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2021

IN THIS ISSUE:

UNIVERSITY OF WYOMING

School of Energy Resources

QUARTERLY NEWSLETTER

Vol. 2, Issue 4

ACADEMICS

RESEARCH

OUTREACH

MESSAGE FROM THE EXECUTIVE DIRECTOR

To the SER community,

As we conclude another prosperous and productive year at the School of Energy Resources, we reflect back on all that we have accomplished.

While 2021 was not without its challenges, it has been filled with many exciting new developments and the final quarter of the year was no exception. In this newsletter, we are pleased to share updates about the activities, projects, and people that have contributed so much to the continuing mission of SER – with many ongoing activities running to the very end of the year.

Over the course of the last year SER had a renewed focus on its academic program, launching a minor in energy resource management (ERM). Students in the academic program have continued to thrive, and we are pleased to send two new graduates out into the world - one with a degree in Energy Resource Management and Development and the other with a minor in Energy Resource Management - to represent the University of Wyoming and hopefully work in the energy sector.

SER has also reinvigorated its outreach program to connect with more stakeholders at UW, in Wyoming, and beyond. With evolving energy discussions on the rise, engagement with the Wyoming community is more important than ever.

Our research programs have expanded significantly. We are continuing to grow our incredibly talented research team to manage our increasing efforts in a variety of energy topics and are positioning Wyoming to continue to be an energy leader long into the future.

Finally, our flagship programs of carbon engineering and the Wyoming CarbonSAFE project have continued to celebrate many accomplishments throughout the year - the pinnacle being the drilling of a second exploratory well over the holiday break to advance CCUS in Wyoming!

We thank you for your support and we wish you all the best in the new year!

Sincerely,

Holly Krutka

Holly Krutka, Ph.D.

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ACADEMICS

SER Welcomes Karolina Klatka as New College Relations Representative

The School of Energy Resources (SER) recently hired **Karolina Klatka** as the new College Relations Representative. In her new role, Klatka will work directly with SER's Academic Program to actively recruit new students to the Energy Resource Management and Development (ERMD) degree program as well as the Energy Resource Management (ERM) minor.

A graduate from the University of Wyoming, Klatka earned dual degrees in Dance and Environmental Systems Science in 2020. Following graduation, Klatka spent a year at the Jagiellonian University in Kraków, Poland to complete a language certificate in Polish.

Originally from Poland, Klatka grew up in Colorado and has current familial ties to Rock Springs, Wyo. She was drawn to the University of Wyoming for its affordability, extremely reputable education, and her love of the outdoors.

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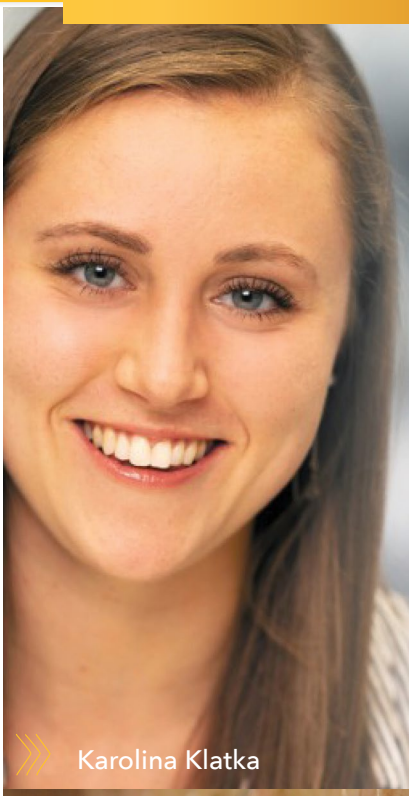

Karolina Klatka

Student Profile: Juliana Santarelli

Women in science technology, engineering, and mathematics (STEM) fields have made significant strides in recent years to increase representation and participation. The School of Energy Resources (SER) is proud to facilitate the critical role of girls and women in the scientific and technological communities through the Energy Resources Management and Development (ERMD) degree.

A native of Colorado, senior **Juliana Santarelli** decided to attend the University of Wyoming because of the small town feel and positive learning experiences that result from the close-knit campus community.

Always attracted to STEM, she began her undergraduate degree as a petroleum engineering major, but quickly switched over to the School of Energy Resources when she realized she wanted a broader energy education.

Santarelli is pursuing her ERMD degree with a concentration in Energy and Environmental Systems concentration – the more science heavy option of the academic program.

READ MORE >


Juliana Santarelli

Academics Highlights

- SER College Relations Representative **Karolina Klata** led focus groups with ERMD students to get feedback on the academic program, and provided students with the opportunity to talk about themselves, discuss their experiences, and listen to different perspectives and stories.

- SER is launching a mentorship program in spring 2022 for students majoring and minoring in the academic program. The intent of the program is to connect underclassmen with upperclassmen, and to foster a welcoming and fun community, while building connections.

UW Student Team Wins XPRIZE and Musk Foundation Award in Carbon Removal Competition

A team of students from the University of Wyoming is a winner of the Carbon Removal Student Competition funded by XPRIZE and the Musk Foundation.

XPRIZE announced that 23 student-led teams won the $5 million Carbon Removal Student Competition, which is part of the $100 million XPRIZE for carbon removal supported by the Musk Foundation. The competition was launched, in part, to fund early-stage concepts from the next generation of carbon removal innovators and to remove barriers to entry for those interested in the main competition.

The UW team – **Shane Heavin**, of Rock Springs; **Danielle Jones**, of Gillette; **Anna Savage**, of Greybull; and **Lander Stone**, of Laramie – submitted a project proposal in the category of Measurement, Reporting and Verification Technologies to improve the design of existing carbon soil gas monitoring sensors created and produced by Earth Platform Systems (EPS).

READ MORE >

Shane Heavin, Lander Stone, and Anna Savage

December Commencement Celebrates Energy Graduates, Alumni and First Graduate with New Energy Resource Management Minor

The winter commencement ceremony is a major milestone for the School of Energy Resources (SER). This year, SER celebrated graduates in the Energy Resource Management and Development (ERMD) degree program, acknowledged past alumni, and graduated the first student to complete the minor program that was launched in fall 2021.

Meredith Hoerman of Franklin, Tenn. graduated from UW with a B.S. in Management with a concentration in entrepreneurship, and minors in economics and energy resource management.

Jak Tanner of Big Piney, Wyo. was the only ERMD student that graduated in the December ceremony. With a background rooted in the energy industry, Tanner pursued an ERMD degree with an Energy and Environmental Systems concentration.

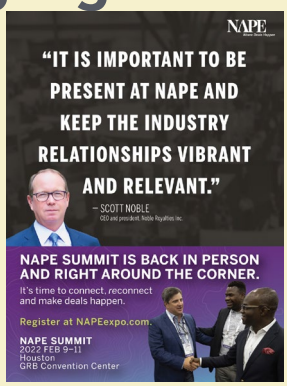
READ MORE >

Meredith Hoerman

Jak Tanner

Academics Highlights

- SER will be at the NAPE Summit in February! Register for event and come see us! Students as well as the SER Academic Director **Kami Danaei** will be in attendance.



- **Dr. Maohong Fan**, a UW School of Energy Resources professor in chemical and petroleum engineering, once again made Clarivate Analytics' list as one of the world's most highly cited researchers.
- Professor **Tara Righetti** recently released a new casebook on The Law of Oil and Gas. **Available to Order Here >>>**
- 2021 marked the 10-year anniversary of the first SER graduates. **Sabrina Hamner Forbis** and **Kyle McDonald** were the first ERMD graduates in 2011.

RESEARCH

Righetti, Hill Named Co-Directors of Nuclear Energy Research Center at UW School of Energy Resources

The UW School of Energy Resources has selected **Tara Righetti** and **Caleb Hill** as co-directors for the new Nuclear Energy Research Center (NERC) of Excellence.

Tasked with driving organization efforts at UW on nuclear, Righetti and Hill will build on upon their existing areas of expertise, interpersonal networks, and nuclear research projects to stand up the research center.

Representing both the social sciences and hard sciences, the duo will work together to manage research efforts among the campus community, and lead collaborative partnerships with national labs and external stakeholders to advance nuclear energy engagement in Wyoming.

In addition to participating in discussions with other partners and stakeholders, the co-directors will be responsible for the preparation of a 5-year strategy for research and engagement for the center and support capacity building at UW through leading a colloquium series.

READ MORE >


Tara Righetti, Esq.


Dr. Caleb Hill

Two UW Teams Make National Semifinals of DOE Geothermal Lithium Extraction Prize

Two University of Wyoming research teams have been named Phase 1 semifinalists of the U.S. Department of Energy's (DOE) American-Made Geothermal Lithium Extraction Prize, a $4 million competition designed to advance technologies and techniques to support direct lithium extraction from geothermal brines.

Projects led by principal investigators **Bruce Parkinson**, a professor in the UW Department of Chemistry and the School of Energy Resources (SER), and **Katie Li-Oakey**, an associate professor in the UW Department of Chemical Engineering, were two of 15 nationwide named as semifinalists.

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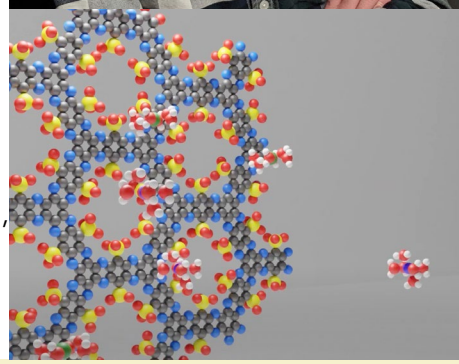


Research Highlights

- The U.S. Department of Energy's (DOE) Office of Fossil Energy and Carbon Management recently announced up to $644,000 for the University of Wyoming School of Energy Resources (SER) to assess the economic impacts of fossil energy production in Wyoming and evaluate opportunities and research needs to deploy clean hydrogen technologies. **READ MORE >**
- The University of Wyoming's School of Energy Resources (SER) and the 9H Research Foundation are collaborating on a $4,000 student research energy competition. Students entered in the competition will spend the spring semester developing an energy project on a designated topic addressing a critical energy need.
  MORE INFO >
- The University of Wyoming (UW) School of Energy Resources executive director **Holly Krutka** is one of twelve judges serving on the selection panel for the XPRIZE Carbon Removal competition incentivized and funded by Elon Musk and the Musk Foundation. **READ MORE >**

Center for Economic Geology Research

SER Welcomes Garrett Gay to the Center for Economic Geology Research

The School of Energy Resources (SER) is pleased to welcome **Garrett Gay** to the Center for Economic Geology Research (CEGR) as the newest research scientist on the team.

In his new position at SER, Gay will continue to utilize and expand his area of expertise in geochemistry and REE occurrences by aiding the recently launched Department of Energy (DEO) funded carbon-ore, rare earth, and critical mineral (CORE-CM) projects in the Powder River Basin (PRB) and the Greater Green River Basins (GGRB).

READ MORE >


Garrett Gay

Center for Economic Geology Research Presents Research at Major International Technical Conference

A recent article on carbon storage written by researchers in the School of Energy Resources (SER) was presented at the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC).

Research scientist **Ying Yu** is the lead author on the paper entitled, "Supercritical CO2-Foam Screening and Evaluation for CO2 Storage Improvement in Sandstone and Carbonate Formations" which was presented among 127 technical sessions and 7 technical panel sessions spread across four days in mid-November.

READ MORE >


Dr. Ying Yu

Researchers at School of Energy Resources Deploy Microseismic Sensors as Part of Ongoing Baseline Monitoring Operations for the Wyoming CarbonSAFE Project

Researchers at CEGR deployed a series of microseismic sensors as part of the ongoing baseline monitoring operations for the Wyoming CarbonSAFE Project.

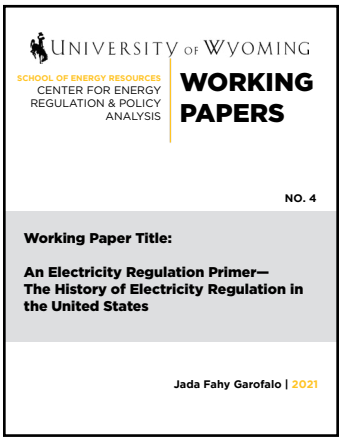
Research scientists **Charles Nye** and **Garret Gay** traveled to Campbell County to assist the installation of 154 sensors around the project site located at Basin Electric Power Cooperative's Dry Fork Station (DFS) and surrounding areas for the purpose of collecting data and determining the normal seismic activity for the area. **READ MORE >**

CEGR Highlights

- Both CORE-CM projects in the Powder River Basin (PRB) and the Greater Green River Basins (GGRB) held kickoff meetings for the projects before the project teams and Department of Energy (DOE).
- Research scientists **Ying Yu** and **Garrett Gay** from CEGR were selected to attend the 2021 Research Experience in Carbon Sequestration (RECS) program. **READ MORE >**
- CEGR is drilling a second exploratory well as part of the Wyoming CarbonSAFE Project -- Phase III. The well will lead to valuable information to fully characterize a second carbon storage site in Wyoming.

Center for Energy Regulation and Policy Analysis

The Center for Energy Regulation and Policy Analysis at the School of Energy Resources Releases Two New Working Papers



The Center for Energy Regulation & Policy Analysis (CERPA) at the School of Energy Resources (SER) has posted two new working papers to its working paper series.

The first paper released is an Electricity Regulation Primer authored by SER Research Scientist **Jada Garofalo**. The paper provides the history of electricity regulation in the U.S., which is meant to help states navigate the impending shift in generation, regardless of the regulatory scheme that operates where they sit.

Serving as a foundational resource, the primer will enable future work on the topic that will explore and recommend ways to value, prioritize, and define resiliency in electricity systems in order to facilitate the forthcoming transition that is likely to encompass varied forms of electricity generation and numerous regulatory schemes.

The second working paper released entitled, "Evaluation of Net Zero Scenarios for the Wyoming Power System," presents a scenario-based techno-policy analysis of a range of pathways for Wyoming to transition to net zero.

Led by CERPA research affiliate **Niall Mac Dowell** of Imperial College London, the study is a collaborative piece written with Garofalo, as well as co-authors **Yoga Wienda Pratama** of Imperial College London, and **Kipp Coddington** of SER.

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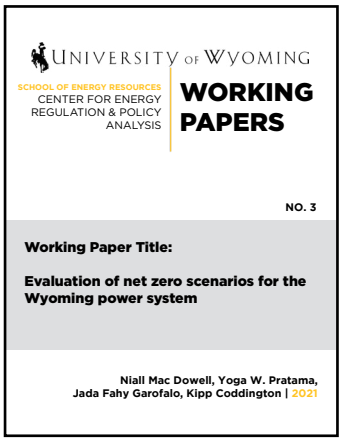


CERPA Highlights

- **Kipp Coddington** served as panelist on the Wyoming Energy Panel at the 2021 Governors Business Forum hosted by the Wyoming Business Alliance in November. The panel focused on the future of Wyoming's energy economy and what is feasible to address the changing global demands.

- CERPA hosted a webinar on Rare Earth Elements and Critical Mineral Development in Wyoming. The panel discussed conventional and unconventional REE sources and processes, a summary of the REE market, current REE law and policy, and opportunities for REE development in Wyoming. **WATCH PRESENTATION >**
- Upcoming publication - CERPA will release an economic analysis of Rare Earth Elements in early 2022.

Center for Carbon Capture and Conversion

UW SER's Collaboration Proposal With Baker Hughes Selected for DOE Funding

The University of Wyoming will receive funding from the U.S. Department of Energy (DOE) as a subawardee in a collaborative grant proposal with Baker Hughes Energy Transition LLC to develop innovative solutions and uses for coal waste.

The joint proposal is among seven projects nationwide recently selected by DOE. UW will support the Baker Hughes project team in researching an economic, novel use of coal waste in additive manufacturing processes.

The joint team will determine the benefits of combining coal-derived, graphene-like materials with polyetheretherketone (PEEK) filaments – a critical feedstock used in additive manufacturing – for use in 3D printing applications, such as fused deposition modeling or stereolithography. Coal-enhanced PEEK is expected to improve corrosion resistance and the strength of 3D printed parts.

The project builds upon ongoing and innovative research initiated by UW's Center for Carbon Capture and Conversion (CCCC) in the School of Energy Resources (SER), which actively works to support existing markets and find novel, nonenergy uses for Wyoming coal.

READ MORE >

Center for Carbon Capture and Conversion Provides Demonstration of Coal-Derived Bricks to High School Students

The CCCC provided a demonstration to high school students from Cheyenne East High School on the coal-derived bricks that have been developed in the center. Students were able to ask questions and engage directly with the researchers on the project team. CCCC Director **Richard Horner** joined UW graduate student **ChooiKim Lau**, who serves as the project lead, post doctoral research associate **Saheed Olawale Olayiwola**, undergraduate student **Noah Scott**, and graduate student **Md Tarik Hossain** to provide the demonstration.

Pictured Left to Right - ChooiKim Lau, Saheed Olawale Olayiwola, Noah Scott, Md Tarik Hossain

CCCC Highlights

- The **CCCC** has released a commercialization plan for its coal to products projects. Carbon engineering projects in the center began in 2016 with the development of a process to convert PRB coal into a wide array of products. These include asphalt for paving and roofing, bricks, flooring and wall plaster, as well as carbon-based agricultural products to improve crop growth, improve soil fertility, and reduce farming costs. In addition, other products under development include using coal derived carbons for energy storage applications and composite materials. Projects are projected to be ready for first-of-a-kind commercialization in 2027-2028.

OUTREACH

SER Attends Basin Electric Power Cooperative Annual Meeting in Bismark, ND

The School of Energy Resources attended the Basin Electric Power Cooperative Annual Meeting in Bismarck, ND. SER's **Christine Reed** attended the meeting along with **Scott Quillinan**, **Fred McLaughlin** and **Kipp Coddington** to represent SER. Quillinan, McLaughlin and Coddington serve as co-PI's on the Wyoming CarbonSAFE Project which is run in partnership with Basin's Dry Fork Station near Gillette, WY.

Pictured Left to Right - Scott Quillinan, Fred McLaughlin, Kipp Coddington

SER Hosts Webinars to Provide Timely Access to Important Energy Information

During the last quarter of the year, School of Energy Resources (SER) hosted four webinar presentations on important energy topics to Wyoming. The presentations covering different energy topics were hosted in partnership with SER's Research of Excellence, the Wyoming Energy Authority, Idaho National Laboratory, and the UW Center for Blockchain and Digital Innovation.

Presentations included:

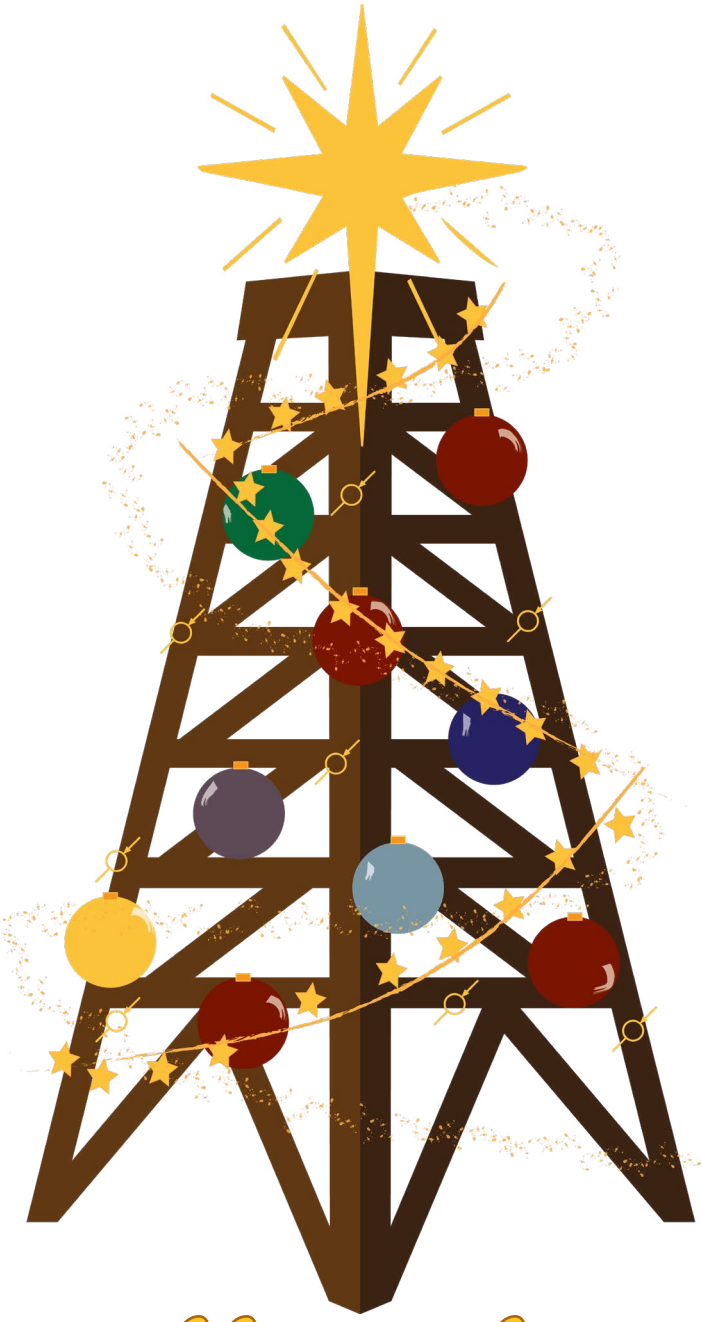
- Rare Earth Element and Critical Mineral Development in Wyoming, November 15, 2021
- Bitcoin Mining in Wyoming Townhall, November 30, 2021
- Advanced Nuclear Frontiers Webinar Series: Advanced Nuclear 101 - Understanding the Basics of advanced Nuclear Technology and What it Means for Wyoming, December 13, 2021
- Carbon Capture, Utilization and Storage Development in Wyoming, December 16, 2021

All of the presentations are available to watch online on the SER Events webpage. **WATCH HERE >**

Outreach Highlights

- The 2021 Fiscal Year (FY21) Annual Report for the School of Energy Resources is now available to the public on the SER homepage. The annual report covers activities that took place from July 1, 2020 through June 30, 2021. **DOWNLOAD HERE >**

- SER sponsored the 2021 Governor's Business Forum hosted by the Wyoming Business Alliance.
- SER hosted the annual CLERR Landscape Discussion on Energy Law and Policy in the Rockies conference in partnership with the College of Law. The full day conference was presented virtually and covered topics including Small Modular Nuclear Reactors, Hot Topics in Oil & Gas, and Low Carbon Energy in the Rocky Mountain West. **WATCH HERE >**



Jingle Bells, Holiday Wells

Happy Holidays from the University of Wyoming School of Energy Resources

UW | School of Energy Resources