

Nasjonal forskerskole i petroleumsfag (NFIP)

Petroleum Research School of Norway



“Oil and Gas Production in Perspective of the Green Energy Shift”

Norwegian Petroleum Museum, Stavanger, November 1st, 2016



Nasjonal forskerskole i petroleumsfag(NFiP)

Petroleum Research School of Norway

Welcome!

- 70 participants**
- 6 distinguished speakers**
- 6 PhD students presenting**

- Norwegian Petroleum Directorate (NPD)**
- Norwegian Research Council (NRC)**
- Petroleum Industry**
- Universities**
- Students from NTNU, UiB and UiS**

A photograph of an offshore oil platform on the left and a large ship on the right, both situated in the ocean under a clear sky. The text is overlaid on the top right of this image.

Nasjonal forskerskole i petroleumsfag(NFiP)

Petroleum Research School of Norway

Seminar Primary Objective:

Update current PhD students on:

***Oil and Gas Production in Perspective of the Green Energy Shift
& Selected PhD presentations***

by speakers from Government, Industry and Universities

Secondary Objectives:

- **establishing discussion forums**
- **establish personal scientific networks**
 - **identify common research interests**
- **initiate interinstitutional research collaborations**



Nasjonal forskerskole i petroleumsfag(NFiP)

Petroleum Research School of Norway

Seminar Program: Oil and Gas Production in Perspective of the Green Energy Shift

09:30 *Registration and Coffee*

10:00 "Welcome", Prof. Arne Graue, Petroleum Research School of Norway, Chairman of the Executive Board of NFiP

10:10 "Norwegian Continental Shelf - Technology Driven?", Arne Holhjem, NPD

10:40 "Petroleum Activities in Norway in 50 years", Steinar Kolstø, Norsk Olje & Gass

11:10 "Research and Education – Adapting to the Green Energy Shift", Aage Stangeland, Norwegian Research Council (NFR) (by Skype)

11:40 "Petroleum as Energy Security in the New Energy Mix - Applications of CO₂ as CCUS Enabler for Efficient, Cost Saving and More Sustainable Petroleum Production", Prof. Arne Graue, UiB

12:15 *Lunch*

13:30 "R&D Collaboration for Future Energy Demand", Kristin M. Flornes, Senior Vice President, IRIS

14:00 "CO₂ Foam EOR for Mobility Control – Upscaling CCUS to Field Pilots", Prof. Arne Graue, UiB

PhD to PhD presentations

14:40 "“Smart Water” from Sandstones and Carbonates; adding environmental and economic value”, Iván Darío Piñerez Torrijos, UiS

15:00 *Coffee*

15:20 "Petroleum, Environment and Society: Role of CO₂ EOR in Economic Dynamics of CCUS", Eduard Romanenko, UiB

15:40 "Polymer Flooding and the Environment", Eystein Oppsahl, UiS

16:00 "Enhancing Oil Recovery with Nanoparticle-Enriched Waterflooding", Katherine R. Aurand, NTNU

16:20 "3D Geological Models and Numerical Simulation of CO₂ EOR Field Pilots in Texas", Zach Alcorn, UiB

16:40 "A Model for Non-Newtonian Flow in Porous Media at Different Flow Regimes", Oddbjørn Nødland, UiS

17:00 Guided tours of the Norwegian Petroleum Museum

18:00 Dinner at Bølgen & Moi, Norwegian Petroleum Museum

A photograph of an offshore oil rig in the ocean. The rig is a complex structure of steel and concrete, with a tall derrick in the center. It is supported by a large platform. The sky is blue with some clouds, and the water is a deep blue.

NFiP

**Petroleum Research School of Norway
was established March 15th, 2010.**

2010 - 2016: Industry funded

2016 - 2023: NFR funding

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Motivation

Education of petroleum researchers at Norwegian universities will benefit from coordinated, interdisciplinary collaboration between the Norwegian universities graduating PhDs in petroleum related scientific disciplines.



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OBJECTIVE

- **coordinate lectures given by the different universities**
- **provide intensive courses, seminars and conferences for all PhD students in Norway with research projects related to petroleum**
- **establish discussion groups, collaborating opportunities and interdisciplinary meeting places for PhD students and their supervisors**
- **promote exchange visitor opportunities for PhD students**
- **promote recruitment to PhD studies in petroleum**

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Participation

- **PhD students admitted to a doctoral study at Norwegian universities**
- **Application to Petroleum Research School of Norway**
- **Admittance is decided by the Executive Board**



Nasjonal forskerskole i petroleumsfag(NFiP)

Petroleum Research School of Norway

Executive Board

- **Prof. Egil Tjøland, Head of the Dept. of Petr. Eng. and Applied Geophysics, NTNU**
- **Prof. Ole Torsæter, Dept. of Petroleum Engineering and Applied Geophysics, NTNU**
- **Prof. Svein Skjæveland, Dept. of Petroleum Engineering, University of Stavanger**
- **Associate Prof. Merete Vadla Madland, Dept. of Petr. Eng., University of Stavanger**
- **Prof. Leiv Gelius, Department of Geosciences, University of Oslo**
- **Prof. Annik Myhre, Department of Geosciences, University of Oslo**
- **Adm. leder Research Centre for Arctic Petroleum Expl. (ARCEX) Alfred Hanssen**
- **Assoc. Prof. Sten-Andreas Grundvåg, ARCEX/IG, UiT**
- **Prof. Tor Arne Johansen, Dept. of Earth Science, University of Bergen**
- **Prof. Arne Graue, Dept. of Physics and Technology, University of Bergen**

Elected Chairman of the Executive Board and Leader of the Petroleum Research School of Norway is Prof. Arne Graue, Dept. of Physics and Technology, University of Bergen.

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Nasjonal forskerskole i petroleumsfag(NFiP)

Petroleum Research School of Norway

Secretariat

A secretariat for the Petroleum Research School of Norway is established at the Petroleum and Process Technology Research Group at the Dept. of Physics and Technology, University of Bergen; with Assoc. Prof. Martin Fernø as coordinator.



Nasjonal forskerskole i petroleum (NFiP)

Petroleum Research School of Norway

NFiP 2010-2016 Activities:

- **More than 600 PhD and Master Students have participated**
- **19 International Activities and Courses on Various Topics**
- **Geological Field Trips to Reservoir Outcrop Analogues**
- **Provided 2 International Conferences in Houston, TX, USA**
- **Annual Technical Seminar, Petroleum Museum, Stavanger**
- **Student Session on Energy Technologies at the 2012 Transatlantic Science Week in Houston;**

<http://www.norway.org/scienceweek>



Nasjonal forskerskole i petroleum (NFiP)

Petroleum Research School of Norway

NFiP Activities 2010-2016 (>600 PhD students participated)

- **Advanced Gas Condensate (HOT Engineering)**
 - Trondheim, mai
 - PhD students from NTNU and UiB
- **Field trip to Møn, Denmark**
 - Copenhagen and Møn, June
 - PhD students from UiB, UiS, UiT, and NTNU
- **Field trip to South England**
 - Devon and Dorset, Oct
 - PhD students from NTNU, UiO, UiB
- **Annual NFiP seminar**
 - Stavanger, November
 - PhD students and MSc from NTNU, UiO, UiT, UiB and UiS
- **Science Week 2012**
 - Houston, TX, 12-19 november
 - PhD students and MSc from NTNU, UiO, UiT, UiB and UiS
 - US PhD students from UT Austin, UT A&M, Rice University and University of Houston
- **Dual Porosity short course**
 - Trondheim, November
 - PhD students from NTNU, UiS and UiB
- **Biennial CO₂ for EOR as CCUS, Houston, TX NFiP/NorTex**
 - PhD students from Norway, UK and 9 univ. in USA

2010 Annual Seminar : *Technological Challenges on the Norwegian Continental Shelf - Importance of Research and Technology*

- 10:00 Welcome – Prof. Arne Graue, Petroleum Research School of Norway, Leader and Chairman of the Board of NFiP.
- Governmental Perspectives:**
- 10:15 “The Energy Race and the Need for Technology - How Can Norway Contribute”, Senior Advisor Reidar Müller, Ministry of Petroleum and Energy (MPE)
- 10:45 "PETROMAKS - an Important Instrument for Petroleum R&D", Special Advisor Siri Helle Friedemann, NRC/Petromaks
- 11:15 “Opportunities and Challenges for the Norwegian Petroleum Activity“, Director Kalmar Ildstad, Norwegian Petroleum Directorate (NPD)
- 12:00 Lunch
- Industry Perspectives:**
- 13:15 "Trends from Reservoir Technical Limit Evaluations of Norwegian Assets", Senior Advisor Reservoir Engineering Tron G. Kristiansen, BP Norge.
- 13:45 “Ekofisk Area Chalk Fields - Status and Challenges“, Senior Reservoir Engineer Sean Pedersen, ConocoPhillips Norway.
- 14:15 *Coffee*
- 14:30 “Application of pore-to-lithofacies workflow“, Augustine Onweazu Okafor, Statoil
- 15:00 “Challenges and opportunities for Total in Norway“, Reservoir Manager, Roar Albrigtsen, Total E&P Norge
- University Perspectives:**
- 15:30 NTNU - “Petroleum Research Activities at NTNU“, Post doc Hassan Karimaie, Dept. of Petr. Eng & Appl. Geophys., NTNU
- 15:45 UiS - “Improved competence in the petroleum industry - The role of the Universities“, Prof. Bernt S. Aadnøy, Head of Dept. of Petroleum Engineering, UiS
- 16:00 UiB - “Opportunity Window for Integrated EOR“, Prof. Arne Graue, Dept. of Physics and Technology, UiB
- 16:15 *Coffee*
- 16:30 Guided tours of the Norwegian Petroleum Museum
- 18:00 Dinner at Bølgen & Moi, Norwegian Petroleum Museum



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2011 Annual Seminar: Unconventional Resources

10:00 "Welcome" , Prof. Arne Graue, Petroleum Research School of Norway, Leader and Chairman of the Executive Board of NFiP

10:15 "Unconventional Resources – Important to Norway?", Senior Geologist Fridtjof Riis, NPD

10:45 "Unconventional Resources – Industry Perspective", Specialist in Structure Geology Helge Løseth, Statoil

Tight Gas Reservoirs:

11:15 "Reservoir engineering aspects of tight gas reservoir evaluation", Prof. Ole Torsæter, Dept. of Petr. Eng & Appl. Geophys. NTNU

12:00 Lunch

Heavy Oil Reservoirs:

13:15 "Heavy Oil Recovery Methods. Status and Research Activity", Prof. Ole Torsæter, NTNU

13:45 "Theoretical Aspects of Thermal Recovery of Heavy Oil". PhD-candidate Yaser Souraki, Dept. of Petr. Eng&Appl. Geophys., NTNU

14:15 *Coffee*

14:35 "Research on Steam Assisted Gravity Drainage ", PhD-candidate Yaser Souraki, NTNU

Hydrates:

15:15 "Gas Hydrates as a Resource: Technology Readiness Level", Senior Engineer Reservoir Technology Jarle Husebø, Statoil

15:45 "Fiery Ice – Gas for the Future", Post doc Geir Ersland, Dept. of Physics and Techn., UiB

16:15 *Coffee*

16:30 Guided tours of the Norwegian Petroleum Museum

18:00 Dinner at Bølgen & Moi, Norwegian Petroleum Museum



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2012 Annual Seminar: EOR, CO₂ for EOR and CO₂ Storage

10:00 "Welcome", Prof. Arne Graue, Petroleum Research School of Norway, Leader and Elected Chairman of the Executive Board of NFiP.

10:15 "From sedimentary environments to rock physics. Prediction of rock properties in sedimentary basins. Examples from Offshore Norway",
Knut Bjørlykke (UoO)

11:00 "The Importance of EOR on NCS", Arne Graue (UoB)

11:15 "Foam for EOR", Bill Rossen (TU Delft)

12:00 Lunch

13:15 "CO₂ for EOR in Europe and USA – IEA energy strategies and CCUS", Jostein Dahl Karlsen (MPE)

13:45 "CO₂ Storage on NCS", Fridtjof Riis (NPD)

14:15 "SCAL for CO₂ based EOR", Martin Fernø (UoB)

14:45 "Rock-Fluid Interactions – EOR", Merete Madland and Aksel Hiorth (UoS)

15:15 *Coffee*

PhD presentations

15: 30 "Fluid flow and assessment of the leakage potential at Snøhvit in the Barents Sea", Alexandros Tasiannas, Department of Geology, University of Tromsø

15: 45 "Application of inverse rock physics modeling for quantitative interpretation of reservoir properties", Kenneth Bredeesen, Department of Earth Science, University of Bergen

16: 00 "Late Cenozoic erosion estimates on the Norwegian Barents Shelf from measured/modeled thermal maturity and sonic velocity data", Irfan Baig, Jan Inge Faleide, Nazmul H. Mondal and Jens Jahren, Department of Geosciences, University of Oslo

16: 15 "Sea Surface Imaging and Reflectivity Estimates", Okwudili Orji, Walter Söllner and Leiv-J Gelius, Dept. of Geosciences, Univ. of Oslo

16:30 Break

16:40 Guided tours of the Norwegian Petroleum Museum

17:40 Reception

18:00 Dinner at Bølgen & Moi, Norwegian Petroleum Museum



Nasjonal forskerskole i petroleumsfag(NFiP)

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2013 Annual Seminar:

EOR in Mature Oil Fields – Technological, Economical and Climatic Aspects

- **09:30** *Registration and Coffee*
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- **10:00** “Welcome”, Prof. Arne Graue, Petroleum Research School of Norway, Leader and Chairman of the Executive Board of NFiP.
- **10:15** “Hydrocarbon Resources in Mature Oil Fields on NCS”, Arvid Østhus (OG21)
- **10:45** “Overview of EOR Processes in Mature Oil Fields”, Prof. Il Dimitrios Georgios Hatzignatiou (UiS)
- **11:15** “Decision Criteria for IOR-projects”, Prof. Petter Osmundsen (UiS)
- **11:45** “Climatic Aspects of EOR in Mature Oil Fields”, Johan Berg Pettersen (MISA)
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- **12:15** *Lunch*
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- **13:15** “IOR Challenges in Mature Oil Fields – Industry Perspective”, Øivind Fevang (Statoil)
- **13:45** “The national IOR-Centre”, Assoc. Prof. Merete Madland, Univ. of Stavanger
- **14:15** *Coffee*
-
- **14:30** PhD to PhD presentations
- “Mud Losses in Fractured Carbonate Formations”, John Emeka Udegbumam, UiS
- “Explicit modeling of fault damage zone properties in reservoir models”, Dongfang Qu, UiB
- “Rock Physics aspects of uplifted sediments - Experimental compaction study”, Sirikarn Narongsirikul, UiO
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- **16:15** *Break*
-
- **16:30** Guided tours of the Norwegian Petroleum Museum
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- **18:00** Dinner at Bølgen & Moi, Norwegian Petroleum Museum



Nasjonal forskerskole i petroleumsfag(NFiP)

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2014 Annual Seminar:

Emphasizing More Sustainability in Upstream Petroleum Activities

- 09:30 *Registration and Coffee*
- 10:00 "[Welcome](#)", Prof. Merete Madland, Board Member Petroleum Research School of Norway (NFiP) and Director of The National IOR Centre of Norway
- 10:15 "Energy Perspectives", Jostein Dahl Karlsen, MPE, Chair of International Energy Agency Working Party on Fossil Fuels
- 10:50 "Need for Increased Sustainability in NCS Operations?", Eva Halland, NPD
- 11:25 "Understanding Biodiversity Protection Opportunities in the Oil and Gas Industry", John Candler, Director Environmental Chemical Services, Schlumberger
-
- 12:00 *Lunch*
-
- 13:15 "Martin Linge – Preparing for the future", Per Grinde, Development Director , Total Norge
- 13:45 "Designer Water", Prof. Torleiv Bilstad, Univ. of Stavanger
-
- 14:15 *Coffee*
-
- 14:30 **PhD to PhD presentations**
 - - "Safe long term storage sealing of CO2 in hydrate", Khadijeh Qorbani Nashaqi, UiB (Supervisor Prof. Bjørn Kvamme)
 - - "3D elastic time-lapse full waveform inversion", Espen Raknes, NTNU (Supervisor: Prof. Børge Arntsen)
 - - ""Smart Water"" in Sandstone Reservoirs Preflooded with Seawater", Zahra Aghaeifar, UiS
 - - "Well Test Analysis - Application to Thermal Recovery Processes for Reservoir Characterization", Ashkan Jahanbani Ghahfarokhi, NTNU (Supervisors: Prof. Tom Aage Jelmert & Prof. Jon Kleppe)
 - - "EOR from Sandstones and Carbonates with "smart water"", Iván D. Piñerez Torrijos (UiS)
- 16:15 *Break*
-
- 16:30 Guided tours of the Norwegian Petroleum Museum
-
- 18:00 Dinner at Bølgen & Moi, Norwegian Petroleum Museum



Nasjonal forskerskole i petroleumsfag(NFiP)

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2015 Annual Seminar Program: Petroleum Research- and Educational Collaboration with USA

09:30 *Registration and Coffee*

10:00 "Welcome", Prof. Arne Graue, Chairman of the Executive Board of Petroleum Research School of Norway

10:10 "Transatlantic Cooperation in Science, Technology and Higher Education: Past Developments and some Future Options for Norway-US Relations", Jostein Mykletun, Ph.D., former Norwegian Consul General in Houston, TX

10:40 "OG21 Technology Strategies", Arne Holhjem, Norwegian Petroleum Directorate (NPD)

11:10 "An Oil-Industry in Transition - Opportunities and Challenges", Frode Berge, Stavanger Chamber of Commerce

11:30 "Road Map for Collaboration with USA - Emphasizing Opportunities for Expanding Petroleum Research and Educational Collaborations with USA", Aage Stangeland, Norwegian Research Council (NFR)

12:00 "NorTex Petroleum Cluster", Prof. Arne Graue, Chairman of the Board of NorTex Petroleum Cluster

12:30 *Lunch*

13:30 "Petroleum and Society: The Economics of a Carbon Constrained Society - Global Context and the Case of North Dakota", Prof. Pål Davidsen, David Wheat and Eduard Romanenko, System Dynamics Group, Department of Geography, University of Bergen

14:00 "Common Oil and Gas Research Challenges for USA and Norway - Experience from Bakken Oil and Gas Production", Prof. Torleiv Bilstad, Univ. of Stavanger

14:30 "Upscaling EOR from Laboratory to the Field - CO2 Foam EOR Field Pilots in Texas", Prof. Arne Graue, Dept. of Physics and Technology, University of Bergen

15:00 *Coffee*

PhD to PhD presentations

15:20 "Seismic Anisotropy: What, How and Why", Yuriy Ivanov (NTNU)

15:40 "The Effect of Fluid Flow in Relay Ramps on Seismic Images", Charlotte Botter (UiS)

16:00 "Preliminary Results from a Field Pilot Workflow for CO2 EOR in Mature Fields", Zach Alcorn (UiB)

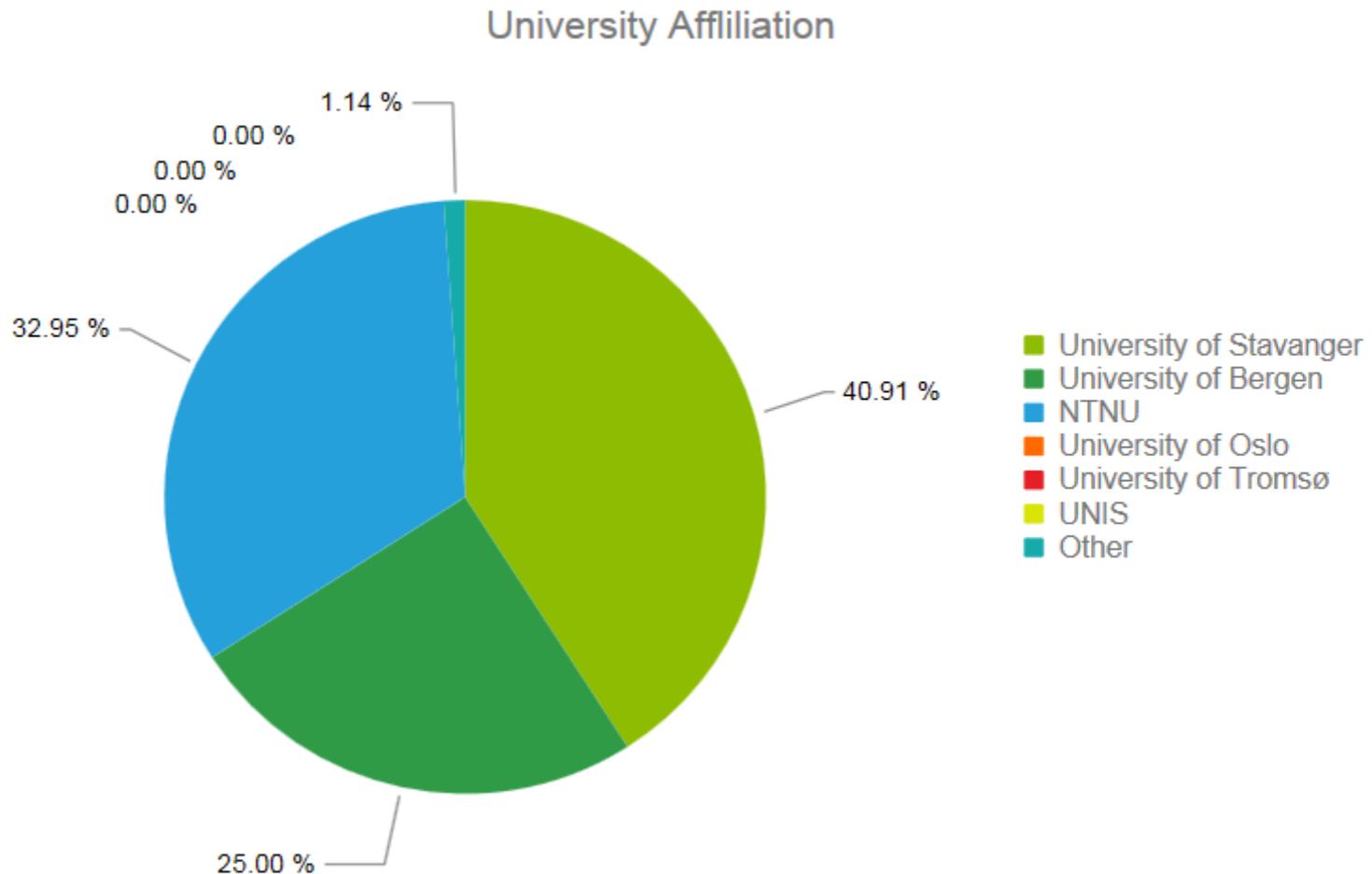
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Nasjonal forskerskole i petroleum (NFiP)

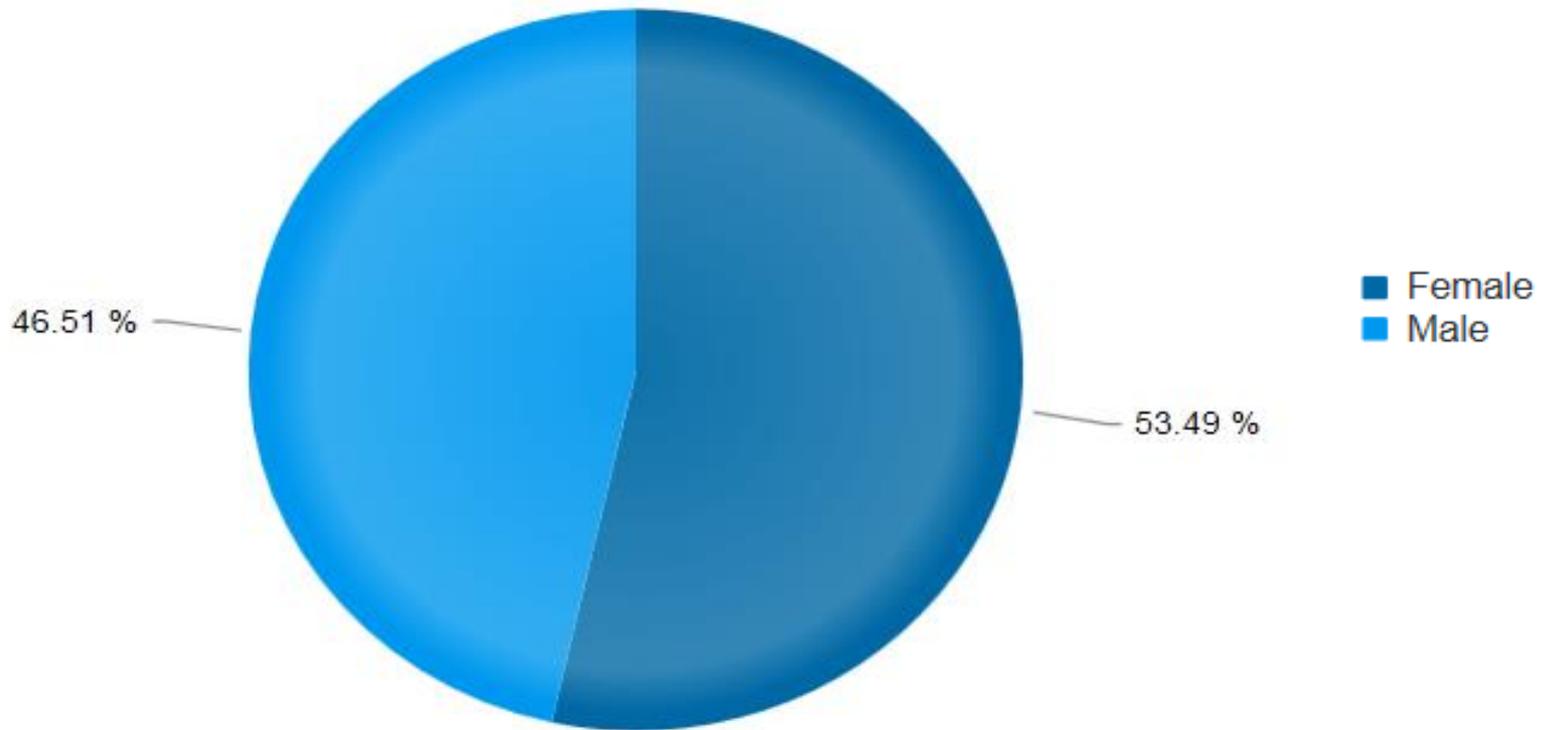
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Nasjonal forskerskole i petroleum (NFiP)

Petroleum Research School of Norway

Male or Female?



Nasjonal forskerskole i petroleum (NFiP)

Petroleum Research School of Norway

PhD or Master

2 entries - 2.27 %

42 entries - 47.73 %

44 entries - 50.00 %

- Professor / Associate Professor
- Industry/Governmental
- PhD-candidate / Postdoc.
- Master student
- Bachelor student
- Other





Nasjonal forskerskole i petroleum (NFiP)

Petroleum Research School of Norway

11 MoU Universities

NFiP has today a broad international profile through 11 signed Memorandum of Understanding (MoUs) with reputational international academic institutions, resulting in co-authored papers, mutual student and researcher exchanges:

- 1. Imperial College London, London, UK**
- 2. Delft University of Technology, Delft, The Netherlands**
- 3. University of Leoben, Leoben, Austria**
- 4. Rice University, Houston, TX, USA**
- 5. University of Texas, Austin, Austin, TX, USA**
- 6. Colorado School of Mines, Golden, CO, USA**
- 7. University of Southern California, Los Angeles, CA, USA**
- 8. University of Houston, Houston, TX, USA**
- 9. University of Tulsa, Tulsa, OK, USA**
- 10. University of North Dakota, Grand Forks, ND, USA**
- 11. University of Kansas, Lawrence, Kansas, USA**

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Nasjonal forskerskole i petroleum (NFiP)

Petroleum Research School of Norway

Contact info

www.NFiPweb.org

contact@nfipweb.org

PETROLEUM RESEARCH SCHOOL OF NORWAY



Annual Petroleum Research School of Norway (NFIP) PhD Seminar November 1st, 2016:

Oil and Gas Production in Perspective of the Green Energy Shift

Provided by: Petroleum Research School of Norway (NFIP; <http://www.nfipweb.org/>)

Place: Norwegian Petroleum Museum, Stavanger

Time: Tuesday November 1st, 2016

Program:

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OLJE- OG ENERGIDEPARTEMENTET

