

ANNUAL REPORT

2025

Western Research INSTITUTE

YOUR WAY TO SUCCESS

Don't delay until later what can be done now

COAL-TO-ASPHALT

MESOPHASE PITCH AND CARBON FIBERS

BIOBINDERS FROM BIOMASS

NCHRP 9-60

ARCTECH AND OTHER COAL PILOT

www.westernresearch.org





TABLE

01 - 02

VISION & MISSION

03 - 04

BOARD OF DIRECTORS

05

BOARD CHAIR STATEMENT

06

CEO STATEMENT

07 - 08

WRI TODAY

09 - 10

LIFE OF THE INSTITUTE

11 - 12

COMMUNICATION

13 - 14

RECORD ATTENDANCE FOR PARC 2025

15

WRI PROJECTS

16

COAL-TO ASPHALT

17

BIOBINDERS FROM BIOMASS

18

NCHRP 9-60

19 - 20

MESOPHASE PITCH AND CARBON FIBERS

21 - 22

COAL RENAISSANCE AT WRI

23 - 24

HOSTING BUSINESSES

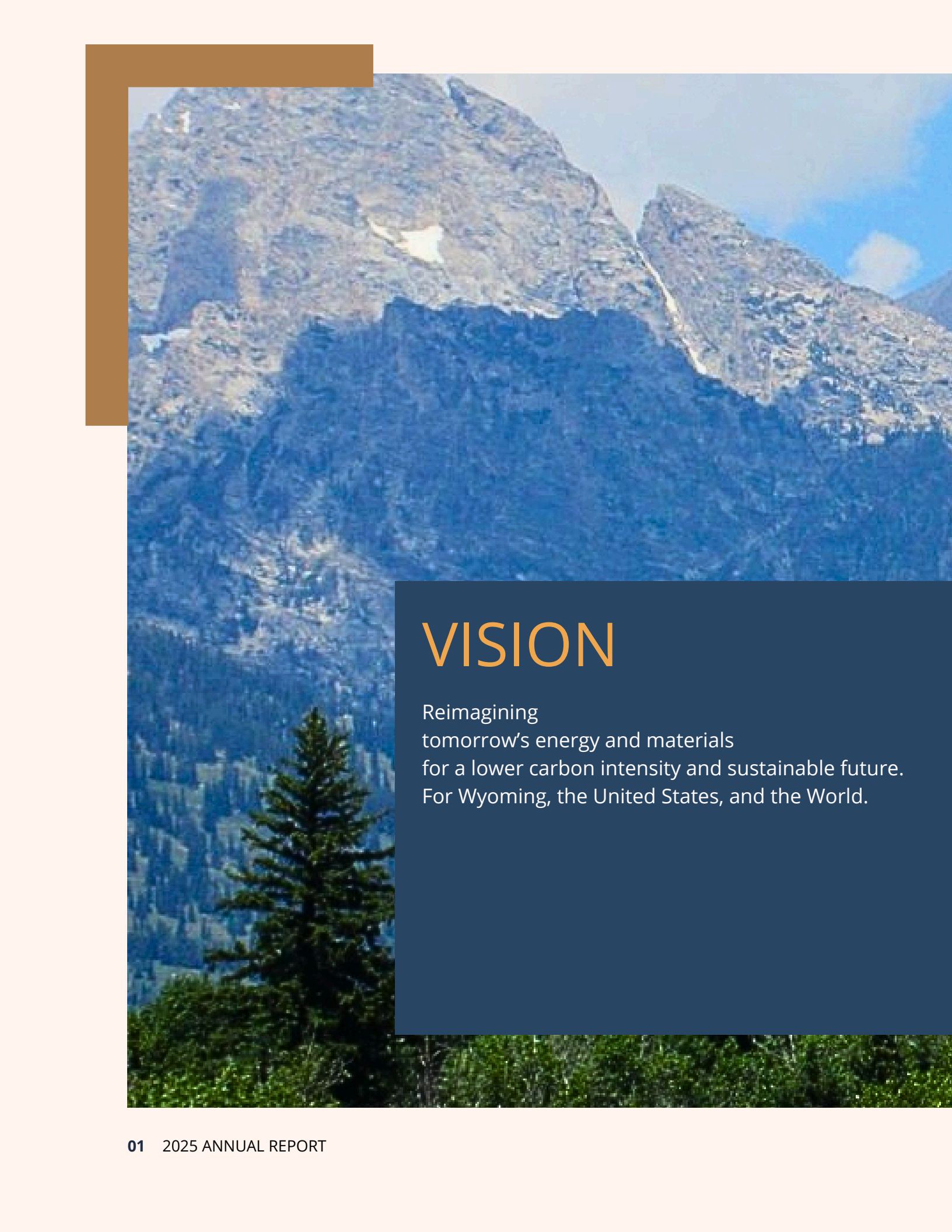
25

2025 SCIENTIFIC PRODUCTION

26 - 27

DONATION / CREDITS

CONTENTS



VISION

Reimagining
tomorrow's energy and materials
for a lower carbon intensity and sustainable future.
For Wyoming, the United States, and the World.



MISSION

Partnering
to innovate, develop, and commercialize
technologies using advanced sustainable
chemistry, analysis, and innovative engineering,
for carbon, natural resources, and wastes.

Board of Directors



MR. RALPH SHIRTS

Chair
President
Ralph Shirts Consulting LLC

MR. ROB HURLESS

Former Deputy Director
Enhanced Oil Recovery Institute
University of Wyoming

DR. ANNE ALEXANDER

Assistant Dean
College of Business
University of Wyoming

DR. HOLLY KRUTKA

Former Executive Director
School of Energy Resources University
of Wyoming

DR. MYRON B. ALLEN

Former Professor Emeritus
of Mathematics,
University of Wyoming

MR. RICHARD C. WILSON, J.D.

Managing Director
Technology Licensing Company LLC

DR. OPINDER BHAN

Former Senior Science Advisor,
Royal Dutch Shell

BOARD CHAIR STATEMENT



2025 marked an important transition for Western Research Institute (WRI). At year's end, Dr. Myron Allen concluded his distinguished seven-year tenure as Chairperson of the Board. I am honored to succeed Dr. Allen and sincerely thank him for his steady leadership and the strong foundation he has helped shaping the Institute into what it is today. We are fortunate that Dr. Allen will continue to serve as a member of the Board, ensuring continuity as we move forward. This transition reflects not a change in direction, but a renewed commitment to advancing WRI's mission with a clear focus on long-term sustainability and growth.

Following the celebration of our 100th anniversary in 2024, this past year has focused on strengthening how we communicate WRI's value to industry, government partners, and other stakeholders. The communication initiatives launched last year—modernizing our messaging, enhancing our digital presence, and more systematically highlighting our technical achievements—are now being fully leveraged to support business development. As a non-profit R&D institute operating on carbon chemistry, natural resources, and waste valorization, WRI must continuously articulate not only technical excellence, but also measurable impact and return on investment for our partners.

In the past year, the Institute has aligned its projects with a more proactive market engagement strategy. Our objective is clear: build a diversified and resilient funding base while remaining faithful to our public-interest mission. By integrating communication, partnership development, and research strategy, WRI is positioning itself to compete effectively for contracts, grants, and collaborative ventures in an increasingly demanding and fast-changing environment.

The work presented in this Annual Report demonstrates that WRI is not only scientifically robust, but organizationally sound. With disciplined execution and continued engagement from our partners and stakeholders, we are confident that WRI will remain a sustainable, independent leader in chemical research for decades to come.

Ralph Shirts

BOARD CHAIR

CEO STATEMENT



2025 will be remembered as a key year in Western Research Institute's history! Our two groups, RenuMAT, led by Dr. Jeramie Adams, and SET, led by Justin Martin, have collectively achieved the highest level of activity for WRI since 2021. Congratulations and thank you to the whole team for such a big success!(Note: you may want to spell out what RenuMAT and SET stands for)

More precisely, RenuMAT has secured record activity through a sizeable number of diverse projects thanks to their healthy research pipeline. Several of them are highlighted in this report. Our patented biosolvent-upcycling technology, currently being used for the Coal-to-Asphalt (CTA) project with the University of Wyoming (UW) School of Energy Resources remains their largest project to date which has achieved production of coal-based asphalt binder with similar properties as petroleum-based paving grade asphalt binder. We applied this technology to transform biomass into asphalt binder-like substances. In parallel, we produced our first carbon fibers from mesophase pitch. WRI remains heavily focused on developing non-energetic applications for hydrocarbons like Wyoming coal or heavy oil bottoms. Another huge accomplishment has been the finalization of national cooperative highway research project NCHRP 9-60 on the low temperature specifications of asphalt binders, which started almost 10 years ago. And finally, the 62nd edition of the Petersen Asphalt Research Conference was an impressive success with record attendance.

SET has also had a busy year on the Solvent-DeAsphalting (SDA) unit, in collaboration with the KBR group as described in the previous annual report. New in 2025, we started a partnership with Arctech where WRI will be hosting their pilot units for the microbial digestion of coal. This technology is a nice addendum to the other coal pilots that WRI still hosts. This is particularly relevant locally here in Wyoming, where the coal industry represents more than 40% of the US production and is trying to revive production to historical levels. Also, in collaboration with UW's business incubator, "Impact 307" we strengthened our business-hosting activity launched in 2024.

Most of our projects are long-term and will continue throughout 2026 and after. One of the highlights of 2025 is the fact we have magnified the synergies between the teams. Not only have some projects use both our laboratory (RenuMAT) and pilot unit (SET) equipment and expertise, but both groups have shared colleagues to meet peak demands and to optimized personnel utilization. Our ability to work collectively as one single team is really unique and opens the possibility to tackle even larger projects.

Our main goals remained to deliver technically and scientifically, meet the yearly objectives set with our partners, and to deliver high quality results on time. In 2025 and the upcoming year we will focus our daily operations on 3 objectives:

- Consolidating cash reserves at the highest possible level. If 2025 has been a good year financially for WRI, our expenses still need to be carefully monitored so that we sustain our activity in the long-term. This is critical for maintaining and updating our advanced equipment and developing new applications. As a non-profit, we are eligible for tax-deductible donations. So, we launched on our website (see back cover page of this report), the possibility for generous donors to help us and already thank them for their much-appreciated support,
- Diversify of scientific work and client base. WRI has historically served primarily the asphalt, coal and oil industries and needs to extend the our reach to ensure a robust pipeline of continued activity. To this end, this year, we produced our first carbon fibers and started to ramp up our emerging activity on rare earth elements. 2026 should see the first major results on the rare earths elements opportunity. This work resonates with the national goal to insure US independence on critical minerals,
- Communicate. In our quest to make WRI's expertise better known to potential partners and all stakeholders, 2025 has seen a major initiative with the launch of our YouTube Channel and the release of 8 videos prepared with interns from UW. These initiatives, combined with a stronger presence on social networks such as LinkedIn, regular communications on our website and publications in scientific events and journals, will ensure increased visibility and project activity.

Thanks again to the team for a great 2025 and we count on you to keep up with the great work in 2026. We are proud to provide Wyoming based a World-class non-profit research institute, where talented chemists, technicians and engineers, can find a great workplace to grow professionally while helping to build a better future.

Didier Lesueur

CHIEF EXECUTIVE OFFICER

WRI TODAY



RENUMAT



JERAMIE ADAMS



The RenuMAT group for Renewable Upcycling Materials and Asphalt Technologies, is led by Dr. Jeramie Adams. It specializes in lab-scale chemistry:

- Hydrocarbons beyond combustion (products: asphalt binders, additives, mesophase pitch, carbon fibers... / feedstocks: coal, oil refining by-products, wastes...),
- waste upcycling & circular economy (asphalt, plastics, composites, biomass,...),
- formulation, analytical chemistry & rheology.

Jeramie Adams

SET



JUSTIN MARTIN

SUSTAINABLE EMERGING TECHNOLOGIES

Western Research
INSTITUTE

The SET group for Sustainable Emerging Technologies, is led by Justin Martin. It specializes in pilot-scale units:

- Hydrocarbon beyond combustion and waste upcycling,
- Refining/distillation, oil partial upgrading & Solvent DeAsphalting (SDA),
- Catalyst development/testing,
- And any tailor-made pilot/demonstration-scale plant

Both groups work together in a complementary way on many projects. This is for example the case with the bio-based binder technologies (including coal-to-asphalt – see corresponding articles in this report), mesophase pitch and carbon fibers (see corresponding article in this report) and our new initiatives with rare earth elements.

Justin Martin

LIFE OF THE INSTITUTE



“

Do you know that 66% of WRI's employees were born and raised in Wyoming? Many of them got their highest degree from UW!

In parallel to helping retain local talent, WRI also attracts some of the best specialists in the World, on very specific areas. 5 nationalities outside of the USA, from Europe, Asia and Africa, are present at WRI.

In 2025, our team experienced a few changes, with Michelle Holmes, our HR manager retiring and being replaced by Sabrina Ecker. In addition to HR skills,

Sabrina brings unique communication skills, and she was behind the creation of our YouTube Channel and most of our linkedin posts.



YEARS OF SERVICE

We also celebrated several work anniversaries, with Chris Seago celebrating 5 years with WRI. Chris performs rheological tests, which are needed for most projects of the RenuMAT team.

Cole Tiejten celebrated 15 years with the Institute and is a key technician on SET projects.

Jason Trout has been 25 years with us, in a variety of roles. In addition to being involved in SET projects, he serves as a backup IT manager.

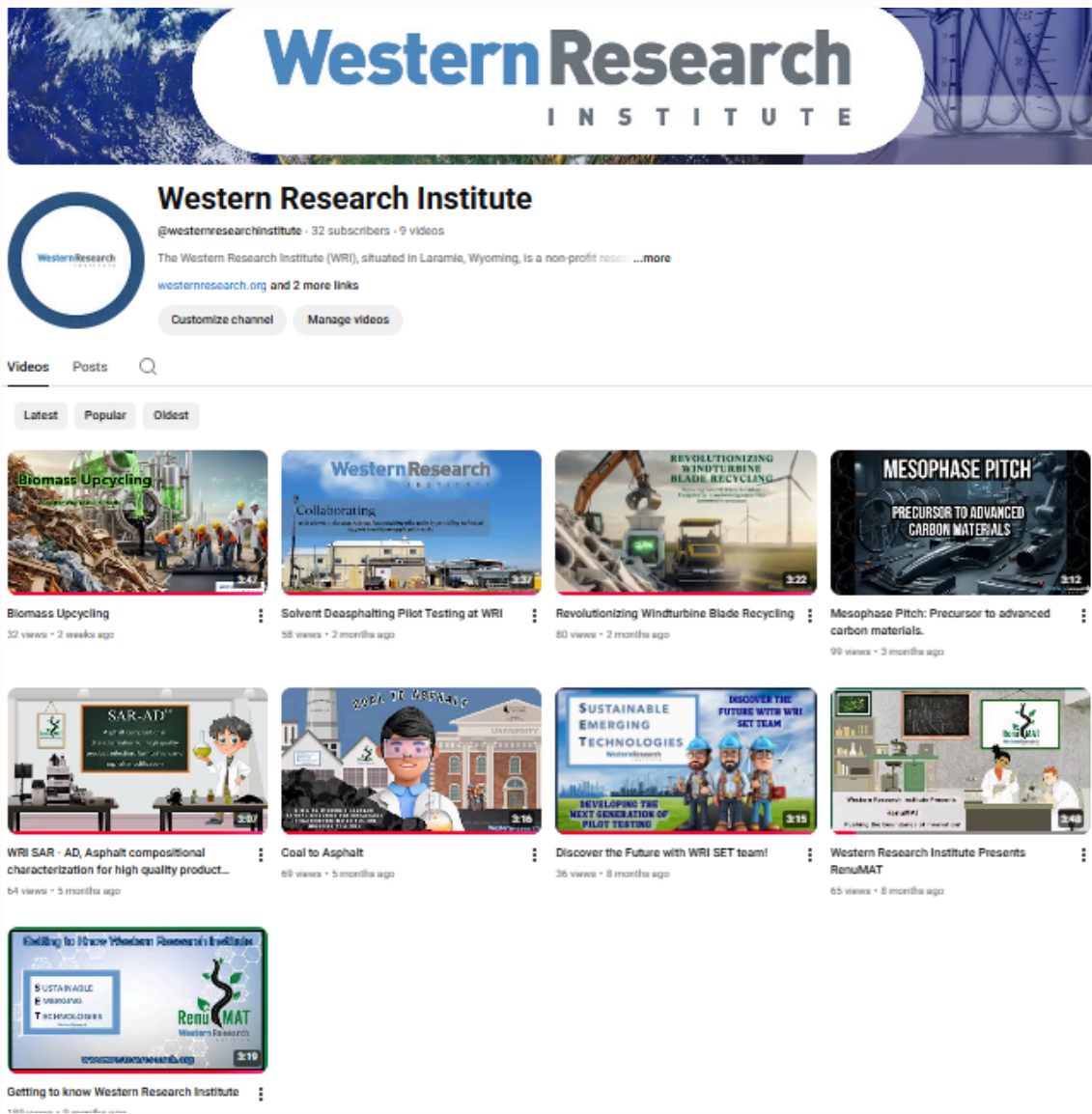
Finally, Morena Wroblewski achieved an impressive 50 years with WRI! She is our current IT Manager and also helps with shipping & receiving. She is also known Worldwide for her implication in PARC organization. Thanks a lot to all of them for their continued service to WRI!



WRI COMMUNICATION

Laramie is seen as a remote place for some of our potential partners. It might be difficult for them to plan a trip just to visit us. So, we decided to make it easier for anyone to better visualize what we offer by making short videos. To do this, we hired 2 interns from the University of Wyoming, Rhema Boabeng and Drake Crawford, who prepared 12 3-min videos on the Institute and some of our projects.

The first 8 have been released regularly throughout 2025, being advertised on our website and our LinkedIn page, together with the creation of our YouTube Channel.



youtube.com/@westernresearchinstitute



Caption: PARC 2025's opening session



Caption: For the first time, PARC hosted a well-received special session on asphalt roofing sponsored by the major US players.

“

The Petersen Asphalt Research Conference (PARC) began 62 years ago in 1963. It is heavily attended by asphalt paving and roofing specialists, with a unique focus on asphalt binder chemistry related to performance, that cannot be experienced anywhere else.

This year, PARC attracted a record 196 attendees, with a global participation encompassing 10 countries across the world. This edition was made possible thanks to the support of 16 sponsors and 10 exhibitors along with the second Stein Sponsor, consolidating a recently started annual tradition! In technical terms, PARC 2025 consisted of 36 presentations +14 posters spanning across 2.5 days, covering a range of important topics such as rheology, mixture physical characterization & specifications, asphalt chemistry, aging (and antioxidants), recycling and rejuvenation, alternative binders, case studies & field performance, artificial intelligence, etc.

For the first time, participants enjoyed a special session on asphalt roofing, sponsored by the main US asphalt roofing companies, where the many initiatives around sustainability and recycling options for asphalt shingles were discussed. Given how well it was received, a roofing session will be repeated in 2026.

Dr. Yogesh Kumbarger, the Conference Director, stresses that “In addition to the abstracts received, the 2025 conference included special invited presentations specifically focusing on the long-term supply of asphalt binders and roofing asphalts”. He further explains that “As always, PARC also provides great networking and business development opportunities for everyone, with lively sessions and of course, a cocktail reception and a banquet dinner”.

Furthermore, PARC’s “love for nature” legacy remains present and the conference ended with an outdoor hike exploring the beautiful landscape of Laramie and the nearby Medicine Bow National Forest.

Over the years, PARC has matured into a forum showcasing disruptive technologies that address the future of environmentally friendly alternative materials, methods, and characterization for binders, mixtures, and flexible pavements—while not losing its dedication to binder chemistry.



WRI PROJECTS



COAL-TO ASPHALT

BIOBINDERS FROM BIOMASS

NCHRP 9-60

**MESOPHASE PITCH AND
CARBON FIBERS**

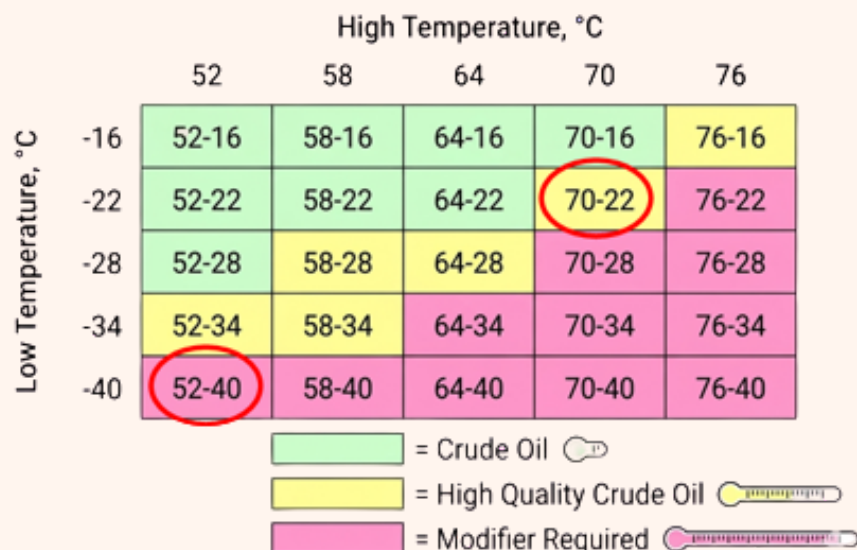
COAL RENAISSANCE AT WRI

Coal-to Asphalt

Coal is an incredibly abundant and easily accessible natural resource. Did you know that Wyoming Powder River Basin coal has a significantly lower CO₂ upstream cradle-to-gate footprint (extraction and transportation) compared to crude oil. It is even significantly lower than harvesting pine for lumber! So why should we not find new ways to utilize this resource for our future material needs? At WRI, in collaboration with UWSER, that is exactly what we are doing.

WRI and UWSER have continued to perfect coal-based asphalt in terms of performance and economics. By marrying coal and vegetable oil, WRI has been able to produce at the laboratory scale quality paving grade binders for low temperature climates (PG52-40) and for higher temperature climates or for roads with more demanding traffic loads (PG70-22). These binders are not just a useful replacement for future petroleum-based asphalt, but they act to store significant amounts of CO₂ due to the biogenic carbon-based vegetable oil component.

WRI continues to assist UWSER in the development of the two-stage process, which entails breaking down the coal macromolecular structure to produce a coal molecular feedstock. This feedstock is then reacted with fatty acids to produce a new viscoelastic material with all the right properties to mimic an asphalt binder. These developments are currently being scaled up at UWSER with their pilot plant, with a Wyoming funded and planned demonstration plant in Gillette, Wyoming. Based on current results, we are aiming to pave a test section near Gillette with WYDOT in 2028.

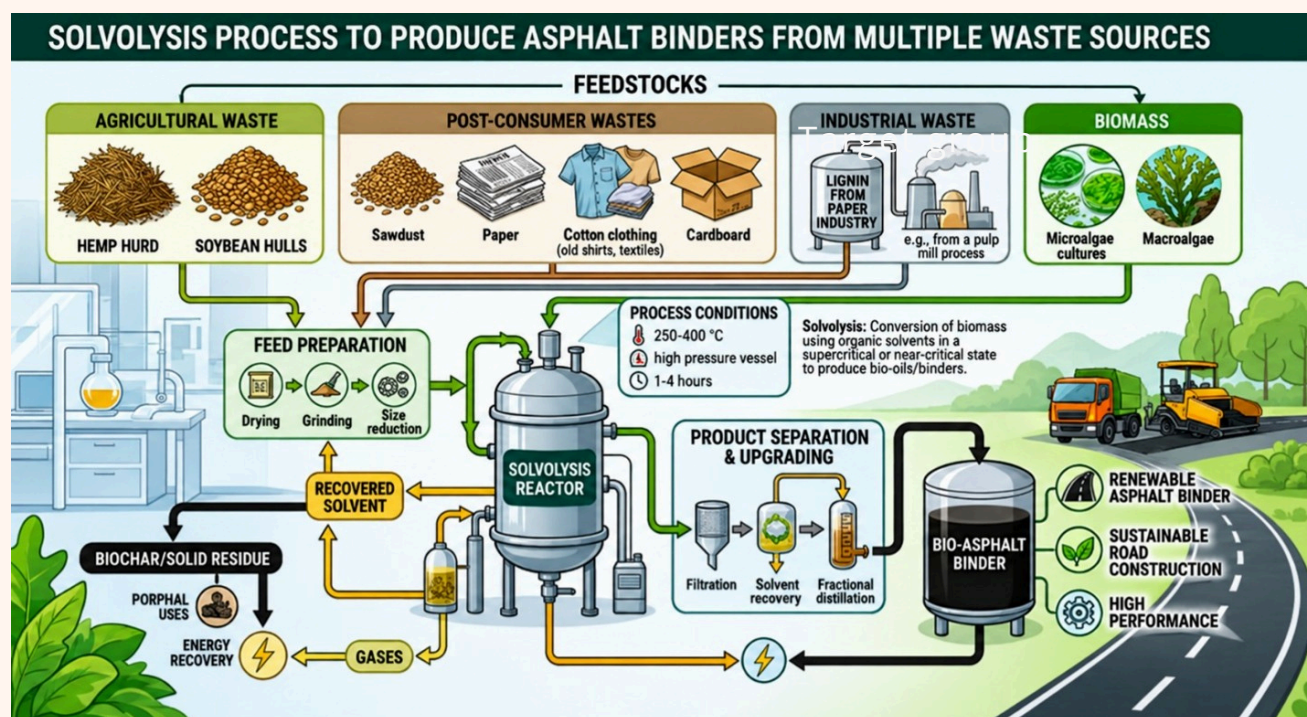


Biobinders from biomass

Asphalt producing refineries continue to close or to be converted to biorefineries. This trend is likely to continue as the energy transition continues its rocky advance. Meanwhile, asphalt demand continues to increase globally, and in the United States. It is also clear that roadways will continue to be the primary and necessary in the long term as our land-based transportation foundation. In the face of these facts, you may ask yourself, where will we be getting our 30+ million tons/year of asphalt binder for paving and roofing materials; well, that would be from Wyoming coal of course!

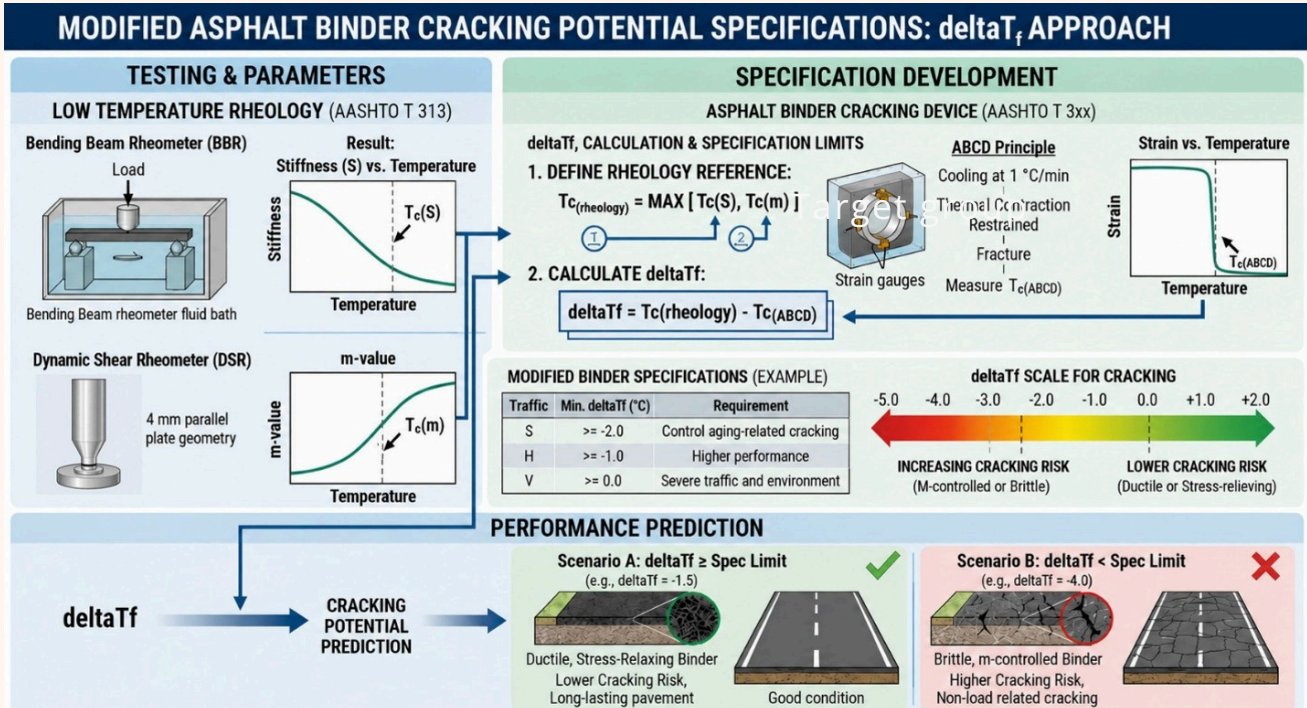
However, if you live in places like Europe, it may make more sense to get your asphalt from other sources such as from waste biomass rather than importing coal-based asphalt from Wyoming. Solvolysis with reactive vegetable oil-based solvents has been demonstrated to transform a wide range of biomass materials into sticky viscoelastic materials. With this process we can tune the final product properties to produce liquids to very stiff pitch-like materials, and everything in between, such as asphalt binders.

With this technology we have explored agriculture waste from soybeans and hemp; post-consumer wastes such as sawdust, paper, cotton clothing, and cardboard; waste from the paper industry as lignin; and even cultivated algae. These results were the basis of a full patent application this past year. This project was internally funded and was great fun while exploring all the possible waste materials that were easily in our reach. Did I mention I am missing a sock! We already have multiple inquiries for this technology using wood wastes, nut shells, and lignins, and we have kicked off our first funded project.



In 2017 WRI launched into advanced carbon materials research with a large DOE consortium to produce low-cost carbon fibers for the automotive industry. Since that study WRI has continued to develop its mesophase pitch production capabilities to various feedstock with domestic and international partners. As business has grown in this space, WRI also invested in melt spinning capabilities and carbon fiber production and testing capabilities. These were all utilized this year with project where WRI produced pitch-based carbon fibers with some amazing properties.

This study is critical because the initial Superpave specifications used today were developed before major adaptations in the modern petroleum refining industry, and before widespread adoption of asphalt modifiers such as softeners, recycled materials, and polymers. Although it is unclear if the final recommendations will be implemented by DOTs, the insights, methods, and data will certainly be useful for the next several decades as new materials, recycling, and modification continue to evolve and enter pavements.



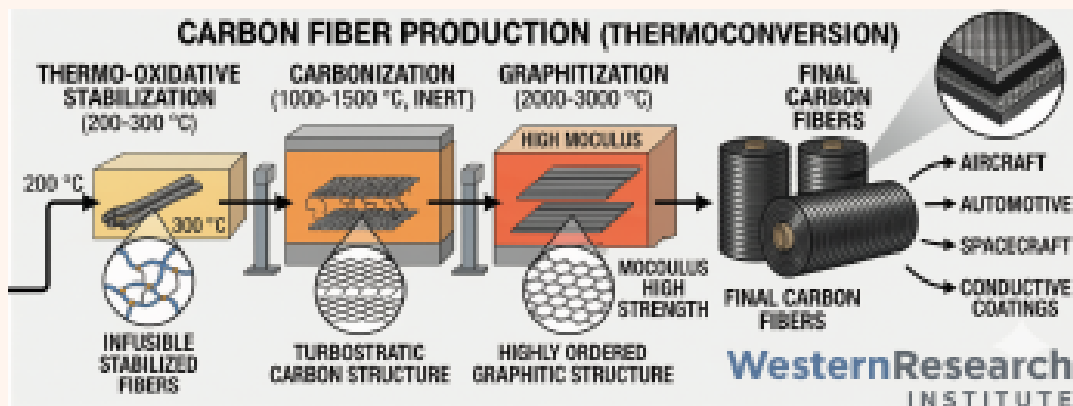
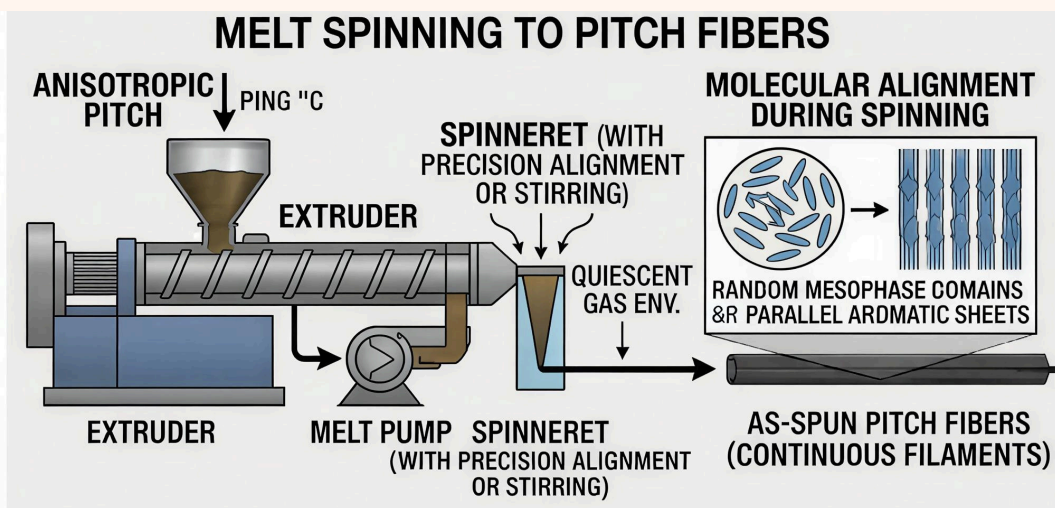
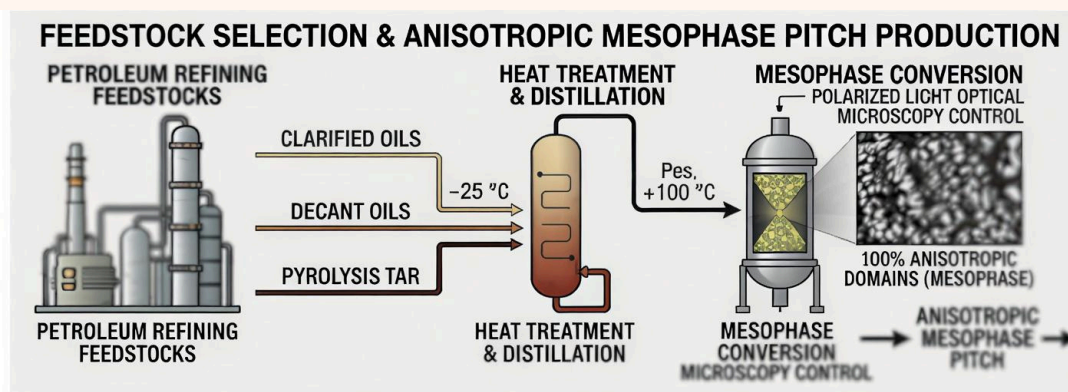
Mesophase pitch and carbon fibers

In 2017 WRI launched into advanced carbon materials research with a large DOE consortium to produce low-cost carbon fibers for the automotive industry. Since that study WRI has continued to develop its mesophase pitch production capabilities to various feedstock with domestic and international partners.



As business has grown in this space, WRI also invested in melt spinning capabilities and carbon fiber production and testing capabilities. These were all utilized this year with project where WRI produced pitch-based carbon fibers with some amazing properties.

Caption: From left to right: microscopic image of mesophase pitch, fibers produced at WRI and microscopic view of a fiber.



Caption: Making carbon fibers out of mesophase pitch.

Coal Renaissance at WRI

As Western Research Institute (WRI) enters its second century, it is returning to its roots with a sophisticated revival of coal research. Under the leadership of VP Justin Martin, in charge of the Sustainable Emerging Technologies (SET) team, WRI's 27-acre campus is once again the epicenter for domestic coal innovation.

A Visionary Partnership: The MicGAS™ Biorefinery

A cornerstone of this revival is a new collaboration with Arctech, a Virginia-based leader in coal biotechnology. Dr. Daman Walia, founder and CEO of Arctech, expressed his enthusiasm for relocating his pilot units to Laramie. "We are happy to have sent our pilots for coal bioengineering to Wyoming and have WRI scale up for commercial applications," Walia noted, citing WRI's "eminent" reputation and facilities for scaling up coal technologies.

The MicGAS™ technology utilizes termite-derived microbes in anaerobic bioreactors to convert mined coal into methane-rich gas and organic humic acid. Also, microbes and nutrients are injected into deep, unmineable coal seams to bio-convert the coal and recover the gas. Wyoming has almost one trillion tons, which are too deep, well below 500 feet, and unmineable with open-pit mining. The State of Wyoming is unique in that it is the first Government entity worldwide that passed a Biogenic Gas Law in February 2011 to allow permitting the use of its deep, unmineable coal seams through the use of a bioconversion approach.

This "zero-waste" process permanently binds heavy metals like mercury and arsenic into solid coproducts while producing Actosol® for agriculture and HUMASORB® for environmental remediation. The ultimate goal of this partnership is to scale these operations into a full-scale coal biorefinery in Wyoming, capable of processing 100,000 tons of sub-bituminous coal annually to support national security and regional economic growth. Arctech has received approval from the Wyoming Department of Agriculture for use of its Bioactivated Base Actosol® as a soil amendment. Wyoming ranchers and farmers are facing with reduced fodder and crop production due to increasing arid conditions. Actosol® comprises humic matter extracted from coal and is well proven to improve soil fertility through carbon farming and combat droughts.



Legacy Pilot: WRITECoal™

While new collaborations flourish, WRI continues to leverage its deep history by hosting and operating legacy pilots. The main example is the WRITECoal™ pilot developed between 1999 and 2007 in partnership with Fuels Management Inc. (FMI – A Florida-based company) and the U.S. Department of Energy (DOE). It is a two-stage process designed to "clean" coal prior to use. "The beauty of WRITECoal™ is its efficiency," explains Martin. The coal is heated up in a bubbling fluidized bed-based reactor at ambient pressure, treating it in a continuous way under oxidative environment, effectively removing up to 80% of mercury, 60% of arsenic, and 20% of selenium, ensuring environmental compliance for power producers. As a result, the treated coal has increased boiler efficiency. The SET team also operates a the WRITECoal™ Gasification unit, which utilizes a CO₂ recycle to reduce methane and tar formation by 90%, significantly increasing cold gas efficiency. The original Process Development Unit (PDU) handles 400 lbs/hour (approx. 4.8 tons/day), while the larger demonstration plant can treat 100 tons per day. From the biological conversion of MicGAS™ to the thermal upgrading of WRITECoal™, WRI has consolidated a century of expertise to handle any coal-related activity. Whether the application is energetic, such as net-zero jet fuels, or non-energetic, such as coal-to-asphalt binders and carbon fibers, WRI's staff of high-quality engineers and world-class facilities stand ready to take Wyoming's natural resources from the drawing board to global reality.



HOSTING BUSINESSES



Caption: From left to right: Jeramie Adams and Didier Lesueur (WRI), with Marc Delage, Yann Busnel, Christophe Desrayaud, Olivier Epinette and Paul-Guilhem Meunier (IMT).

WRI's 27-acre campus North of Laramie is evolving into a strategic "Business Park" that fosters innovation by providing essential infrastructure for both emerging startups and established companies. While organizations like the University of Wyoming's incubator, Impact 307, offer standard office space, WRI fills a critical industrial gap by providing specialized facilities, including wet labs and warehouse space necessary for technical ^{INSTITUTE} operations.

Uplink Robotics pioneered this hosting initiative in April 2024, leasing a full building to install a dedicated paint shop for their inspection robotics business. Although Uplink Robotics successfully utilized the campus before departing in March 2025, their tenure proved the viability of WRI's facilities for supporting local high-tech manufacturing and industrial scaling.

Currently, WRI hosts Downrange Operations and Training as well as American Rare Earths Limited (ARE). Downrange provides logistics, construction, and specialized operational support to organizations working in challenging or high-threat environments, focusing on risk management, compliance, and mission execution.

American Rare Earths Limited (ARE) has significantly integrated its operations into the WRI campus to support the development of their Halleck Creek mine in Wheatland, Wyoming. ARE is currently leasing building space to centralize its drill core and assay samples while simultaneously preparing to process ore at a pilot scale on-site. This complex technical work is being conducted with the support of Justin Martin's Sustainable Emerging Technologies (SET) team, whose expertise in pilot-scale engineering helps companies move from the drawing board to functional testing.

In this context, WRI hosted a visit of France's Institut Mines Telecom (IMT) in September, headed by Yann Busnel SVP Research (see picture). He was accompanied by Olivier Epinette (Director International Affairs), Paul-Guilhem Meunier (Head of Innovation and Economical Development), Marc Delage (Head of European and International R&D) and Christophe Desrayaud (Head of Materials & Structures Sciences Center / Coordinator of Industry 4.0 initiatives). In addition to launching research projects together, they were enthusiastic about the possibility to have some of their start-ups grow in the US from WRI's campus. Within its network of engineering and business schools, IMT incubates ~100 newly created companies every year, making it the 1st French network of public incubators.

By hosting these diverse entities and opening to international opportunities as well, WRI progressively acts as a vital resource for Wyoming, helping to find novel market avenues for businesses willing to develop in North America.

Papers in peer-reviewed journals

- Kumbarger Y., Planche J.-P., Adams J. J., Elwardany M. D., and King G., Effect of Binder Chemistry and Related Properties on the Low-Temperature Performance Parameters of Asphalt Binders, Transportation Research Record 2679(1), 2025, 846–864 (<https://doi.org/10.1177/03611981231155173>)
- Ouazri, M., Maherzi, W., Lesueur, D. and Khouchaf, L. "Development of a new method to quantify filler dispersion in bituminous mastics by transmission microscopy and image analysis", Scientific Reports, 15(1), 2025, 34754 (<https://doi.org/10.1038/s41598-025-18535-4>)
- Lostier A., Sarica T., Lasne J., Roose A., Sartelet K., Jamar M., Gaudion V., Dusanter S., Lesueur D., Chen H., Salameh T. and Romanias M.. "Real-World Asphalt Pavement Emissions: Combining Simulation Chamber Measurements and City Scale Modeling to Elucidate the Impacts on Air Quality", ACS ES&T Air 2(3), 2025, 426-435 (<https://doi.org/10.1021/acsestair.4c00323>)

Oral Communications and Posters (underlined = invited presentation)

- Kumbarger Y., Adams J., Lesueur D. and Literati A., "Effective evaluation of recycling agents for the current and future of asphalt industry", Transportation Research Board, 104th Annual Meeting, Washington DC, January
- Lesueur D. and Little D.C., "Protecting Tack Coats with Milk of Lime: A State-of-the-Art Review", Annual Meeting of TX-AWPA, McAllen TX, June
- Adams J., Pan C.-Y. and Kumbarger Y., "Antioxidant benefits and potential pitfalls when blending with SBS polymer". 62nd Petersen Asphalt Research Conference, Laramie WY, July
- Kumbarger Y., Adams J., Literati A., Lesueur D. and Bassham S., "Effective characterization of recycling agents for well-performing recycled asphalt pavements". 62nd Petersen Asphalt Research Conference, Laramie WY, July
- Pan, C.-Y., Adams J., Muller L. C., Miller R., Kumbarger Y., Loveridge J., Seago C., Igelsrud Pfeiffer T., Behrens P., Holberg S. and Martin J., "Update on Coal-to-Asphalt project". 62nd Petersen Asphalt Research Conference, Laramie WY, July
- Precilla, A., Shah R., Jafaripour M., Delores L. A., Adams J. and Kumbarger Y., "Predicting and Mitigating Heat-Induced Deposition and Coke Formation in Asphalt Binder Refining Using Automated Flocculation Titrimetry and the WRI Coking Index". 62nd Petersen Asphalt Research Conference, Laramie WY, July
- Lesueur D., "Experiencia Internacional do Uso de Cal para Pavimentacao", Paving Expo, Lhoist Workshop, São Paulo, Brazil, September
- Pan, C.-Y. and Igelsrud Pfeiffer T., "Powder River Basin Carbon Engineering Program: Coal-derived Asphalt Binder Project (COphalt)". Rocky Mountain Mining Institute, Lakewood, CO, September
- Kumbarger Y., Adams J. and Lesueur D., "Innovative 'waste to asphalt' upcycling technologies for sustainable decarbonization of the asphalt industry". The Road Forward: National asphalt Pavement Association (NAPA) International Summit, Chicago IL, September
- Kumbarger Y., Adams J. and Lesueur D., "Effective performance characterization and evaluation of recycling agents", Assoc Modified Asphalt Producers (AMAP) Annual Conference and Workshop, Lexington KY, October
- Adams J., Pan C.-Y. and Kumbarger Y., "Benefits and Potential Pitfall of Antioxidants in Polymer Modified Asphalt", Assoc Modified Asphalt Producers (AMAP) Annual Conference and Workshop, Lexington KY, October
- Kumbarger Y., Adams J., Bassham S., Literati A. and Lesueur D., "Evaluación efectiva de agentes rejuvenecedores", XXIII Congreso Ibero-Latinoamericano del Asfalto (CILA), Asunción, Paraguay, November
- Adams J., Kumbarger Y., and Lesueur D., "Tecnologías innovadoras de reciclaje de residuos en la carretera", XXIII Congreso Ibero-Latinoamericano del Asfalto (CILA), Asunción, Paraguay, November

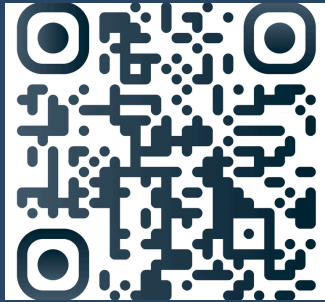


CREDITS

All rights for pictures and text reserved. Copyright WRI 2026

Western Research INSTITUTE

WRI website (<https://www.westernresearch.org>)



WRI YouTube Channel (<https://www.youtube.com/@westernresearchinstitute>)



Western Research

I N S T I T U T E

Help us maintain World-class chemical research in Wyoming!

For over 100 years, Western Research Institute has been involved in cutting edge research in the field of chemistry.

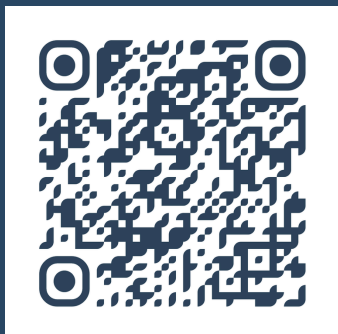
Initially focused on energy (oil, coal...), the Institute has also developed skills covering advanced carbon-based materials for longer lasting roads and roofs (see for example the work we do with AIRC), non-energetic applications of fossil resources to find new ways to valorize oil and coal (see our Advanced Carbon Materials page), environmental research on waste management and circular economy (see our Waste Re-engineering Initiative (Circular Economy page) and we are just starting to be involved in critical minerals recovery. Please have a look at our latest Annual Report to know more about our activity.

All of these projects contribute to making a better life and a better environment for Wyoming, the USA and the World.

Donating to WRI will help us:

- Maintain a competitive workforce and retain high-level technician and scientist jobs in Southern Wyoming,
- Improve our research tools and facilities to remain at the forefront of international chemical research,
- Train interns and students and help them become the leaders of the future.

**Click the Donate Now button below to be taken to our donation portal.
The whole team at WRI thanks you for your help!**



HOW TO DONATE



WESTERN RESEARCH INSTITUTE
3474 North 3rd St
Laramie, WY 82072