

2021/2022 NFiP Annual Report

Report for the period: 01.01.21 – 01.10.22

Petroleum Research School of Norway

Nasjonal forskerskole i petroleumsfag (NFiP)

Introduction

Petroleum Research School of Norway (NFiP) has since it was established in 2010 provided activities for PhD students from all universities in Norway within petroleum related disciplines. NFiP provides coordinated inter-institutional and interdisciplinary collaboration between the five Norwegian universities graduating PhD's in petroleum related scientific disciplines. NFiP has an extensive international scientific network, more than 300 international students have participated in NFiP's activities and NFiP has signed MoUs with 13 reputational universities in Europe, Asia and in the USA. In 2016, NFiP obtained financial support from The Research Council of Norway (RNC) amounting to NOK 23mill for the next 8 years. This support enabled NFiP to continue and expand the educational efforts.

NFiP was established to provide a national tool to improve the PhD education within petroleum related sciences in Norway. This is achieved by coordinating lectures given by the different universities and providing intensive courses, seminars and conferences for all PhD students in Norway with research projects related to petroleum. The objective is also to establish discussion groups, collaborating opportunities and interdisciplinary meeting places for PhD students and their supervisors in Norway and internationally, for more information please see <https://nfip.no/>.

Adhering to the new transparency strategy of the Research Council of Norway, NFiP strongly supports open-access of scientific contributions to the public at large. Thus, current and previous scientific presentations related to NFiP activities are freely available at <https://nfip.no/> under the specific course/seminar.

Members of NFiP include University of Bergen (UiB), University of Stavanger (UIS), University of Oslo (UiO), Norwegian University of Science and Technology (NTNU), University of Tromsø (UiT), and the University Center at Svalbard (UNIS).

More than 1500 students (PhD and MSc students) have participated in NFiP activities in total. Thus, the average annual participation is more than 200 students participating in NFiP activities. Unfortunately, the pandemic in 2020-2021 shut down most in-person activities, initiating digital

activities including an on-line CCUS course, digital rhetoric course, a digital field excursion on Svalbard and a national course in Drill String Dynamics is in the works as a collaboration between NTNU and UiS. These digital activities have continued also after the restrictions under the pandemic have been relaxed.

2021 NFIP Activities

2021 Courses, Conferences and Seminars provided by NFIP and in NFIP collaborations.

The outbreak of Covid-19 prevented NFIP to provide in-person courses, conferences, and seminars during the Spring and Summer of 2021.

The IOR Norway Conference 2021 was scheduled to be financially supported and co-hosted by NFIP as a collaborative effort with The National IOR Center of Norway at the University of Stavanger, however, due to the pandemic the conference was turned into a virtual event in April of 2021 by UiS.

During the spring 2021, UiB provided a digital CCUS course for 20 NFIP students. For networking purposes, part of the course included digital group work. There were more than 50 applicants to this course. To meet the demand, the course was repeated in the Fall of 2021 with 20 students.

During the Fall of 2021 four in-person courses, seminars and conferences were provided as restrictions on physical meetings introduced during the pandemic were lifted. The Rhetoric Course was offered to 15 students Oct. 27-29th in Oslo, the Annual NFIP Conference at the Norwegian Petroleum Museum in Stavanger was provided Nov. 9th for 70 participants and the collaborative Drilling Course between NTNU and UiS was offered to 8 PhD students from September 2021, with 4 seminars in Trondheim and one international site visit in the Spring of 2022.

NFIP had also scheduled a Whole Value Chain CCUS Conference Week in Colorado, USA, in October 2021, the conference was postponed due to closed US borders, but is now scheduled Nov. 14-18th, 2022. Digitalization of a field excursion course at Svalbard is in the works.

Links to NFIP courses and conferences for the period 01.10.21-01.10.22:

- *Course in Rhetoric:*
[PRACTICAL COURSE IN RHETORIC 2021 | Nasjonal forskerskole i petroleumsfag \(nfip.no\)](#) .
- *NTNU-UiS Well Bore Drilling Dynamics:*
[PG8502 – Mechanical Real-time Models in Drilling | Nasjonal forskerskole i petroleumsfag \(nfip.no\)](#)
- *Annual NFIP Conference 2021:*
[NFIP ANNUAL PHD SEMINAR 2021 | Nasjonal forskerskole i petroleumsfag](#)
- *Python and Machine Learning for Geosciences:*
<https://nfip.no/2022/03/07/python-and-machine-learning-for-geosciences/>
- *Core Logging & Core Characterization Workshop:*
<https://nfip.no/2022/08/22/core-logging-core-characterization-workshop-iku-shallow-drillings/>
- *Dorset Field Trip (Petrox) 2022:*
<https://nfip.no/2022/06/09/dorset-field-trip-petrox-2022/>

2022 Student/Researcher Exchange

NFIP promotes and supports collaborative international petroleum research initiatives; preferentially between universities that have signed MoU's with NFIP, by providing financial travel support for

students. NFIP has signed one additional MoU during the project period with Institute of Petroleum and Energy (IPE), Visakhapatnam, India, on July 8, 2022 India. Totally, NFIP has signed MoUs with 13 universities: eight in the USA, three universities in Europe, and two in Asia.

During 2021, the following students were supported with maximum 10 000 NOK to attend conferences:

Tekst I gult må oppdateres for rapporteringsperioden.

First Name	Surname	Affiliation	Destination	From	To
*Peter	Betlem	UNIS	International Conference on Gas Hydrates 2020, Singapore	21.6.2020	26.6.2020
*Ricardo	Vasconcellos Soares	University of Bergen	European Conference on the Mathematics of Oil Recovery XVII, Edinburgh, UK	14.9.2020	17.9.2020
*Lingya	Wang	University of Bergen	European Conference on the Mathematics of Oil Recovery XVII, Edinburgh, UK	14.9.2020	17.9.2020
*Mohammad	Nezhadali	University of Bergen	Ensemble Kalman Filter (EnKF) Workshop, Geilo, Norway	10.5.2020	13.5.2020
*Mohammad	Nezhadali	University of Bergen	European Conference on the Mathematics of Oil Recovery XVII, Edinburgh, UK	14.9.2020	17.9.2020

*Postponed due to outbreak of Covid-19.

2021/2022 student exchange programs (Postponed due to outbreak of Covid-19)

PhD student Leilei Zhang, Rice University, Houston, USA – visit at University of Bergen, Norway

Project Name: CO2 foam for improved oil recovery
Institution: Rice University
PhD student: Leilei Zhang
Project Supervisor: George Hirasaki and Sibani Biswal
Institution Visited: University of Bergen
Hosted By: Arne Graue
Period: Mar. 18th - Apr. 15th, 2020

Project Summary:

The research topic is CO2 foam for improved oil recovery, which is directly aligned with my PhD dissertation. University of Bergen is a leading institution in CO2 foam research, we collaborated in designing a pilot CO2 foam test in west Texas for the purpose of CCUS and IOR. During the STEP period, I would like to visit our collaborated labs for research and attend an conference to present our research to the industry.

PhD student Metin Karakas, University of Bergen (based in Texas) – visit at University of Bergen, Norway

Project Name: CO2 Foam Pilot evaluation
Institution: University of Bergen
PhD student: Metin Karakas
Project Supervisor: Arne Graue
Institution Visited: University of Bergen
Hosted By: Arne Graue

Period: Jan. 1st - Jun. 1st, 2020

Project Summary:

Main focus will be the analysis of dynamic data for CO2 Foam Pilot evaluation. This will be done using numerical and analytical models. The end result will be a better understanding on CO2 Foam Evolution in real reservoir conditions.

PhD student Jacquelin Cobos Mora, Aalborg University – visit at University of Bergen, Norway, and Colorado School of Mines, USA

Project Name: Wettability changes in carbonates
Institution: Aalborg University
PhD student: Jacquelin Cobos Mora
Project Supervisor: Erik Sjøgaard
Institution Visited: University of Bergen and Colorado School of Mines
Hosted By: Arne Graue
Period: Jan. 13th - Apr. 13th, 2020

Project Summary:

The project at UiB and Colorado School of Mines align with PhD research tasks since I am studying wettability changes in carbonates from a chemical point of view. UiB was chosen because their institution possess equipment for wettability alteration and wettability determination. On the other hand, Colorado School of Mines has advanced instruments to characterize rock surfaces.

The main research tasks that will be performed at UiB are:

- Evaluate the stability and reproducibility of the altered wettability
- Determine the distribution of the altered wettability by a non-imaging technique
- Explore the rock surface behavior in reactive environments
- Understand the mechanisms that control the wettability alteration at the complex rock/brine/oil thin interface

PhD student Stian Almenningen, University of Bergen, Norway – visit at Colorado School of Mines, USA

Project Name: Sedimentary Gas Hydrates
Institution: University of Bergen
PhD student: Stian Almenningen
Project Supervisor: Geir Erslund
Institution Visited: Colorado School of Mines
Hosted By: Carolyn Koh
Period: May 2nd - May 30th, 2020

Project Summary:

Characterization of natural gas hydrates in porous media by Raman Spectroscopy. Special focus on gas hydrates in unconsolidated sand and geomechanical stability during hydrate formation, CO2 injection, and hydrate dissociation.

PhD student Linda Haaland, NTNU, Trondheim, Norway – visit to Prins Karls Forland, Svalbard, Norway

Project Name: Geological fieldwork
Institution: NTNU
PhD student: Linda Haaland
Project Supervisor: Per Terje Osmundsen and Kim Senger
Institution Visited: Prins Karls Forland, Svalbard (fieldwork)
Hosted By: -
Period: Aug. 1st - Aug. 10th, 2020

Project Summary:

Fieldwork along the west Svalbard margin is planned to take place mainly on the island of Prins Karls Forland in order to investigate the relationships between the geology of the Forlandsundet area and crustal thinning along the continental margin. Specifically, studies of kinematics of the Pinkie unit, a so far ambiguously identified metamorphic core complex on Prins Karls Forland, are to be carried out. In addition, the structural and sedimentological investigations near the Eocene-Oligocene Forlandsundet Basin is to be carried out in order to refine and expand on previous tectono-sedimentary models of the basin. This work is seen as a crucial part of deepening our understanding of the transition between transpression to transtension along the western Spitsbergen margin.

2022 student exchange programs

Student exchange programs granted financial support in 2022:

PhD student Linda Haaland, NTNU – visit at Prins Karls Forland, Svalbard, Svalbard

Project Name: Geological fieldwork
Institution: NTNU
PhD student: Linda Haaland
Project Supervisor: Per Terje Osmundsen, Kim Senger, Tim Redfield
Institution Visited: UNIS, Svalbard
Hosted By: Kim Senger
Period: 10.08.2022 - 30.09.2022

Project Summary:

Fieldwork along the west Svalbard margin is planned to take place mainly on the island of Prins Karls Forland in order to investigate the relationships between the geology of the Forlandsundet area and crustal thinning along the continental margin. Specifically, studies of kinematics of the Pinkie unit, a so far ambiguously identified metamorphic core complex on Prins Karls Forland, are to be carried out. In addition, the structural and sedimentological investigations near the Eocene-Oligocene Forlandsundet Basin is to be carried out in order to refine and expand on previous tectono-sedimentary models of the basin. This work is seen as a crucial part of deepening our understanding of the transition between transpression to transtension along the western Spitsbergen margin.

The following student exchanges obtained financial support in 2021:

First Name	Surname	Affiliation	Destination	From	To
Amalie Rott	Ellingsen	UiB	TU Delft, Netherlands	01.11.2021	07.11.2021
Aleksandra	Sæle	UiB	TU Delft, Netherlands	01.11.2021	07.11.2021
Kristine	Austevoll	UiB	TU Delft, Netherlands	01.11.2021	07.11.2021
Linda	Haaland	NTNU	Prins Karls Forland, Svalbard, Svalbard	10.08.2021	30.09.2021
Malin	Haugen	UiB	Stavanger	01.12.2021	02.12.2021
Solveig	Onstad	UiB	Stavanger	01.12.2021	02.12.2021
Maksim	Lyysy	UiB	SINTEF Industry, Trondheim	14.10.2021	09.11.2021
Amalie Rott	Ellingsen	UiB	Rice University, TX, USA	06.02.2022	13.03.2022
Aleksandra	Sæle	UiB	Colorado School of Mines, CO, USA	06.02.2022	13.03.2022
Kristine	Austevoll	UiB	Rice University, TX, USA	06.02.2022	13.03.2022

Lorena	Oliveira	Federal University of Rio Grande do Norte	UiO	02.02.2022	02.05.2022
Peter	Betlem	UNIS	MARUM-University of Bremen, Germany	22.04.2022	02.05.2022
Abhisek	Basa	UiO	Federal University of Campina Grande, Brazil	29.01.2022	20.02.2022

Master student Amalie Rott Ellingsen, UiB – visit at TU Delft, Netherlands

Project Name: CO2 Utilization
Institution: UiB
PhD student: Amalie Rott Ellingsen
Project Supervisor: Zachary Paul Alcorn and Arne Graue
Institution Visited: TU Delft, Netherlands
Hosted By: -
Period: 01.11.2021 - 07.11.2021

Project Summary:

Participate in CCUS seminar, visit laboratory facilities and exchange knowledge and experience and learn from students and researchers working on similar projects at **TU Delft**.

The research stay is planned to be for a week to observe and discuss projects of relevance. The research partner was chosen to expand the current collaboration between the universities and to investigate the opportunity to conduct experiments at TU Delft laboratory facilities during a longer research stay in 2022.

The scientific topic of interest is related to CO2 storage and utilization of CO2 as a commodity for EOR. We are emphasizing utilization of CO2 in the concept of CCUS and the objective of the visit is to improve our collaborative efforts.

The objective is to increase our international collaboration and exchange knowledge to build and preserve our international scientific network.

PhD student Aleksandra Sæle, UiB – visit at TU Delft, Netherlands

Project Name: CO2 Utilization
Institution: UiB
PhD student: Aleksandra Sæle
Project Supervisor: Zachary Paul Alcorn, Arne Graue, Geir Ersland
Institution Visited: TU Delft, Netherlands
Hosted By: -
Period: 01.11.2021 - 07.11.2021

Project Summary:

Participate in CCUS seminar, visit laboratory facilities and exchange knowledge and experience and learn from students and researchers working on similar projects at **TU Delft**.

The research stay is planned to be for a week to observe and discuss projects of relevance. The research partner was chosen to expand the current collaboration between the universities and to investigate the opportunity to conduct experiments at TU Delft laboratory facilities during a longer research stay in 2022.

The scientific topic of interest is related to CO2 storage and utilization of CO2 as a commodity for EOR.

We are emphasizing utilization of CO2 in the concept of CCUS and the objective of the visit is to improve our collaborative efforts.

The objective is to increase our international collaboration and exchange knowledge to build and preserve our international scientific network.

Master student Kristine Austevoll, UiB – visit at TU Delft, Netherlands (Participation Cancelled)

Project Name: CO2 Utilization
Institution: UiB
PhD student: Kristine Alexandra Solensteen Austevoll
Project Supervisor: Zachary Paul Alcorn, Arne Graue
Institution Visited: TU Delft, Netherlands
Hosted By: -
Period: 01.11.2021 - 07.11.2021

Project Summary:

Participate in CCUS seminar, visit laboratory facilities and exchange knowledge and experience and learn from students and researchers working on similar projects at **TU Delft**.

The research stay is planned to be for a week to observe and discuss projects of relevance. The research partner was chosen to expand the current collaboration between the universities and to investigate the opportunity to conduct experiments at TU Delft laboratory facilities during a longer research stay in 2022.

The scientific topic of interest is related to CO2 storage and utilization of CO2 as a commodity for EOR. We are emphasizing utilization of CO2 in the concept of CCUS and the objective of the visit is to improve our collaborative efforts.

The objective is to increase our international collaboration and exchange knowledge to build and preserve our international scientific network.

PhD student Malin Haugen, UiB – Young Energy Conference in Stavanger

Project Name: Presentation at conference
Institution: UiB
PhD student: Malin Haugen
Project Supervisor: Martin Fernø and Bergit Brattekkås
Institution Visited: Young Energy Conference in Stavanger
Hosted By: -
Period: 01.12.2021 - 02.12.2021

Project Summary:

Malin Haugen has been asked to present at the Young Energy Conference in Stavanger December 2nd. The presentation will be held together with Solveig Lie Onstad from Department of Geoscience, UiB.

Tentative plan:

1. How the oil industry of the future is dependent on technology that will enable zero-emission society (ref. introduce UNs sustainable development goals to emphasize the importance of an energy transition for a sustainable future) (Malin Haugen)
2. Showcase CO2-storage latest and greatest research (Malin Haugen)
3. Deep sea mining – what is it and how can it help enable the energy transition? (Solveig Lie Onstad)

PhD student Solveig Lie Onstad, UiB – Young Energy Conference in Stavanger

Project Name: Presentation at conference
Institution: UiB
PhD student: Solveig Lie Onstad
Project Supervisor: -
Institution Visited: Young Energy Conference in Stavanger
Hosted By: -
Period: 01.12.2021 – 02.12.2021

Project Summary:

Solveig Lie Onstad has been asked to present at the Young Energy Conference in Stavanger December 2nd. The presentation will be held together with Malin Haugen from Department of Physics and technology, UiB.

Tentative plan:

1. How the oil industry of the future is dependent on technology that will enable zero-emission society (ref. introduce UNs sustainable development goals to emphasize the importance of an energy transition for a sustainable future) (Malin Haugen).
2. Showcase CO₂-storage latest and greatest research (Malin Haugen)
3. Deep sea mining – what is it and how can it help enable the energy transition? (Solveig Lie Onstad)

PhD student Maksim Lyusy, UiB – experiments at SINTEF, Trondheim (postponed until Febr. 2022)

Project Name: Project experiments for subsurface hydrogen storage
Institution: UiB
PhD student: Maksim Lyusy
Project Supervisor: Geir Erslund
Institution Visited: SINTEF Industry, Trondheim
Hosted By: -
Period: 14.10.2021 - 09.11.2021

Project Summary:

Maksim Lyusy needs contribution to the achievement of one of his PhD research tasks, as well as strengthening the national collaboration on his research topic - subsurface hydrogen storage.

Despite growing interest in the topic, multiphase hydrogen flow is still not adequately investigated. The main objective of his PhD project is to quantify essential hydrogen flow functions and to improve the modelling methodologies under relevant storage conditions, currently largely undescribed by the scientific community.

This short-term exchange at SINTEF in Trondheim will contribute to the achievement of one of the PhD research tasks, that is to measure hydrogen-water relative functions. SINTEF can provide a modern laboratory flow rig with integrated visualization technology. This infrastructure facilitates core-scale laboratory measurements under relevant storage conditions. Such infrastructure is missing at his home institution. SINTEF is also working on the same research topic and this exchange program will improve the collaboration between UiB and SINTEF.

With severe lack of literature on the research topic, the acquired laboratory data will add missing data to hydrogen dataset.

Master student Amalie Rott Ellingsen, UiB – visit at Rice University. (Postponed)

Project Name: CO₂ Utilization in CCUS - Longer international research stay
Institution: UiB
PhD student: Amalie Rott Ellingsen
Project Supervisor: Zachary Paul Alcorn and Arne Graue

Institution Visited: Rice University and University of Houston
Hosted By: -
Period: 06.02.2022 - 13.03.2022

Project Summary:

The objective of the research term is to conduct experiments and exchange knowledge with international research partners in an ongoing NFR project on CO2 utilization in CCUS. Rice university is one of the main partners in this project.

Besides conducting experiments at Rice University, also visits at University of Houston, Colorado School of Mines are planned as these universities all are collaborative partners in the project.. The possible research partners have been chosen based on current collaboration between the universities and the unique expertise available at these institutions.

The scientific topic of interest is related to CO2 storage and utilization of CO2 as a commodity for EOR. We are emphasizing utilization of CO2 in the concept of CCUS. The objective of the visit is to improve our collaborative efforts and conduct experiments as a part of her thesis. Further objectives for the research term is to increase our international collaboration and exchange knowledge to build and preserve our international scientific network.

PhD student Aleksandra Sæle, UiB – visit at Colorado School of Mines (Postponed)

Project Name: CO2 Utilization in CCUS - Longer international research stay
Institution: UiB
PhD student: Aleksandra Sæle
Project Supervisor: Zachary Paul Alcorn, Arne Graue and Geir Ersland
Institution Visited: Colorado School of Mines
Hosted By: -
Period: 06.02.2022 - 13.03.2022

Project Summary:

The objective of the research term is to conduct experiments and exchange knowledge with international research partners in an ongoing NFR project on CO2 utilization in CCUS. Colorado School of Mines is one of the main partners in this project.

Besides conducting experiments at Colorado School of Mines, also visits at University of Houston and at Rice University, Houston, are planned as these universities all are collaborative partners in the project. The research partners have been chosen based on current collaboration between the universities and the unique expertise available at these institutions.

The scientific topic of interest is related to CO2 storage and utilization of CO2 as a commodity for EOR. We are emphasizing utilization of CO2 in the concept of CCUS. The objective of the visit is to improve our collaborative efforts and conduct experiments as a part of the thesis. Further objectives for the research term is to increase international collaboration and exchange knowledge to build and preserve international scientific networks.

Master student Kristine Alexandra Solensteen Austevoll, UiB – visit at Rice University (Postponed)

Project Name: CO2 Utilization in CCUS - Longer international research stay
Institution: UiB
PhD student: Kristine Alexandra Solensteen Austevoll
Project Supervisor: Zachary Paul Alcorn and Arne Graue
Institution Visited: Rice University, University of Houston, Colorado School of Mines or TU Delft
Hosted By: -
Period: 06.02.2022 - 13.03.2022

Project Summary:

The objective of the research term is to conduct experiments and exchange knowledge with international research partners in an ongoing NFR project on CO2 utilization in CCUS. Rice university is one of the main partners in this project.

Besides conducting experiments at Rice University, also visits at University of Houston, Colorado School of Mines are planned as these universities are collaborative partners in the project. The research partners have been chosen based on current collaboration between the universities and the unique expertise available at these institutions.

The scientific topic of interest is related to CO2 storage and utilization of CO2 as a commodity for EOR. We are emphasizing utilization of CO2 in the concept of CCUS. The objective of the visit is to improve our collaborative efforts and conduct experiments as a part of the thesis. Further objectives for the research term is to increase international collaboration and exchange knowledge to build and preserve international scientific network.

PhD student Lorena Oliveira, Federal University of Rio Grande do Norte – visit at UiO

Project Name: Research stay
Institution: Federal University of Rio Grande do Norte
PhD student: Lorena Oliveira
Project Supervisor: Francisco Bezerra and Francisco Nogueira
Institution Visited: UiO
Hosted By: -
Period: 06.02.2022 - 13.03.2022

Project Summary:

Lorena Oliveira's thesis focuses on multiscale analysis of an outcrop area in the south part of the Rio do Peixe Basin (Brazil), which involves 3D seismic cube interpretation linked to structural field analysis. The integration of these analyses in multiple scales improves the fault zone and damage zone understanding as well as supports the knowledge of the damage zone behavior observing it in the outcrop area and in-depth below that. Lorena Oliveira has already had fieldwork combined with drone imaging in the studied area. In many places of the world, machine learning (ML) techniques are being applied to impulsing the results, reducing possible errors and the work time at the laboratories. In this case, she intend to utilize this technique in the 3D seismic data to the fault interpretation creating its structural plans and geometries, besides to compare to manual seismic interpretation. She has been collaborating with University of Oslo, particularly with Prof. Anita Torabi in the last few months, and she works using ML in the seismic data analysis with a licenses software granted at the University of Oslo. Therefore, the main Norway travel objective is integrating ML technique to multiscale structural analysis to advance the results.

PhD student Peter Betlem, UNIS – visit at MARUM-University of Bremen, Germany

Project Name: Research stay
Institution: UNIS
PhD student: Peter Betlem
Project Supervisor: Kim Senger
Institution Visited: MARUM-University of Bremen
Hosted By: -
Period: 22.04.2022 - 02.05.2022

Project Summary:

Expedition 396 of the International Ocean Discovery Program (IODP) has just returned from a 61-day expedition to the Norwegian Sea. Key mission objectives were to understand how the great volcanic

province of the Northeast Atlantic was formed, how this volcanism may have led to global warming 56 million years ago, and to see whether the basaltic sequences have carbon sequestration potential that can help address the current climatic challenges. A unique data set from 20 newly drilled boreholes across 10 sites in the Norwegian Sea. Alongside the data, over 2 km of core material has been recovered, covering basaltic and inter-basaltic sequences that are key to determine the region's carbon sequestration potential. The appraisal of this potential forms the foundation for post-cruise research, neatly supplementing and enhancing the outcome of ongoing PhD work on faulted carbon sequestration cap rocks. Further analyses of core material is needed to refine the thousands of collected petrophysical data points. The Expedition 396 Sampling Party (SP) in Bremen forms the primary opportunity to collect samples during the 1.5 year moratorium. All expedition scientists, including shoreside scientists and collaborators unable to join the expedition due to Covid19 restrictions, have therefore been invited to Bremen for the last week of April (this may be moved to May if needed due to the ongoing Covid19 pandemic). Alongside the distribution of core material, the SP also provides an opportunity to refine the workup proposals of the expedition results, plan high impact dissemination, and establish lasting international collaboration. Participation is not only key to successfully accomplishing my PhD candidacy goals, but it also greatly enhances my early-career scientific prospects. Follow-up rock physics laboratory experiments are planned for late spring/autumn 2022 that rely on the successful acquisition of a unique set of samples during the SP.

PhD student Abhisek Basa, UiO - visit at Federal University of Campina Grande, Brazil

Project Name: Research stay
Institution: UiO
PhD student: Abhisek Basa
Project Supervisor: Anita Torabi
Institution Visited: Federal University of Campina Grande, Brazil
Hosted By: -
Period: 29.01.2022 -20.02.2022

Project Summary:

The project aims at developing an integrated approach towards investigation of faults found in different tectonic regimes using fieldwork, laboratory studies and seismic interpretation techniques. This study has several implications in different areas such as petroleum exploration, subsurface storage of carbon dioxide, nuclear waste disposal and evaluation of seismic risks. The sedimentary basins in northeast Brazil provide excellent outcrops of faults. As the study area is well-known to the host university in Brazil a collaboration with the Department of Petroleum Engineering, Federal University of Campina Grande, Brazil will provide joint fieldwork and further in-situ measurements, drone survey, laboratory investigation of samples collected from the fieldwork.

List of unique participants at NFiP activities from Norwegian universities from 2015 - 2022

Name - First	Name - Last	Gender	Email	Position	Affiliation	Year	Start	End PhD/MSc
Dayo	Akindipe	m	dayoa@stud.ntnu.no	MSc	NTNU	2015	01.08.2014	01.08.2016
ALBERTO Joseph	Cheru	m	albertoc@stud.ntnu.no	MSc	NTNU	2015	01.08.2015	01.10.2017
Zuhura	Mkindi	k	zuhuranm@stud.ntnu.no	MSc	NTNU	2015	01.08.2015	01.09.2017
Tore Lie	Sirevaag	m	torelis@stud.ntnu.no	MSc	NTNU	2015	01.08.2010	01.09.2016
Sandy	Tran	k	Hoangtran1979@hotmail.com	MSc	NTNU	2015	?	?
Reidun Cecilie	Aadland	k	reidun.aadland@ntnu.no	PhD	NTNU	2015	01.08.2010	01.01.2020
Vegard	Hagen	m	vegard.hagen@ntnu.no	PhD	NTNU	2015	01.01.2015	01.06.2020
Hamid	Hosseinzade Khanamiri	m	hamid.hosseinzade@ntnu.no	PhD	NTNU	2015	01.02.2013	01.11.2016

Yuriy	Ivanov	m	yuriy.ivanov@ntnu.no	PhD	NTNU	2015	01.08.2014	01.05.2018
Ashkan	Jahanbani Ghahfarokhi	m	ashkan.jahanbani@ntnu.no	PhD	NTNU	2015	01.08.2010	01.03.2015
Kyrre Heldal	Kartveit	m	kyrre.kartveit@ntnu.no	PhD	NTNU	2015	01.08.2010	01.02.2019
Anna	Lim	k	limanna.geo@gmail.com	PhD	NTNU	2015	01.11.2015	01.05.2020
Bahador	Najafiazar	m	bahador.najafiazar@ntnu.no	PhD	NTNU	2015	01.12.2014	01.12.2019
Mats	Rongved	m	mats.rongved@ntnu.no	PhD	NTNU	2015	01.08.2009	01.11.2019
Benjamin	Werner	m	benjamin.werner@ntnu.no	PhD	NTNU	2015	01.08.2014	01.01.2018
Shibo	Xu	k	shibo.xu@ntnu.no	PhD	NTNU	2015	01.08.2014	01.08.2018
Iselin	Aarseth	k	iselin.aarseth@uib.no	PhD	UiB	2015	01.01.2015	31.12.2017
Yu-Fen	Chang	m	yu-fen.chang@uib.no	PhD	UiB	2015	20.01.2009	29.03.2016
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Parnia	Haddadi	K	pha076@post.uit.no	PhD	UiT	2022	15.08.2022	06.2024
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Commented [AG1]: List deltagere i 2021 og 2022

Memorandum of Understanding (MoUs)

To initiate and confirm intention of scientific collaboration and student exchange, a MoU agreement between NFIP and Indian Institute of Petroleum and Energy (IIPE), Visakhapatnam, India, was established on July 8, 2022.

The list of institutions with signed MoUs with NFIP currently counts at 13:

USA:

- University of Tulsa, Tulsa, OK, USA
- MoU signed between NFIP and University of Tulsa August 25th 2015
- University of Southern California, Los Angeles, CA, USA
- MoU signed between NFIP and University of Southern California November 24th 2014
- University of Houston, Houston, TX, USA
- MoU signed between NFIP and University of Houston, January 31th, 2014
- Colorado School of Mines, Golden, CO, USA
- MoU signed between NFIP and Colorado School of Mines November 11th, 2013
- University of North Dakota, ND, USA
- MoU signed between NFIP and University of North Dakota September 23rd, 2013
- University of Texas, Austin, TX, USA
- MoU signed between NFIP and UT Austin, TX November 12th, 2012, at the Science Week 2012
- University of Kansas, Lawrence, KS, USA
- MoU signed between NFIP and University of Kansas April 24th, 2012
- Rice University, Houston, TX, USA
- MoU signed between NFIP and Rice University, April 5th, 2011

Europe

- Delft University of Technology, Delft, The Netherlands
- MoU signed between NFIP and Dept. of Geotechnology, TU Delft, February 4th, 2011
- Imperial College London, London, UK
- MoU signed between NFIP and Imperial College London, Department of Earth Science and Engineering, May 7, 2013

11. University of Leoben, Leoben, Austria
- MoU signed between NFiP and Reservoir Engineering, Montan University of Leoben, March 17th, 2011

Asia

12. Indian Institute of Technology (IITK), Kharagpur, India
- MoU signed between NFiP and IITK, September 20th, 2021
13. Indian Institute of Petroleum and Energy (IPE), Visakhapatnam, India, was established on July 8, 2022

2021/2022 Board Meetings

Board Meeting: Wednesday January 26th, 2022.

Two Board Circulation Matters: May 5th, 2022, and June 21st, 2022.

2021/2022 Chairman Activities

During 2021 NFiP was promoted by the Chair of the Executive Board of NFiP in digital meetings and webinars with: Colorado School of Mines, Golden, CO, USA, Rice Univ. and Univ. of Houston, TX, USA, Colorado State University (CSU), Ft. Collins, CO, U. of Tulsa, USA, USDOE, Pittsburgh, USA, Occidental, Houston, TX, USA and MPE, NPD and NRC in Norway and in meetings with numerous industry collaborators.

Selected talks by the Chairman where NFiP was presented:

1. Arne Graue: "*Research and Educational Opportunities in Reservoir Physics – Energy Technology and CO2 Storage (CCUS)*", CCUS Forum, NORAD CCUS Collaboration, December 2nd, 2021.
2. Arne Graue; "Reservoir Physics – Energy Technology and CO2 Storage (CCUS)", CCUS Forum, NORAD CCUS Collaboration, December 2nd, 2021.
3. Arne Graue: "*CCUS Enablers for Efficient, Cost Saving and More Sustainable Oil & Gas Production*", Energy Transition in Oil & Gas, Petroleum Research School of Norway (NFiP) Annual PhD Seminar, Norwegian Petroleum Museum, Stavanger, November 9th, 2021.
4. Arne Graue: "*CCUS Enablers for Efficient, Cost Saving and More Sustainable Oil & Gas Production* ", CCUS Seminar, TU Delft, The Netherlands, November 4-5th, 2021.
5. Arne Graue: "*Energy Transition Perspectives - Disruptive CCUS Technologies and CO2 Storage Enable Petroleum as Energy Security*", Energy Norway 2022, UiS, Norway, April 26th, 2022.
6. Arne Graue: "ENERGY for the FUTURE - CCUS Enables Petroleum as Energy Security for More Sustainable Energy in the Future ", CCUS Seminar, Florida Atlantic University, Boca Raton, FL, USA April 28th, 2022.
7. Arne Graue: "Disruptive New CCUS Technologies for Reduced Carbon Emissions and New Energy Solutions", Zoom Meeting with Cairn and IITK in India, Houston, TX, USA, April 12th, 2022.
8. Arne Graue: "Petroleum Research School of Norway", Visit by Indian Delegation, Bergen, Norway, July 4th - 8th, 2022.

NFiP Web-site

The NFiP web-site has been further improved and updated through 2022: <https://nfip.no/>
The NFiP secretariat, at Dept. of Physics and Technology, UiB, with Prof. Martin Fernø as coordinator, and Else Johannesen and Merry Ho, as secretaries, has been of immense value for the 2022 activities.

September 31st, 2022

Arne Graue

Chair NFiP Executive Board