# spring 2024

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### ABOUT THE SCHOOL OF ENERGY RESOURCES

The University of Wyoming (UW) School of Energy Resources (SER) was created in 2006 to enhance the University's energy-related education, research, and engagement. SER directs and funds cutting-edge energy research and technology development, which integrates with the formulation and conduct of academic programs at UW and bridges academics and industry through targeted engagement efforts. The partnerships formed between academics and industry ensure programs are relevant, current, and deliver impact and high value to stakeholders and the State.

Since its inception, SER has maintained flexibility in its focus and structure to meet the changing needs of Wyoming's energy industries and the State's economy–which is now more critical than ever.

This quarterly newsletter highlights SER's significant achievements from mid-January 2024 through April 2024, in academics, research, newly emerging areas of focus, and engagement to keep UW and Wyoming at the forefront of the energy sector.





SER EXECUTIVE DIRECTOR Holly Krutka, Ph.D.

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# ACADEMICS

#### SER Academic Program Sends Student Cohort to 2024 NAPE Summit

Seven students in the School of Energy Resources' (SER) academic program attended the 2024 North American Petroleum Expo (NAPE) Annual Summit event taking place February 7-9 in Houston, Tex.

Founded in 1993 by the American Association of Professional Landmen (AAPL), NAPE is an organization to benefit the energy industry at large through programs such as education, legislative and regulatory advocacy, technical publications, public lands access efforts, scholarships and more.

**Rachel Reese**, of Johnstown, Colo.; **Kendall Klos**, of Johnsburg, Ill., **Jacob Burns** of Wheatland, Wyo., **Connor Fleming** of Huntersville, N.C., **Micah Brant** of Denver, Colo., **Madalynn Gower** of Parker, Colo., and recent graduate **Jacob Schneider** of Cincinnati, Ohio (B.S. '23) attended the annual event that boasts unmatched networking, career prospects, and informative panels and prominent speakers in the energy industry.

All seven of the students are pursuing the Professional Land Management (PLM) concentration in SER's Energy Resource Management and Development (ERMD) bachelor of science program.

#### READ MORE >



# School of Energy Resources Students Complete Legislative Internships during Budget Session

During the recent legislative budget session, two students in the Energy Resource Management and Development (ERMD) degree programs in the School of Energy Resources (SER) participated in the Wyoming Legislative Internship Program.

**Rachel Reese** of Johnstown, Colo., and **Tyler Schlagel** of Cheyenne, Wyo., spent over 40 hours among Legislative Service Office staff, Wyoming legislators, and other elected officials during the 2024 session to gain a new appreciation for, and perspective on, representative democracy and public service in Wyoming.

The Wyoming Legislative Internship Program offers a unique 'behind the scenes' opportunity for college students to assist legislators and observe the Wyoming Legislature in action. Students from all majors are immersed in the session, committee meetings, and given tasks to assist legislators for the duration of the session.

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# ACADEMICS

**UW SER Hosts Third Annual Rocky Mountain Professional Landman** Conference

The University of Wyoming's School of Energy Resources (SER) once again hosted the Rocky Mountain Professional Landman Conference on April 29.

The in-person forum seeks to bring together industry professionals and professional landman alumni in the Rocky Mountain region to showcase the profession; discuss current topics and issues facing the industry; and explore career paths and opportunities for future graduates.

The robust agenda was composed of panel discussions covering hot topics in the energy sector, including issues on federal lands; enhanced oil recovery and how it relates to carbon capture, utilization and storage; nuclear energy; water; and a legal ethics panel.

Brooks Yates, president of the American Association of Professional Landmen (AAPL), delivered the keynote address.

Presentation recordings can before on the UW SER Youtube Channel.

WATCH NOW >

# **Academics Highlights**

**Energy Resource Management and** Development student **Connor Fleming** was accepted in the UW Leadership Academy, which will explore the intricacies of Wyoming's industries beginning in fall 2024.



Saman Aryana, professor and Occidental (Oxy) Chair in Energy and Environmental Technologies, as well as head of the University of Wyoming's Department of Chemical and Biomedical Engineering, has received a Fulbright Scholar Award to conduct research in Australia.



Pictured:Brooks Yates, AAPL President

He will engage with the University of New South Wales, studying and exchanging ideas on topics related to energy transition.

The University of Wyoming lists the following students from the School of Energy Resources on the 2023 academic Dean's and Dean's Freshman Honor Rolls.

Gwen Andela - Deans Roll Tally Carter - Deans Roll Ryan Fogg - Deans Roll Kendall Klos - Deans Roll Lars Quinlivan - Deans Roll

Jacob Schneider - Deans Roll Brogan Byram - Freshman List Kolten Harmsen - Freshman List Harper Pollock - Freshman List David Meraz Ordonez - Deans Roll Madalynn Gower - President's List Nathan Kessler - President's List

Cassidy Lolley - President's List Rachel Reese - President's List Drake Richards - President's List Tyler Schlagel - President's List McKinzie Barnes - Provost List Micah Brandt - Provost List

### RESEARCH

### **Wyoming Integrated Test Center**

#### Wyoming Integrated Test Center to Host New Large-Scale Carbon Capture Pilot Project

The U.S. Department of Energy's (DOE) Office of Clean Energy Demonstrations has announced the selection of TDA Research Inc. (TDA) to negotiate an award of up to \$49 million to test a carbon capture system at the Wyoming Integrated Test Center (ITC), located adjacent to Basin Electric Power Cooperative's Dry Fork Power Station near Gillette.

Led by TDA and in collaboration with global energy technology company SLB as the technology development and deployment partner, the project is a large-scale pilot with the aim of testing a sorbent-based, post-combustion carbon capture system capable of capturing 158,000 metric tons of carbon dioxide each year – an amount equivalent to the annual CO<sub>2</sub> emissions of 35,000 gasoline-powered cars.

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# MTR Carbon Capture Awarded DOE Funding for Integrated CCS Demonstration Project at Dry Fork Station

Membrane Technology and Research (MTR) Carbon Capture announced it has been selected to receive \$4.6 million in funding from the U.S. Department of Energy's (DOE) Office of Clean Energy Demonstrations (OCED) to develop a Front-End Engineering Design (FEED) study for an integrated carbon capture and storage (CCS) project at Basin Electric Power Cooperative's Dry Fork Station, a coal-based power plant near Gillette, Wyoming. The Wyoming Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Project, led by the University of Wyoming School of Energy Resources (SER), is a strategic partner for sequestering the captured CO<sub>2</sub> and is a co-recipient on this award.

The project includes a FEED study for a proposed capture plant featuring MTR Carbon Capture's secondgeneration PolarisTM membrane. The project aims to capture, compress, and store onsite 3 million tonnes of  $CO_2$  per year, achieving at least a 90% carbon capture rate.

#### READ MORE >

### **Center for Carbon Capture and Conversion**

#### UW Researchers Publish Results Assessing Coal Char as a Soil Amendment

A University of Wyoming Research team led by Research Professional **Resham Thapa** in the School of Energy Resources (SER) published an article assessing the effects of coal char as a soil amendment in *Agronomy*, a top-tier journal in the fields of agronomy and crop science.

The article, "An Assessment of Plant Growth and Soil Properties Using Coal Char and Biochar as a Soil Amendment," was co-written by UW professor emeritus **Peter Stahl**; **Roger Coupal**, the community development specialist in the UW Department of Agricultural and Applied Economics; and **Mohan Dangi**, a professor in the Department of Geography and City and Regional Planning at California State University-Fresno.

The study demonstrated that the use of coal char and biochar as soil amendments could increase soil organic carbon and cation exchange capacity in semiarid rangeland soil.

#### READ MORE >





Short on time or simply want a general overview? Download the research briefs for a summary of the paper! **RESEARCH BRIEF >** 

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### Center for Economic Geology Research

#### UW Researchers Publish Study on Geological Hydrogen Storage

A collaborative study on hydrogen storage from researchers in the University of Wyoming's College of Engineering and Physical Sciences and the School of Energy Resources (SER) yielded a publication in the *International Journal of Hydrogen Energy*.

The article, titled "Experimental study on the effect of hydrogen on the mechanical properties of Hulett sandstone," was written by Ph.D. student **Ehsan Dabbaghi** in the Department of Civil and Architectural Engineering and Construction Management. The research was under the supervision of **Kam Ng**, the Provost's Term Professor and Hoy Engineering Fellow in the Department of Civil and Architectural Engineering and Construction Management.

Additional authors of the study are SER research professionals **Tyler Brown** and **Ying Yu** in the Center for Economic Geology Research to provide geological and reservoir expertise.

#### READ MORE >

#### DOWNLOAD THE RESEARCH BRIEF >

#### UW Researcher Receives Fulbright Award for Critical Mineral Research in Norway

**Erin Phillips**, a researcher in the University of Wyoming's School of Energy Resources (SER), has received a Fulbright Award to conduct research associated with energy challenges and sustainable resource management, specifically as they relate to critical materials.

Beginning in January 2025, Phillips will be based in Bergen, Norway, at NORCE – an independent research institution dedicated to addressing societal issues and to increasing sustainable value creation at the local, national and global levels. Over the course of five months, she will work with collaborators at the host institution to conduct a comparative study of the parallels between critical materials supply chains in Norway and Wyoming.

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School of Energy Resources Hosts Second Annual Meeting for CORE-CM project in Powder River Basin

The School of Energy Resources (SER) hosted the second annual forum for the Carbon Ore, Rare Earth, and Critical Mineral (CORE-CM) project in the Powder River Basin (PRB).

The event took place on April 24 at the Northern Hotel in Billings, Mont., as well as online. It was open to any interested stakeholder, especially those located within the PRB of Montana and Wyoming.

The day-long forum allowed stakeholders and project partners to learn about updates and overviews of the varying tasks on the project, as well as hear from some featured keynote presentations, and participate in discussion sessions geared toward finding solutions for the development of a viable domestic supply of rare earth elements, critical minerals, and other valuable products.

#### WATCH RECORDING >





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### **Center for Energy Regulation and Policy Analysis**

#### UW School of Energy Resources Releases Toolbox for Community Benefits Planning

The University of Wyoming School of Energy Resources (SER) has released a resource guide and webpage to help Wyoming stakeholders craft community benefit plans (CBPs) in Wyoming.

Led by SER research professionals **Selena Gerace** and **Madeleine Lewis** in the Center for Energy Regulation and Policy Analysis (CERPA), the toolbox provides a summary of key resources and strategies to use as guidance for developing CBPs in relation to applications for federal funding from the U.S. Department of Energy (DOE).

In addition to incorporating CBPs into the internal projects at SER-led projects, many SER researchers have been approached by statewide organizations and private companies operating in Wyoming for their expertise and assistance. The Toolbox guides those seeking assistance to resources in the state and will empower them to pursue more funding opportunities that require a CBP.

#### READ MORE >

#### **CERPA Releases Paper Examining Natural Gas Markets for Wyoming Producers**

The Center for Energy Regulation and Policy Analysis (CERPA) in the School of Energy Resources (SER) has released a white paper examining the challenges and opportunities facing exports of Wyoming natural gas to decarbonizing western markets in California, Washington, Oregon, and Nevada.

Authored by Senior Research Professional for Energy Policy **Esther Wagner**, and in collaboration with **Melissa Firestone**, an energy economist working under contract with CERPA, the paper provides an overview of natural gas production in Wyoming, explains the challenges facing exports of the State's natural gas posed by other states' energy policies, and describes how Wyoming is uniquely positioned to prosper in this new energy landscape given the low-carbon attributes of its natural gas resource.

#### READ MORE >

#### DOWNLOAD THE RESEARCH BRIEF >

#### SER's Madeleine Lewis Publishes with ABA Defining Environmental Justice and What it Means for Energy Communities

**Madeleine Lewis**, attorney and associate research professional of law and policy in the School of Energy Resources' (SER) Center for Energy Regulation & Policy Analysis (CERPA) and Center for Economic Geology Research (CEGR), published an article in the Winter 2024 edition of the American Bar Association's *Natural Resources & Environment Magazine* helping to define the term 'environmental justice' and what it means for energy communities.

The article examines the challenges of implementing a one-size-fits-all framework of environmental justice, particularly for rural energy states like Wyoming.

READ MORE >





### **3D Visualization Center**

# UW's 3D Visualization Center Develops Tool for Understanding Carbon Storage

The 3D Visualization Center at the University of Wyoming School of Energy Resources (SER) is developing a powerful outreach and communication application to help the public understand the mechanics of underground carbon storage as part of the Wyoming CarbonSAFE project in the Powder River Basin.

Located adjacent to Basin Electric Power Cooperative's Dry Fork Station near Gillette, the Wyoming CarbonSAFE project is part of a national initiative to capture and permanently store large volumes of carbon dioxide deep underground.

The new interactive visualization tool developed by the 3D Visualization Center allows users to see and experience the sheer scale and depth of the project, as well as understand the different geological formations that serve as storage zones and caprock seals.



#### READ MORE >

### **Research Highlights**

 Construction commenced at the Wyoming Innovation Center for the Pyrolysis Pilot Project in the Center for Carbon Capture and Conversion (CCCC) including the installation of the rotating kiln!



• Engineering Researcher **ChooKim Lau** received the 2024 Outstanding Master's



Thesis Award. Housed in the Department of Civil and Architectural Engineering and Construction Management and funded by the School of Energy Resources, Lau's thesis on the coal-derived bricks set the stage for the entire array of coal-to-

products under development at UW.

 Associate Research Professional in the Center for Economic Geology Research Lily Jackson presented in Platte County about critical minerals and rare earth elements as part of the 'UW in Your Community Event.'



The Hydrogen Energy Research Center ( $H_2ERC$ ) will be working on a University of Texas at Austin - led project to explore geologic hydrogen. The proposed \$1.7 million project was selected for funding from the Department of Energy Advanced Research Projects Agency Energy (ARPA-E) and will aim to stimulate hydrogen production from iron-rich rocks using natural catalysts. In collaboration with  $H_2ERC$ , the team will explore the feasibility of this process on different rock types across the United States. **READ HERE >** 

# OUTREACH

#### Spring 2024 Distinguished Speaker Series

The University of Wyoming School of Energy Resources (SER) hosted its regular Distinguished Speaker Series during the spring 2024 semester. The series is designed to bring in experts from all disciplines as they relate energy. Speakers regularly come from academia, industry, government, and business sectors.

Featured speakers in the spring included: **Ashley Harpstreith**, Executive Director of the Wyoming Taxpayers Association; **Caryn Campbell**, Director of Operations for Enbridge's Southwest Region; and **Katherine Dombrowski**, Senior Process Engineer at Trimeric Corp.



### **Outreach Highlights**

- Gillette College and SER hosted a community educational lecture on Carbon Capture & Storage in Gillette. SER Senior Director of Research Scott Quillinan and CEGR Director Fred McLaughlin presented at the event.
- Please stay up to date on our upcoming events by checking the EVENTS CALENDAR >



Looking for ways to stay connect to SER? Connect SER Director of Outreach Christine Reed at christine.reed@uwyo.edu | (307) 766-6708  SER hosted a booth at the AAPG CCUS Conference in Houston featuring information on SER research projects and the Wyoming Integrated Test Center (ITC).



 SER Executive Director Holly Krutka was a featured guest on two podcasts. On the podcast, 'Wyoming My 307,' she discusses coal in Wyoming and the incredible research efforts led by SER, and on the podcast, 'EcoRight Speaks,' she discusses Carbon Capture and Storage technology in Wyoming.



#### PHILANTHROPIC SUPPORT

# PHILANTHROPIC SUPPORT

Gift of \$250,000 to UW Supports Carbon Capture, Utilization and Storage

A \$250,000 gift to the University of Wyoming School of Energy Resources (SER) from energy infrastructure leader Williams will advance carbon capture, utilization and storage (CCUS) within the state and beyond.

**READ MORE >** 



The gift supports the newly created Carbon Dioxide  $(CO_2)$ Storage Excellence Fund, which will provide increased flexibility in addressing key challenges for the near, medium and long term. Most immediately, the excellence fund will provide support needed for current projects to transition from research and demonstration to commercialization.

The charitable contribution will be matched dollar-for-dollar by the state of Wyoming and will jump-start the program with immediately expendable funds. It also will provide the foundation for a multimillion-dollar endowment that will have a sustained impact for generations to come.

### CO<sub>2</sub> Storage Excellence Fund

The University of Wyoming School of Energy Resources has long been working on science, technology, outreach and policy to position Wyoming and industry for success in CO<sub>2</sub> storage.

The  $CO_2$  Storage Excellence Fund will provide the support needed to transition from research to commercialization, which will ensure the success of this field long into the future.

Support raised for the CO<sub>2</sub> Excellence Fund will create immediately expendable dollars to jump start the program as well as a multi-million dollar endowment to provide a sustained impact for generations to come.

Anyone interesting in making a contribution toward this fund, is invited to contact the UW Foundation.

### MAKE A GIFT

#### **CONTACT THE UW FOUNDATION**



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