in its infancy, and the CIO Forum Artificial Intelligence invited stakeholders to meet with experts and actors from both public and private sector, who have already succeeded in implementing artificial intelligence with a direct value and impact. At Computer World’s conference NORA’s Klas Pettersen was part of Computerworld’s podcast, Digitaliseringspådden. NORA also had a booth and showed the SME’s how several image generation algorithms work.

Launch of the National Infrastructure for Research Data (NIRD)

On the 6th of December, NORA attended Sigma2´s launch of the new National Infrastructure for Research Data (NIRD), the new storage facility for research data for Norwegian researchers, located in the Lefdal Mine Datacenter. The Lefdal Mine Datacenter is located in Sogn and Fjordane between Måløy and Nordfjordeid. The new storage infrastructure was opened by Sigma2 and the Minister for Research and Higher Education, Ola Borten Moe who also delivered an opening speech.

Digitalisation of Coastal Industries Conference

On the 6–7th of December 2022, NORA attended the Digitalisation of Coastal Industries Conference in Måløy, Vestlandet. The conference was organised by the National Competence Center for HPC. The focus of the conference was to learn more about what companies in the coastal industry require support with, in terms of competence and advice from actors with expertise in artificial intelligence.

Norway Summit 2022 Panel Discussion. Klas Pettersen, Inga Strumke, Ulrich Paquet, Anita Krohn Traaseth.

Norway Summit 2022 Panel Discussion. Klas Pettersen, Inga Strumke, Ulrich Paquet, Anita Krohn Traaseth.

National Infrastructure for Research Data.

Arendalsuka. Cathrine Lofthus, Ingrid Stenstadvold Ross, Morten Goodwin, Robert Jensen.

NORA put AI on the agenda during Arendalsuka

Arendalsuka is Norways largest political meeting

The conference included talks from research institutions (NORCE, SINTEF), the public sector (Innovation Norway, Digitalisation Agency), business leaders from coastal industries (Mowi, VYRD, Fjordbase Holding) and Norway's two EDIHs, namely Nemonoor and Oceanopolis. The conference was also attended by county municipality representative Hans Inge Gloppen and the Minister for Local Government and Regional Development, Sigbjørn Gjelsvik.

11.3 Arendalsuka 2022

During Arendalsuka NORA participated in several events and co-organised two events on The Future of Healthcare with Artificial Intelligence and Possibilities in Norway for Smart Health. The event was hosted together with Visual Intelligence (UiT) and CAIR (UiA), with participants also from Oslo Cancer Cluster, Smart Care Cluster, Cancer Registry of Norway, HoD and Directorate of e-Health. The event had prominent speakers such as Cathrine Lofthus who is the Secretary General of the Ministry of Health and Care Services (HoD) in Norway, Ingrid Stenstadvold Ross, the General Secretary of the Norwegian Cancer Society, Morten Goodwin from CAIR at UiA, and Robert Jensen from Visual Intelligence at UiT. The presentations were followed by a panel discussion moderated by Klas Pettersen. In addition to this, NORA participated in other panel discussions, one in which pertained to legal aspects of AI and upcoming legislation.

11.4 Newsletter

The NORA monthly newspaper is one of the primary means of communication with partners and other interested parties in NORA's activities and achievements. The newsletter is open to all our members and promotes AI-related activities, open calls, news from NORA consortium partners, conferences or open positions that may be of interest to the AI community in Norway.

NORA has built up a subscriber base of over 1,870 people, with close to 1,000 visits on average per month. The numbers are constantly growing, indicating that the NORA newsletter has become and will continue to be a popular and vital communication tool.

NORA webpage users and views

75 345 USERS
2019–2022

NORA´s webpage has had 75 345 individual users and 277 124 page views in total from 1st April 2019 until the end of 2022

*NORA was operational from 1st April 2019

2022

109 558 page views

29 697 users

2019*

23 489 page views

6 719 users

2020

43 017 page views

10 952 users

2021

101 060 page views

27 977 users

AI Directory webpage users and views 2022

2021

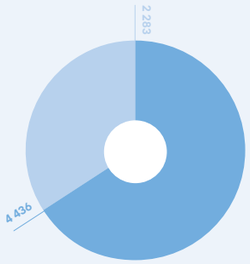
4348 visits

2022

18200 visits

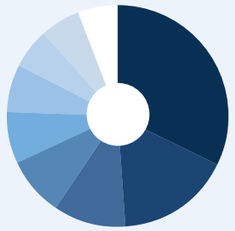
NORA.ai top ten countries by users

2019



66% NORWAY **34% WORLD**

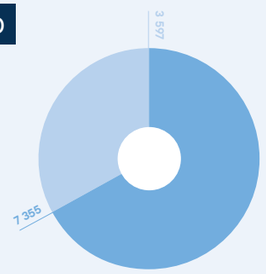
66% of NORA´s users (4 436 individuals) in 2019 were located in Norway



Top NORA.ai users abroad in 2019

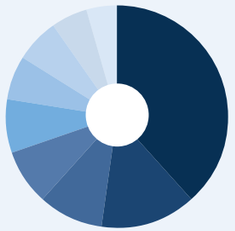
- United States: 476 users
- Not set: 247 users
- Sweden: 157 users
- India: 126 users
- Canada: 112 users
- China: 99 users
- Germany: 90 users
- Japan: 86 users
- United Kingdom: 82 users

2020



67% NORWAY **33% WORLD**

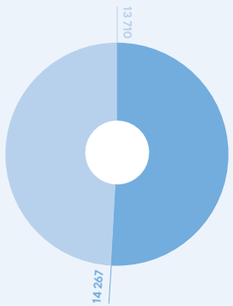
67% of NORA´s users (7 355 individuals) in 2020 were located in Norway



Top NORA.ai users abroad in 2020

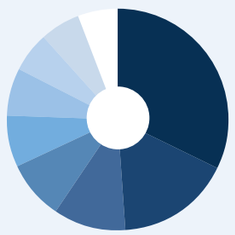
- United States: 875 users
- India: 320 users
- China: 215 users
- Germany: 183 users
- United Kingdom: 177 users
- Sweden: 148 users
- France: 144 users
- Netherlands: 119 users
- Italy: 100 users

2021



51% NORWAY **49% WORLD**

51% of NORA´s users (14 267 individuals) in 2021 were located in Norway



Top NORA.ai users abroad in 2021

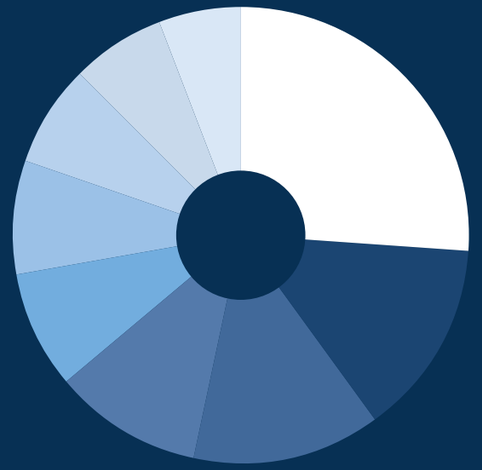
- United States: 3 504 users
- United Kingdom: 1 060 users
- Germany: 851 users
- India: 770 users
- China: 592 users
- Sweden: 588 users
- Finland: 574 users
- Netherlands: 574 users
- France: 501 users

NORA.ai top ten countries by users 2022

52% NORWAY

48% WORLD

52% of NORA´s users in 2022 were located in Norway



Top NORA.ai users abroad in 2022

- United States: 2544 users
- Finland: 1335 users
- Netherlands: 1293 users
- Germany: 1007 users
- United Kingdom: 797 users
- France: 778 users
- India: 711 users
- Austria: 650 users
- Sweden: 543 users

NORA.ai users
by country

140 COUNTRIES
6 CONTINENTS

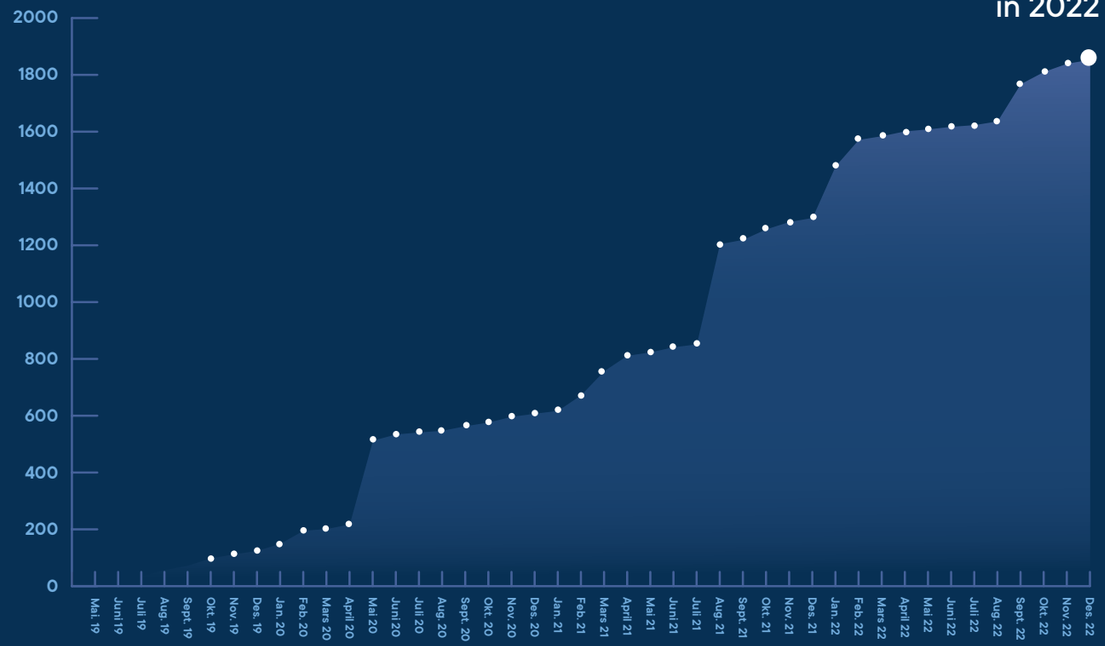
Number of NORA Newsletter Subscribers

506

Subscribers to NORA.startup newsletter

1866

Subscribers in 2022



10934

Opens newsletter

5599

Clicked

Disclaimer
The numbers and figures featured in this report are based on data collected from Jan–Dec 2022.
The data is correct and complete to the best of our knowledge.
All images used in this report were created using Dall-E.

2022

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