winter 2022

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MESSAGE FROM THE EXECUTIVE DIRECTOR

To the SER community,

2022 was a wonderful and productive year at SER with exciting new activities!

In addition to important ongoing projects related to Carbon Capture, Use and Storage (CCUS), critical mineral and rare earth elements, oil and gasrelated research, carbon engineering, and wind, SER has expanded its research portfolio by adding Centers of Excellence dedicated to hydrogen production and nuclear energy.

In order to tackle these new challenges, SER has spent much of the year growing the research team with subject matter experts and talented professionals. We look forward to continued advancements in our efforts to support Wyoming.

Finally, our academic program has grown leaps and bounds with new, innovative partnerships. Through the development of a 3+3 degree program with the UW College of Law, and the addition of two certificate programs in CCUS and Land Administration, we are leveraging existing energy expertise on campus to enrich the educational opportunities for Wyoming students.

We could not accomplish all that we do without your continued support. We look forward to continued engagement during another prosperous year!

Sincerely,

Holly Kritka Holly Krutka, Ph.D.



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School of **Energy Resources**

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ACADEMICS

UW Trustees Approve New Certificate Programs in Carbon Capture, Land Administration

The University of Wyoming will offer two new certificate programs to equip current students and working professionals in the evolving energy landscape.

Approved by the UW Board of Trustees during its November meeting, the School of Energy Resources, in collaboration with other colleges and schools across campus, will launch a new undergraduate certificate program in carbon capture, utilization and storage (CCUS) and a land administration undergraduate certificate program.

Both certificates will provide students and industry workers with the skills to take on new challenges, make an impact on global decarbonization efforts, and advance their careers.

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UW's John Kaszuba Advances CO₂ Storage Research With Recent Publication

John Kaszuba, the University of Wyoming's John and Jane Wold Centennial Chair in Energy and School of Energy Resources professor of geology and geophysics, recently published an article in collaboration with Pacific Northwest National Laboratory (PNNL) that advances carbon dioxide storage research.

The new high-profile, peer-reviewed article in *Nature Reviews Chemistry* discusses how CO_2 converts from a gas to a solid in ultrathin films of water on underground rock surfaces. These solid minerals, known as carbonates, are both stable and common.

The partnership with PNNL has led to a second important publication on basalt formations, written by Kaszuba's current Ph.D. student, **Ellen Polites**, from York, Pa. Polites recently published an article, "Exotic Carbonate Mineralization Recovered from a Deep Basalt Carbon Storage Demonstration," in *Environmental Science & Technology*.

The article examines the reactive subsurface environment of the Wallula Basalt Carbon Storage Pilot Project that demonstrated that CO₂ injected into greater than 800 meters deep in the Columbia River Basalt Group flow top reservoirs mineralizes on month-year timescales.



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Academics Highlights

in Energy and Environmental

Policies and SER Professor of Law **Tara Righetti**, was listed as one of the Top 20 Academic Articles for the year as recognized by the

An article authored by Occidental Chair

SER Celebrates Fall 2022 Graduate

The School of Energy Resources is excited to celebrate and acknowledge the monumental occasion of success for our fall 2022 graduate, **Austin Moon**.

An accomplished individual, Moon is graduating with a degree in Energy Resources Management and Development (ERMD) with a concentration in Energy and Environmental Systems (EES), as well as a minor in Reclamation and Restoration Ecology, and an undergraduate certificate in Geographic Information Systems (GIS).

A native of Cheyenne, Wyo., Moon has excelled in his education and been afforded exceptional opportunities during his time at SER. In addition to working on innovative energy research as a GIS and Geology Generalist for the Center of Economic and Geology Research (CEGR), Moon has gained valuable experience working with rangeland research scientists as a Biological Science Technician for the Agricultural Research Service under the US Department of Agriculture, along with other opportunities.

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UW Students Awarded Scholarships in Martin Knauss Experiential Energy Education Competition

Students in the University of Wyoming's School of Energy Resources (SER) and the College of Engineering and Physical Sciences recently received scholarship awards as part of the Martin Knauss Experiential Energy Education competition.

The winners of the competition, receiving scholarships totaling \$4,500, were:

– First place: **Ryan Jardee**, from Franktown, Colo., with a dual major in petroleum engineering and chemical engineering.

- Second place: **Gavin Geertson**, of Gillette, with a dual major in mechanical engineering and energy systems engineering.

– Third place: **Kieran McMullen**, from Castle Pines, Colo., majoring in energy resource management and development, with a concentration in professional land management, as well as a dual degree in finance, with a minor in mathematics.

Sponsored by 1980 petroleum engineering alumnus **Martin Knauss**, the competition was administered jointly by SER and the College of Engineering and Physical Sciences to help students "discover how Wyoming's natural resources can be leveraged to produce energy, in all forms, for the betterment of Wyoming and the world."









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Center for Carbon Capture and Conversion

Researchers Conduct Second Harvest on Crops Treated with Coal-derived Soil Amendments

Researchers in the Center for Carbon Capture and Conversion (CCCC) completed a second harvest of crops testing coal-derived soil amendments. In October, a sugar beet crop was harvested at the Powell Research and Extension Center (PREC) in Powell, Wyo., followed by a harvest of corn at the at James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) in November. The field studies are being conducted to test the novel coal-char soil amendment product against industry-used biochar, and are being led by **Resham Thapa**, from Pyuthan, Nepal, a Ph.D. candidate in the UW College of Agriculture and Natural Resources. The coal char has the potential to enhance the water and nutrient holding capacity of soil. The team will now evaluate the crop yields and soil fertility properties of the various treatments in an effort to collect comparative data from year-to-year.

Center for Energy Regulation and Policy Analysis

Natural Resources Attorney and Policy Expert Joins UW School of Energy Resources

Kara Brighton Fornstrom, a prominent natural resources attorney and regulatory policy expert, is the new University of Wyoming School of Energy Resources Center for Energy Regulation and Policy Analysis (CERPA) director.

Fornstrom will lead a team of research scientists and attorneys to monitor and evaluate existing legislative and regulatory issues relating to energy development issues in the state, and to serve as a resource for decision-makers at the local, state, regional and national levels.

Fornstrom has more than 20 years of experience in the utility regulatory and administrative law sectors, and she has a proven record of generating internal and external relationships, addressing complex technical issues and managing challenging situations.

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Prefeasibility Study on the Use of Carbon Dioxide in Concrete Public Works Projects in Wyoming Released through School of Energy Resources

Led by SER Senior Advisor **Kipp Coddington**, the School of Energy Resources released an analysis of the viability of using carbon dioxide (CO_2) in concrete public works in Wyoming. The study was completed in fulfillment of the requirements set forth in the Enrolled Act No. 12, from the Senate of the 66th Legislature of the State of Wyoming, during the 2022 budget session.

The prefeasibility study examines the potential use of CO_2 in concrete for public works projects in Wyoming, focusing on coal-fired electric generating units (EGU) as the CO_2 source(s). The use of CO_2 in concrete is technically and commercially complicated. The paper examines these uses and weighs the costs and benefits of such an approach.

DOWNLOAD STUDY HERE >







RESEARCH

Center for Economic Geology Research

Center for Economic Geology Research Completes Step Rate and Mechanical Integrity Testing on Underground CO₂ Storage Site

The Center for Economic Geology Research (CEGR) completed mechanical testing at the Wyoming CarbonSAFE Project site located next to Basin Electric Power Cooperative's Dry Fork Station near Gillette, Wyo.

Over the course of nine days, a collaborative team conducted Step Rate Testing (SRT) and Mechanical Integrity Testing (MIT) between two wells that were previously drilled to Class VI Carbon Capture, Utilization and Storage (CCUS) standards at the site, and have the potential to serve as Wyoming's first commercial scale carbon dioxide (CO₂) injection wells for permanent underground storage. The two wells are currently permitted as Class I wells and will need to be converted to Class VI prior to any CO₂ being injected.

The testing is part of phase III of the project to fully characterize the site and increase the safety assurances associated with geologic sequestration.

SRT and MIT were conducted by injecting water into three targeted storage formations, namely the Minnelusa Formation, Hulett Sandstone, and Lakota Sandstone, from one of the wells, while monitoring the pressure response from the sensor installed in the other well. The resulting information established the fracture pressure, regional stress, and formation connectivity of each zone.

In addition to establishing a threshold for injection pressure, a second objective of the testing is to rule out any possibility of contaminating underground drinking water sources. Both are requirements by the Wyoming Department of Environmental Qualify (DEQ) for the approval of a Class VI permit.





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Research Highlights

• Eugene Holubnyak of the Hydrogen Energy Research Center (HERC), attended the United States Hydrogen Alliance (USHA) convention and presented on the 'Hydrogen Production Pathways' panel.



• Fred McLaughlin, Director of the Center for Economic Geology Research (CEGR) presented at the "UW in Your Community" event in Gillette, WY alongside President Seidel.



Research Scientist ChooiKim
 Lau in the Center for Carbon Capture and
 Conversion (CCCC) presented to the Laramie
 Engineering Club about the coal-derived
 engineering projects.

OUTREACH

OUTREACH

Tribute to Jim Nielson

James "Jim" Nielson, a longtime support of the School of Energy Resources and the university, passed away on November 17, at the age of 91. A University of Wyoming graduate and a veteran, Nielson worked in Husky Oil, his family's energy company, and went on to start a number of successful energyrelated businesses during his career. He was committed to education as a way to transfer knowledge to the public. He spent his time and energy conserving Wyoming's natural resources and promoting the sustainability of its environment.

He was honored by UW as a Distinguished Alumni in 2016. In 2006, Nielson created a \$5 million endowment for the director of the UW School of Energy Resources and the Nielson Energy Scholarships, which are designed to support highly talented students planning a career in the energy sector.

Considered a pillar of his community, Nielson had a deep love for Wyoming and dedicated his life to serving the state and its people. His legacy will live on through the School of Energy Resources, as well as other important causes that he championed throughout his lifetime.

Fiscal Year Annual Report

The 2022 Fiscal Year (FY22) Annual Report for the School of Energy Resources is available to the public on the SER homepage. The report covers activities that took place from July 1, 2021 through June 30, 2022, and highlights the academic, research and outreach accomplishments achieved consistent with SER's mission of energy-driven economic development for the state of Wyoming.

DOWNLOAD HERE >

2023 Preview

Many exciting activities are already in the works to continue our outreach efforts during 2023. Be sure to stay tuned for details on the following spring semester events and opportunities to engage with the School of Energy Resources including:

- SER Distinguished Speaker Series (six free public presentations throughout the semester featuring experts in their fields to discuss energy-related topics)
- Hydrogen Energy Awareness Event Presented by ASUW and the Hydrogen Energy Research Center (H₂ERC)
- RENEW (Research Explorations for Nuclear Energy in Wyoming) Academic Workshop presented by the Nuclear Energy Research Center (NERC)
- Rocky Mountain Professional Landman Conference presented by the Student Chapter for Energy Resources



PROFESSIONAL LANDMAN CONFERENCE







Please stay up to date on our upcoming events by checking the **EVENTS CALENDAR >**



Conference Panels & Keynote @8am-2:30pm UW Conference Center, Hilton

Lunch included throughout the day

R E N E W

Research Explorations for Nuclear Energy in Wyoming

Academic Workshop

April 14, 2023 8:00 AM - 5:00 PM

Where

University of Wyoming Conference Center -- at the Hilton Garden Inn Laramie, Wyoming

eaturing

- Dr. Kathryn Huff, Assistant Secretary, Office of Nuclear Energy, Department of Energy
- Breakout Sessions for Science/ Economic Track and Physical Science/Technical Track

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