Volume 21 – Issue 6

EERC EDGE

Our Edge Is Our People

November/ December 2010

NPC appointment bodes well for EERC

EERC Associate Director John Harju discusses his appointment to the National Petroleum Council and the challenges facing energy users and producers in the decades to come.

John Harju, Associate Director for Research at the University of North Dakota (UND) Energy & Environmental Research Center (EERC), has been appointed to serve as a member of the National Petroleum Council (NPC) for the 2010–2011 term by U.S. Secretary of Energy Steven Chu. The NPC is a self-funded advisory body to the Secretary of Energy.

Secretary Chu has directed the NPC to undertake two major studies during the current term: "Future Transportation Fuels" and "Prudent Development of North American Natural Gas and Oil Resources." Harju's work for the NPC will focus primarily on the second study, which will evaluate and examine the supply of hydrocarbon resources on the North American continent through 2050.

"My main contribution to the NPC will be in the arena of evolving technology and emerging resources, interpreting how technological breakthroughs will facilitate development of these resources," said Harju. "The tripling of Bakken oil production over the course of the last 4–5 years is a perfect example of that. I can provide some objective insight as to why that happened and how it will continue to evolve."

The NPC's nearly 200 members represent all sectors of the oil and gas industries and related interests. Harju will represent the views of institutions engaged in energy and environmental technology research.

The NPC was created by President Truman in 1946 to provide information and recommendations on matters related to oil and natural gas to industry and government. The council symbolizes the cooperation between the oil and gas industry and the government that began during World War II. Secretary Chu stated in his appointment letter to Harju that the council's work during the 2010–2011 term will be important to the U.S. Department of Energy (DOE) and the nation.

"I am honored to have been appointed to this prestigious organization. It's extremely humbling," said Harju. "It is a substantial recognition of the EERC as a whole, certainly not just me.

I expect it will provide continued and heightened visibility for the EERC's oil and gas programs and the state

Continued on page 2

Inside

Continued from page 1

of North Dakota. I also anticipate that many new relationships and opportunities will come from this."

Harju directs several programs at the EERC that address the NPC study issues, including projects that focus on finding alternative water supplies for oil and gas drilling and completion, optimizing completion technologies for Bakken production, and using captured CO_2 for enhanced oil recovery (EOR).

"Our oil and gas work at the EERC has been expanding for about 8 years," said Harju. "Much of that has to do with our work in CO_2 EOR and in the Bakken. It became quite apparent early on, leading the Plains CO_2 Reduction (PCOR) Partnership work that, regionally, the primary opportunities for carbon management were associated with eking incremental oil out of productive reservoirs. A lot of synergy exists between our oil and gas programs and our carbon management programs." Harju sees such synergies as hallmarks of any future carbon-managed economy. "If we're in a carbon-managed economy, that very much affects production with certain types of resources," he said. "These factors are all integral to the study as a whole."

Harju expects the NPC study will be one of the most objective analyses of its type done in this time frame, but it will be a complicated study.

"Petroleum reserve accounting is very rigorous, and we'll be going well beyond that," Harju explained. "The projected supply is a function of many things: first and foremost, price and technology and the interplay of those two things, but a whole additional round of substantive factors have to be considered. For example, while the natural gas market in North America is largely self-contained, oil is absolutely a global commodity. You have to factor in what's going on in the rest of the world."

Harju explained that the NPC must consider changes in policy and regulations but does not try to influence policy. Rather, it tries to provide an objective analysis of the existing resource base and to project what could be done under a variety of scenarios.

"The effects of the Horizon deepwater oil spill in the Gulf are rippling through the entire industry and causing a reevaluation of everything. From that, I expect a general tightening of regulatory oversight across the board. With greater pressures from regulatory agencies, inevitably you have resources that become more economically challenging to develop," said Harju. "When the regulatory environment is constrained, the ability to develop certain supplies is compromised; however, at the same time, that is a stimulus for technology."

Harju adds that the NPC studies will also have to consider competing energy platforms, but he notes that the world's dependence on fossil fuels will not end any time soon, so innovation in recovering those resources will become even more important.

"Any credible projection of our energy mix suggests that we may be dependent on fossil fuels for much longer than 50 years. At present, there's no substitute," said Harju. "However, more oil exists in already-known reservoirs than has ever been produced, because recovery is so low with existing technology. A wealth of existing hydrocarbon resources can become exploitable at *some* price with *some* technology."

Harju believes that how we use our existing energy resources will change and evolve dramatically in the future. Even if we were to evolve to a hydrogen-based transportation system or electric cars, for example, the hydrogen or the electricity would still have to be produced using coal, oil, gas, nuclear power, renewables, and other energy sources. Most current projections show a future energy mix that does not differ much from that of today. What is certain is that we will need a lot more energy, regardless of the source.

"It is my deeply held conviction that in the future we're going to need more oil and gas, more renewables, more nuclear—more of everything," said Harju. "All energy resources will need to make a more substantial contribution to the growing global energy demand puzzle. This is a planet that has gone from a billion people to 6 billion people over the last 100 years or so. The consequences of not growing the energy supply to meet this growing population are catastrophic. If you think about what energy means to us, it's clean water, it's better health care, it's food production—it affects everything in our lives, so the stakes are very, very high. I'm very optimistic that we are going to meet those challenges. It's exciting to be involved with an enterprise like the NPC that will make meaningful contributions toward that effort."

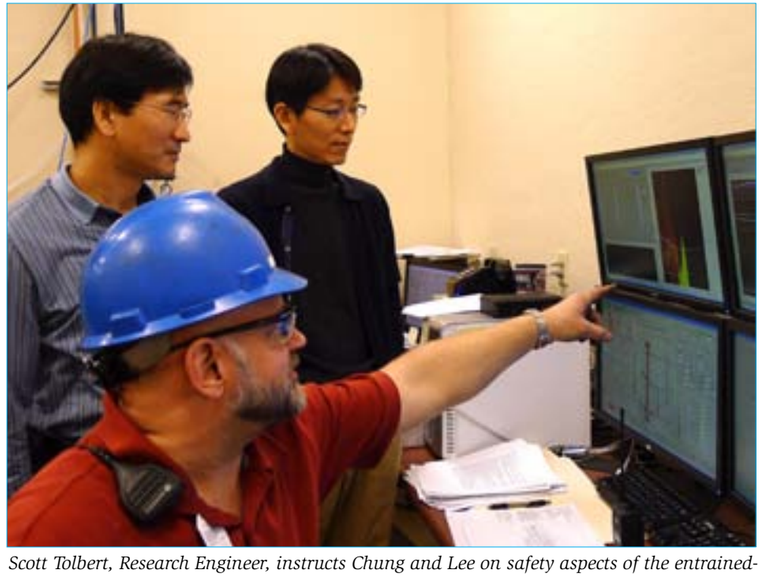
–Sandy Van Eck

South Korean trainees Jae-Hwa Chung and Hyun-Dong Lee with the entrained-bed gasifier (center background).

South Koreans train in gasification

As part of the EERC's Education and Training Program, Jae-Hwa Chung, Principal Researcher of the IGCC [integrated gasification combined cycle] Project Team, and Hyun-Dong Lee, Assistant Manager of Fossil Fuel Combustion, from the Korea Electric Power Research Institute of Daejon, South Korea, are spending 3 months pursuing gasification training at the EERC. Their study includes gasification fundamentals, gasifier design/construction considerations, and hands-on entrained-flow gasification operation.

"In Korea, gasification technology is not well developed," said Lee. "Korea Electric Power Corporation, our parent company, has plans to build a gasification power plant; it would be the first time in Korea. We came here to get more practical experience. We believe America has real experience in gasification technology."



Scott Tolbert, Research Engineer, instructs Chung and Lee on safety aspects of the entrained-flow gasifier.

The EERC has worked with virtually every major coal gasification company in the world and is home to a variety of unique gasification demonstration systems.

The EERC's on-site training program has been very successful. Scientists from government, industry, and academic laboratories all over the world have come to the EERC for training in gasification technologies, scanning electron microscopy, and supercritical fluid extraction techniques. The EERC has provided on-site training in these techniques since 1990 to students and researchers from 12 other countries around the world. Gasification technologies are used to produce a synthesis gas or fuel gas stream for the production of hydrogen, liquid fuels, chemicals, and electricity.

While the training is going well, Lee added, "The environment for living is different; severely cold. This was my first time to face such cold weather. At home, I only experienced it in the refrigerator. Outdoor living is not possible."

"Long time outside is not possible," Chung agreed with a smile.

–Trish McGuire

Bursting at the seams

The south two-thirds of the lunchroom on the second floor in Building W was recently converted into much-needed office space. The space now provides six offices for nine full-time and four student employees. This left just one-third of the space for the employee lunchroom, but John Hendrikson, Associate Director for Business and Operations, said that he hopes the temporary offices revert back to lunchroom space once new office space is built.

"Once funding becomes available for the planned addition, we will be able to build permanent office space for these 13 employees and another 87," Hendrikson said, referring to the proposed 60,000-square-foot addition to be built north of the EERC's present office building at 2nd Avenue and North 23rd Street in Grand Forks.

EERC Director Gerald Groenewold said that this proposed $12M expansion, which would increase laboratory as well as office space, is an investment in the future of the EERC and essential to its continued success. He pointed out that the EERC is a key economic engine for the Grand Forks region. Funding has been sought from the North Dakota State Board of Higher Education.

–Sandy Van Eck

Offices were created out of the second-floor lunchroom in Building W.

Employees give back

The holiday season is a time for counting one's blessings and for helping others less fortunate. As in past years, EERC employees generously contributed to the Adopt-a-Family Project. Clothes, household items, toys, and gift certificates for gas and groceries were given to help three families with a total of ten children to have a joyous holiday.

"We are always thankful for the EERC employees who want to help out in the community," said Sue Bartley, EERC Human Resources Manager and liaison to the Adopt-a-Family Project. "Our three families will get everything they wished for and more. People at the EERC are extremely generous."

Kelly Hodgson, Lead Research Information Associate, helps a UND Staff Senate member pick up the EERC's "Tub of Love" for transport to the Northlands Rescue Mission.

A new way for EERC employees to give back this season was the UND Staff Senate's "Tubs of Love" donations for the Northlands Rescue Mission. The Staff Senate put large plastic tubs around campus for the donation of new essential items needed for residents of the mission, including backpacks, duffel bags, combs, razors, deodorant, socks, shampoo, shower gel, soap, and men's T-shirts.

–Sandy Van Eck

Shown with Adopt-a-Family gifts donated by EERC employees are (left to right) Santa's chief shoppers Sue Bartley and Joyce Sundby of the Human Resources Office and chief wrappers Bonnie Hillerud and Jenny Le Texier, Administrative Assistants.

The EERC's got talent

On December 10, the Alerus Center ballroom in Grand Forks was filled with EERC employees and their guests celebrating at the annual EERC holiday party. As always, it was a great way to share good food, laughter, and glad tidings of the season while having some creative fun.

This year's program theme was "The EERC's Got Talent." And do we ever!

John Kay showed his comedic side as he introduced each of the eight acts in contention for the title of Most Talented EERC Employee. Nick Kalenze played a jazzy acoustic guitar; Kerryanne Leroux aspired to be a ballerina; Teresa and Robert Bonev and Jen Knudson all shook their bells but were deemed unworthy by the judges. While Dan Daly sang to get his proposal out the door, Jim Fiala juggled progressively bigger objects (the eyes of those sitting closest to the stage got bigger and bigger too). The Twisted Twirlers, aka Sheryl Landis, Erin O'Leary, and Kelly Hodgson, were found to be a bit too twisted for the judges' taste and left the stage unwillingly, while accompanist Roxanne Hurley had to be carried off the stage by husband John. Derek Walters sang a lovely rendition of "Home" by Michael Bublé, and to close the show, the Aquadudes (Kyle Glazewski and Jordan Bremer) showed off their best dance moves in the "Evolution of Dance."

Judges for the event were Denny Laudal (channeling his inner Piers Morgan), Dee Heisler (even nicer than Sharon Osbourne), and Dan Daly (who some said had always reminded them of Howie Mandell but with hair).

While the audience's votes were being tallied and the performers were waiting in anticipation, the EERC Choir sang "Little EERC Researcher" to the tune of "The Little Drummer Boy" and "The Judging Song" to the tune of Alvin and the Chipmunk's "The Chipmunk Song/ Christmas Don't Be Late."

At the end of the night, Nick Kalenze took home the trophy for most talented, with the Aquadudes coming in a close second.

Thanks go out to the Holiday Party Committee for planning a great event and to those courageous EERC folks who bravely put their talents on display for the rest of us!

–Sandy Van Eck

New employees

Dr. Hui Pu is a Research Engineer with the Oil and Gas Group at the EERC, where his work focuses on using oil and gas industry simulation software to develop geophysical models of the subsurface and to run dynamic simulations to determine the long-term fate of produced/injected fluids, including hydrocarbons, CO_2, and brine, to aid in both oil and gas recovery and CO_2 storage. He will also be involved in laboratory testing and design in the new Applied Geology Laboratory. Pu's areas of interest and expertise include modeling of CO_2 storage, EOR, reservoir simulation and engineering, wettability, and interfacial phenomena.

"The EERC is a great place to work. It offers unparalleled and exciting opportunities. At the EERC, people collaboratively take on some of the most complex engineering and technical challenges in energy and environmental research," said Pu. Originally from Fukang in China's far west Xinjiang province, Pu earned a Ph.D. degree in Petroleum Engineering from the University of Wyoming in December of 2010 and holds M.S. and B.S. degrees in Petroleum Engineering from the Northeast Petroleum University (formerly Daqing Petroleum Institute) in China.

Pu enjoys many sports, including downhill skiing, ice skating, and watching and playing basketball. In Grand Forks, he's taking up swimming and playing badminton, but hockey is a new sport for him. He says he would love to attend a UND hockey game.

Pu's wife, Wei Wang, is studying for her Ph.D. in Petroleum Engineering at Louisiana State University. Pu and Wang have a daughter who is a year and a half old. While living in Laramie, Wyoming, the family often traveled to the Snowy Range, a ski resort near the mountain pass of the same name, to ski and enjoy the stunningly beautiful vistas. His most recent trip found Pu driving his small Pontiac Sunfire, loaded with nearly all of his possessions, from Wyoming to North Dakota to start work at the EERC. His first experience in the Great Plains states of North and South Dakota was memorable to say the least.

"It is worth mentioning that I felt the high winds over the massive area of the Midwest were a greeting from nature," Pu says.

Stelios Arvelakis has accepted a position as a Research Engineer in Bruce Folkedahl's Environmental Technologies Group at the EERC, where his work focuses on the design of bench- and pilot-scale renewable and fossil fuel energy production systems, predominantly in the area of biomass torrefaction technology. Torrefaction is the roasting of wood or other biomass to create a product that has increased energy density, is easier to handle and transport, and is practical to cofire in existing coal plants.

Arvelakis's principal areas of interest and expertise include energy from biomass, coal, waste combustion, and gasification. Specific areas of interest include the development of pretreatments for raw materials to improve their use as feedstock for combustion and gasification applications to generate energy and fuels/chemicals; the study of high-temperature inorganic reactions, ash chemistry, corrosion, deposit formation, agglomeration, and fly ash utilization; development of catalytic materials from low-cost agricultural biomass and wastes for pollution control, for example, mercury capture; and development of methods to capture and use CO_2 from energy/industrial applications for greenhouse gas mitigation.

"One of the aspects of my job that I really appreciate is that I have many opportunities to network with industry and research organizations nationwide," said Arvelakis.

A native of Greece, Arvelakis holds Ph.D. and M.S. degrees in Chemical Engineering from the National Technical University of Athens (NTUA), Greece. In 2001, he received an award for the best Ph.D. dissertation in the field of Chemical Engineering from the Thomaidion Foundation, NTUA, Greece. He held several research fellowships and research positions in Germany, Italy, Ireland, Denmark, and The Netherlands before coming to the EERC as a Researcher in 2009.

Arvelakis's hobbies include hunting and fishing.

–Sandy Van Eck

The Olympic ice sheet at the Ralph Engelstad Arena facilitates wide-open play and plenty of skating.

Cold Fusion

No, the EERC is not delving into nuclear power, although you might think so if you have heard talk about "cold fusion" in the halls recently. Cold Fusion is the name of a UND intramural hockey team made up solely of EERC employees.

"We wanted an energy-related name because our work revolves around energy," said Cold Fusion cofounder Nate Fiala, Research Engineer.

The team has no coach, but cocaptains are Fiala and Josh Stanislowski. The two, along with Jonathan LaBonte and Jordan Bremer, started talking about forming an intramural hockey team last year. Other team members include Phillip Bellmore, Tyler Bloms, Chris Damiani, Nick Lentz, Corey Lindeman, Mark Musich, Brandon Pavlish, Scott Schulz, Tony Snyder, J.C. (Joseph) Strang, Josh Strege, and Jeff Thompson.

Corey Lindeman comes out of the net to cut off the angle.

"I hadn't played in about 8 years," said Mark Musich, Research Engineer, who played on an intramural EERC hockey team about that long ago. "I'm really doing this for the exercise and the camaraderie. I'm one of the older guys, but we have a lot of 'young legs' on the team."

The team plays in Division III, which Fiala says is more of a beginner's league. That is appropriate for Cold Fusion, as many of its players are new to hockey, and some have only been skating for a year or two. Cold Fusion's win record is 50% halfway through the season. Games are played on the main ice rink or the Olympic ice rink at the Ralph Engelstad Arena. Many teams don't have matching jerseys, but Cold Fusion team members bought their own matching yellow jerseys with numbers on them. Next year, they may put the team name or a logo on them.

Fiala said they will welcome new players in the future, and because the league is coed, they would like to hear from both women and men interested in playing. The team would also like to increase its fan base, but Fiala thinks game times might not work well for spectators.

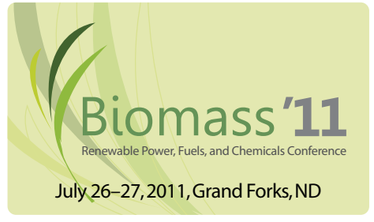
"We would like to invite people to come out and watch us play, but because there's so much competition for ice time, our games are always at 10 or 11 on Monday nights," said Fiala, who promised to post Cold Fusion's spring game schedule in the mailroom for those who need a late-night diversion.

–Sandy Van Eck

Jordan Bremer (middle) follows the action from the bench.

Upcoming events

Abstracts are due February 1, 2011. Submit online at www.undeerc.org/AQ8/abstractsubmittal.aspx



Congratulations!

Award winners (from left) are Earl Battle, Lila Christensen, Heidi Vettleson, Michelle Olderbak, and Joyce Sundby.

The annual Administrative Resources (AR) Employee Recognition awards were given out on December 15 at the AR holiday luncheon. This year's winners are Earl Battle – Attitude, Lila Christensen – Customer Service, Heidi Vettleson – Team Player, and Michelle Olderbak – Leadership.

Award winners are nominated by their colleagues in each category and selected by AR managers and Deb Haley, Associate Director for Marketing, Outreach, and Administrative Services.

"Administrative Resources is committed to providing excellent service to the EERC." said Haley.

"I am honored to work with such an outstanding group of individuals."

A special "Star of Excellence" award was given this year to Joyce Sundby in recognition of her extraordinary attitude and 30 years of exceptional service to the EERC.

–Sandy Van Eck

Research Engineer Bob Cowan's daughter, Stephanie, recently starred as Janet Van der Graaf in the production of "The Drowsy Chaperone" at Penn State in State College, Pennsylvania. Stephanie is a first-year student in the Musical Theatre BFA program, so getting the lead speaks well of her talent and previous experience. Stephanie's next production at Penn State will be in the supporting role of the young Little Edie Beale in the production of "Grey Gardens" in February. Bob and his wife, Kim, are proud of Stephanie and enjoy watching her perform.

–Trish McGuire

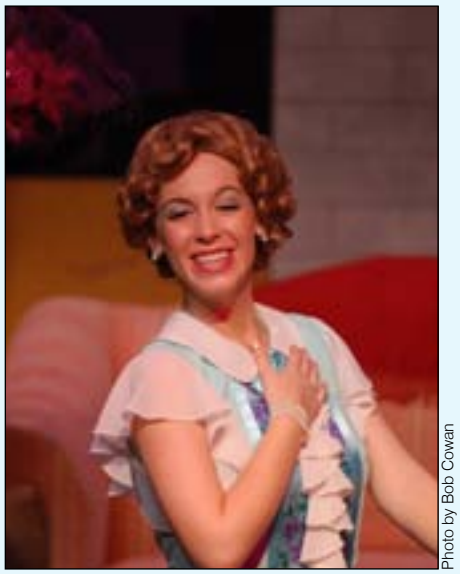


Photo by Bob Cowan

EERC EDGE

The EERC Edge is published for employees of the Energy & Environmental Research Center at the University of North Dakota. Send comments and story suggestions to Sandy Van Eck, Editor, (701) 777-5023 or svaneck@undeerc.org.

Energy & Environmental Research Center
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018
(701) 777-5000
www.undeerc.org