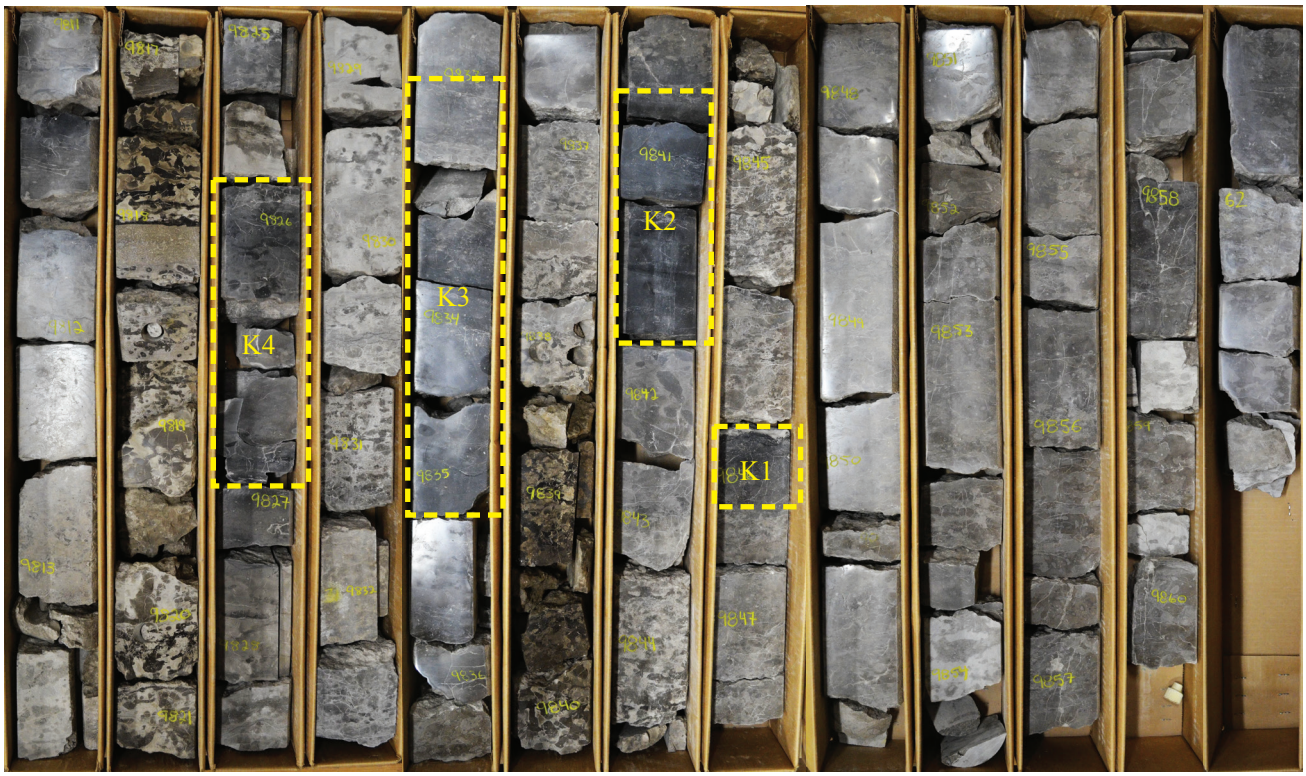
2019 Williston Basin Core Workshop

North Dakota Geological Survey

Wilson M. Laird Core and Sample Library
Grand Forks, North Dakota
October 7-8 & 9-10



Dear Williston Basin geologists,

The North Dakota Geological Survey (NDGS) would like to invite petroleum geologists and related staff to our 2019 Williston Basin Core Workshop event this coming October. This event will be held in Grand Forks, North Dakota at the Wilson M. Laird Core and Sample Library. Two separate, two-day core workshop sessions (which cover the same material) will be offered on October 7-8 (Monday-Tuesday) and October 9-10 (Wednesday-Thursday). Each session will provide a walk-through of core samples and relevant geologic information covering many of the productive sedimentary units within the Williston Basin of North Dakota, in which 19 different formations have commercially produced hydrocarbons. Geologic maps and cross-sections will be combined with example cores to provide an overview of the stratigraphy and sedimentology of each unit.

While the content for each formation will vary, time will be taken to examine reservoir facies, petroleum source beds, and hydrocarbon seals in both core and wireline log examples. In addition to providing an overview of Williston Basin stratigraphy, this workshop will also: 1) review historical oil and gas plays, 2) discuss active plays across the basin, and 3) foster the development of new play concepts. Included is a tentative agenda for the workshop event with a list of the presenters.

The Wilson Laird Core and Sample Library (core library) was recently renovated and expanded in 2016. Over 455,000 feet (86.5 miles) of core, which has come primarily from oil and gas wells drilled across North Dakota during the past ~100 years, is stored and accessible at this facility. Several labs were added during the renovation/expansion and allow for multiple groups to visit the facility simultaneously. Usage of the labs and core access is free of charge, ideally with a lab reservation booked days to weeks (or months) in advance.

Registration for this event will open within the coming weeks and will be set at $200/person. Registration proceeds will go towards providing lunch and refreshments for registrants during the workshop and covering travel costs for guest presenters (non-NDGS staff). Registrants will need to make their own travel arrangements (flights and hotels). Registration costs are relatively low because the primary purpose of this event is to gather geologists to examine and discuss core samples relevant to petroleum systems and exploration. Your time, interest, and participation in the event is our focus.

We hope that you will be able to join us this coming fall. Any feedback regarding your interest level and/or thoughts on the workshop content would be greatly appreciated!

Sincerely,

Timothy Nesheim
Subsurface Geologist/Head of Subsurface Section
North Dakota Geological Survey
Wilson M. Laird Core and Sample Library
2835 Campus Rd.
Grand Forks, ND 58202-8156
(701) 777-2460
tonesheim@nd.gov
www.dmr.nd.gov/ndgs

Tentative 2019 NDGS Core Workshop Schedule

October 7-8 & 9-10

Day #1 (October 7th and 9th)

- 8:00-9:00 – Intro to core logging and evaluation: *A. Husinec, S. Egenhoff, & T. Nesheim*
- 9:00-9:45 – **Winnipeg Group** (and Deadwood Formation): *T. Nesheim*
- 9:45-10:00 *coffee break*
- 10:00-12:00 – **Red River Formation:** *A. Husinec & T. Nesheim*
- 12:00-1:00 *Lunch (provided with registration)*
- 1:00-1:45 – **Stony Mountain and Stonewall Formations**: *A. Husinec*
- 1:45-2:15 –**Interlake Formation**: *A. Husinec*
- 2:15-2:45 – **Winnipegosis and Dawson Bay Formations**: *T. Nesheim*
- 2:30-2:45 *coffee break*
- 3:00-4:30 – **Birdbear Formation:** *J. Bader & F. Nwachukwu*
- 4:30-5:00 – **Duperow Formation:** *J. Bader*

Day #2 (October 8th and 10th)

- 8:00-9:45 – **Three Forks Formation:** *S. Egenhoff, T. Nesheim, F. Nwachukwu, & S. Nordeng*
- 9:45-10:00 *coffee break*
- 10:00-12:00 – **Bakken Formation:** *S. Egenhoff & S. Nordeng*
- 12:00-1:00 *Lunch (provided with registration)*
- 1:00-2:30 – **Madison Group:** *T. Nesheim & S. Nordeng (?)*
- 2:30-2:45 *coffee break*
- 2:45-3:30 – **Tyler Formation**: *T. Nesheim & S. Nordeng*
- 3:30-4:15 – **Spearfish Formation:** *T. Stolldorf*
- 4:15-5:00 – **Inyan Kara Formation:** *J. Bader*

Core Workshop Instructors

Dr. Antun Husinec – *St. Lawrence University*
Dr. Sven Egenhoff – *Colorado State University*
Stephen Nordeng – *University of North Dakota*
Francis C. Nwachukwu – *University of North Dakota*
Travis Stolldorf – *North Dakota Geol. Survey*
Jeff Bader – *North Dakota Geol. Survey*
Timothy Nesheim – *North Dakota Geol. Survey*

Core Workshop Instructors

Sven Egenhoff, Ph.D. (left) is an expert in both shale and carbonate sedimentology applied to understanding conventional and unconventional reservoir deposition and diagenesis. Sven has nineteen years of experience post-doctorate working worldwide on hydrocarbon-related problems, mostly onshore Sweden, Norway, continental US (Bakken and Woodford), and Bolivia, as well as offshore UK (Kimmeridge Clay). He is currently a professor at Colorado State University and has trained over 400 undergraduate and graduate students in oil-related sedimentology and well-logs. Sven has graduated 19 students with M.S. or Ph.D. degrees since 2006 working on unconventional reservoirs in shales and mixed carbonate-siliciclastic systems, and has consulted or held research contracts with Hess, Marathon, and Noble Energy, among others.

Jeff Bader (right) has been a geologist for nearly 40 years and is a Professional Geologist in Wyoming and Utah. He has a Bachelor's degree in Geology from the University of Colorado and a Master's degree in Petroleum Geology from San Jose State University. He has served with the North Dakota Geological Survey since 2014 where he is presently Director of the Wilson M. Laird Core and Sample Library. Jeff's research interests center on cratonic origins/development and resulting influences on the Phanerozoic tectonic, structural, stratigraphic, and sedimentological evolution of sedimentary basins. Jeff's Williston Basin focus has dominantly been centered on the Inyan Kara Formation along with recent research on the Birdbear and Duperow Formations.

Antun Husinec (left) is a carbonate geologist – sedimentologist with 20+ years of international experience in detailing and predicting surface and subsurface geometries, composition, and textural character of carbonate and evaporite sedimentary rocks on a local and regional scale for hydrocarbon exploration and reservoir sedimentology/petrology. Carbonate exploration experience covers the whole range of Paleozoic, Mesozoic, and modern carbonate systems using core, wireline log, outcrop, thin-section to seismic-scale data. It involves high-resolution sequence stratigraphy, facies, and diagenetic controls on carbonate and evaporite systems, specifically from the Central and Eastern Europe, Middle East, Caribbean Region, and North America with a focus on the Williston Basin. Research and teaching is directed at the use of the sedimentary record and microfossils coupled with the integration of stratigraphic analysis, modeling, isotopic approaches and spectral analysis to track the evolution of climates and oceans, and its relationship to the occurrence of petroleum.

Travis Stolldorf (right) joined the NDGS as a subsurface geologist in August 2017. His current role involves characterizing reservoirs within the Williston Basin through core data analysis coupled with wireline log interpretation. Prior to his present position, Travis spent five years as a geologist with Chevron. At Chevron, Travis proposed and drilled wells in Pennsylvania, the Gulf of Mexico and West Africa. Mr. Stolldorf graduated from Rice University with a M.S. in Earth Science. Before attending Rice, Travis spent seven years working in finance after receiving his B.S. in Finance from the University of Nebraska.

Core Workshop Instructors

Dr. Stephan Nordeng (left) is the Distinguished Professor of Petroleum Geology at the Harold Hamm School of Geology and Geological Engineering at the University of North Dakota (UND). Prior to joining UND, Dr. Nordeng spent 8 years with the North Dakota Geological Survey from 2006 to 2014, where he worked on numerous Bakken-Three Forks-related petroleum resource investigations, among other projects. He also has spent time teaching in Wisconsin and as a petroleum geologist in Alaska. Dr. Nordeng has numerous refereed publications and expertise on several of the Paleozoic oil-producing units within the Williston Basin. His current research focuses on source rock kinetics of Bakken shales and other petroleum source rocks in the Williston Basin.

Francis C. Nwachukwu (right) is a doctoral candidate at the University of North Dakota. He obtained his B.S. in Geosciences at Nnamdi Azikiwe University, Awka, Nigeria, and an M.S. in Petroleum Geology at the University of North Dakota, Grand Forks (2016). His interests include sedimentology, stratigraphy, conventional and unconventional reservoir characterization, deposition, diagenesis and source bed characterization, with emphasis on mixed carbonate-siliciclastic depositional environments in the Williston Basin. His research presentation "Re-Evaluating Petroleum Potential of Birdbear Formation in McKenzie County, Williston Basin, North Dakota" was amongst the top 15 best at the 2018 AAPG ACE international conference in Salt Lake City, Utah. He has presentated at international conferences and meetings around the United States. His doctoral dissertation is titled "A review of the Three Forks Formation Nomenclature, depositional history, and regional stratigraphy of an Upper Devonian carbonate-siliciclastic play in the Williston Basin".

Timothy Nesheim (left) has worked as a subsurface geologist with the North Dakota Geological Survey (NDGS) for the past 9+ years, where he has also served as Head of the Subsurface Section since 2017. Prior to the NDGS, Tim received a B.S. in Geosciences from the Minnesota State University of Moorhead (2007), earned an M.S. in Geosciences from the University of Iowa (2009), and worked as a full-time temporary research assistant at Washington State University (2009-10). During his time at the NDGS, Tim has worked and published on many of the oil and gas producing formations in the Williston Basin of North Dakota, including: Icebox-Black Island (Winnipeg Group), Red River, Bakken-Three Forks, and Tyler Formations.

Wilson M. Laird Core and Sample Library

External view of the Wilson M. Laird Core and Sample Library (above

Wilson M. Laird Core and Sample Library was initially built in 1980 on the campus of the University of North Dakota and was recently expanded/renovated in 2015-2016. This building was named for the late Wilson M. Laird, who was the State Geologist from 1941-69 and assisted in the initial development of rules and regulations for oil and gas drilling in North Dakota. Laird's early oil and gas regulations were enacted in the early 1940's, nearly 10 years before the initial discovery of oil in North Dakota. One of Laird's rules required operating companies to submit any and all core samples collected during drilling operations, which has allowed North Dakota to maintain one the most complete core inventories of North America.

To date, the library sample inventory includes over 455,000 feet (86.5 miles) of core which primarily consists of the numerous oil and gas producing sedimentary formations of the Williston Basin. An expansive inventory of drill cuttings (over 50,000 boxes) from oil and gas wells is also available as well as cores from various mineral test wells. The current facility includes three main labs that are available for usage by visiting professionals as well as several secondary, smaller lab spaces. The numerous lab spaces are meant to allow multiple visitor/groups to utilize the core and sample inventory at the same time. In addition to multiple lab space, the core library also features conference and break rooms that are also accessible to visitors.

The Julie A. LeFever core laboratory is 1,300 square feet (above)

Conference room (above)

Usage of the facility, both lab and core access, is free of charge to visiting professionals. Lab reservations are ideally booked days to weeks (or months) in advance to assure space is available. For additional information or to reserve lab space, please see the contact information below:

https://www.dmr.nd.gov/ndgs/Offices/Core_Library/
Phone: (701) 777-2231

2835 Campus Rd.
Grand Forks, ND 58202-8156