2019 YEAR IN REVIEW

# BLACKDANDNDS WEST VIRGINIA

DEPARTMENT OF MINING ENGINEERING BENJAMIN M. STATLER COLLEGE OF ENGINEERING AND MINERAL RESOURCES WEST VIRGINIA UNIVERSITY



### **GOVERNOR JIM JUSTICE DELIVERS** 2019 POUNDSTONE LECTURE

Governor of West Virginia Jim Justice delivered the Poundstone Lecture on Thursday, Sept. 19, as part of West Virginia University's Department of Mining Engineering's William N. Poundstone Lecture Series at the Erickson Alumni Center.

Justice is the 36th Governor of West Virginia and is a successful coal mining and agricultural businessman.

A native of West Virginia, Justice has always had a strong interest in nature and the outdoors. He started Justice Family Farms in 1977. Under his direction, it has grown to be a major agricultural enterprise. In 1993, he became the president and CEO of Bluestone Industries, Inc. and Bluestone Coal Corporation. In 2009, Justice acquired The Greenbrier resort in White Sulphur Springs, West Virginia, the luxury resort and national historic landmark that has been welcoming guests from around the world since 1778. "Gov. Justice has built a very successful professional career and his presence at this lecture series creates excitement, confidence and curiosity among mining engineering students," said Vladislav Kecojevic, the Robert E. Murray Chair and Professor of Mining Engineering.

Following the lecture, students and faculty members had the opportunity to connect with Justice and other industry professionals.

"Giving students an opportunity to connect with the highest office in our state provides reinforcement of the potential that lies ahead," Kecojevic said. "Having Gov. Justice speak as a Poundstone lecturer acknowledges the importance of mineral resources to the state and recognizes the contribution of the Department of Mining Engineering educating future leaders in this fourth industrial revolution, promoting sustainable mining practices for the state, nation and world."

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#### MISSION STATEMENT

The Statler College mission is to prepare students for success in their professional careers; to contribute to the advancement of society through learning, discovery, extension and service; and to stimulate economic wellbeing in West Virginia and the world through technical innovation, knowledge creation and educational excellence.

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#### Dear Alumni and Friends,

Greetings from Morgantown! While writing this note in late December, winter returned to our beloved West Virginia. It is hard to believe that 2019 has come to a close, however, it was an exciting and very productive year for the Department with so many achievements, accomplishments and activities of our students and faculty. I do hope that you will enjoy reading them.

Our mining engineering students landed summer 2019 internships and jobs across the coal, metal and non-metal sectors of our industry, both nationally and internationally. In my survey of the students, they worked for a number of companies, across the globe, including NALCO, Martin Marietta, Peabody Australia, Murray Energy Corporation, Arch Coal, Luck Stone, Coronado Coal, RESPEC, GMS, Nevada Gold Mines, Freeport-McMoRan, BNN Coal, Consol, Victaulic, United Coal, Vulcan Materials, Kiewit, Pennsy Supply and North American Coal Corporation. It is gratifying to have our students working in a variety of commodities and gaining valuable experience during the summer. I have included several stories on their summer internship experiences and I hope you enjoy reading them.

It has been encouraging to conduct industry information sessions on campus and see many companies come back to interview our students. We welcomed Martin Marietta, Alliance Coal, Coronado Coal, RESPEC, GMS, Blackhawk Mining, Komatsu and CEMEX. During our career fair, we were excited to meet with representatives of NALCO Mining, Vulcan Materials, Arch Coal, Westmoreland Coal, Murray Energy Corporation and United Coal. We appreciate them coming to WVU.

Our students have actively engaged in professional societies, attended professional meetings, industry info sessions and mine trips, participated in job interviews with mining companies and volunteered to assume leadership responsibilities in order to build valuable skills and accumulate experiences that will serve them well in their future professional careers. I advise and encourage students to apply and compete for many external scholarships that are awarded to mining engineering students. I am happy to report that our students won a number of national scholarships and awards; they make us very proud of their achievements.

In September, we had the honor of welcoming West Virginia Governor Jim Justice as the speaker for the William N. Poundstone Lecture. Governor Justice shared a valuable lecture with the students, faculty, alumni and friends of the Department, and his presence created excitement, confidence and curiosity among our students.

At the 2019 Student Awards Banquet, we were privileged to have Ryan Murray, vice president of operations for Murray Energy Corporation, West Virginia Senator Randy E. Smith and WVU President E. Gordon Gee as the guest speakers. They all expressed their words of wisdom to our graduates as they transition from school to industry.

In my message from last year, I promised that we would make a new promotional video for the Department. I am happy to report that this project has been completed with the help of Murray Energy Corporation. I invite you to watch the video at the following Youtube link:

#### https://youtu.be/Fy-TMdJi7HA

Please remember that your feedback, observations and experience with the WVU Department of Mining Engineering, either in person, by e-mail or by phone, is always welcome and much appreciated. My office door is always open, and you are welcome to share information about any aspect of our Department. I will be listening to your suggestions to continuously improve. The faculty and staff of the Department are fully committed to provide all our undergraduate and graduate students with a friendly, conducive and supportive educational environment.

As the chair, and on the behalf of the faculty, staff and students, I thank you very much for your support and commitment to the WVU Department of Mining Engineering.

I wish you all a safe, healthy and happy new year.

#### **VLADISLAV KECOJEVIC**

Robert E. Murray Chair and Professor Department of Mining Engineering

### Research

### A saving grace underground: WVU engineers utilize robots to improve mine safety

Injuries and deaths caused by roof collapses and falling debris, common culprits for underground mine accidents, could be prevented by the unlikely force of robots and drones, thanks to the work of WVU engineers.

Ihsan Berk Tulu, assistant professor of mining engineering, along with Jason Gross, Yu Gu and Guilherme Pereira, from the Department of Mechanical and Aerospace Engineering, are developing an autonomous robotic system to monitor the structural integrity and safety of underground mines.

By using a combination of remote vehicles that consist of an unmanned aerial vehicle attached to an unmanned ground vehicle, the team will provide high-resolution 3D maps for assessment of pillar and roof damage.

The researchers were awarded a \$750,000 grant from the Alpha Foundation to conduct this research on the health and safety of underground miners.

"Ultimately, this project will develop an early warning system that will notify the mine engineers for elevated hazardous conditions in underground stone mines," Tulu explained.

According to Tulu, in underground mines in the United States, "fall of ground"related accidents are one of the leading causes of injuries. This occurs when part of the roof or a pillar collapses. Although underground stone mines have generally

experienced good ground stability, a recent mine pillar collapse in Pennsylvania, and reported roof fall accidents highlight the potential safety impact on the miners.

"The autonomous robotic early warning system for monitoring stone mines will enable a rapid response to detected degradations in pillar and roof stability," Tulu said. "Successful development and deployment of this system is expected to reduce injuries of underground stone mine workers. "While the initial problem is associated with pillar stability and design, the techniques developed in this research would be adaptable to the underground coal and metal/nonmetal mining sectors," said Tulu. "The autonomous robots mapping ability would also be adaptable to facilitate search and rescue efforts in case of an accident."

The researchers will leverage similar technology to what is currently under development for underground tunnel rescue operations by

> the WVU robotics team to develop the robotic system. The system will then be deployed to Laurel Aggregates underground stone mine in Lake Lynn, Pennsylvania, for testing.

> Located a few miles north of Morgantown, Laurel Aggregates is a large surface and underground limestone quarry operation which produces approximately three million tons of construction aggregates per year. Richard Rohrssen, manager of operations and engineering, Barry Fink, vice president and general manager, and Brian Cramer, underground superintendent, are leading the effort for Laurel to support the WVU research team. Rohrssen ('09, civil engineering) and Fink ('82, mining engineering) are both graduates of the Statler College. "As WVU engineering

graduates, Barry and I are excited to be supporting the WVU team in their effort to develop this technology," said Rohrssen.

"Miners' safety is a No. 1 priority in the mining industry," said Vladislav Kecojevic, the Robert E. Murray Chair and Professor of Mining Engineering. "Research grants such as this one from the Alpha Foundation will allow our WVU engineers to leverage state of the art technology into an underground environment and contribute toward an ultimate goal of zero fatal- and non-fatal injuries in our nation's mines."

Researchers from the Statler College of Engineering and Mineral Resources are developing an autonomous robotic system to monitor the structural integrity and safety of underground mines. Pictured from left to right are Berk

Tulu, Guilherme Pereira, Yu Gu and Jason Gross of the

Laurel Aggregates.

Statler College, and Barry Fink and Richard Rohrssen of

Berk Tulu, assistant professor of mining engineering, studies a map with personnel from Laurel Aggregates, a large surface and underground limestone quarry near Morgantown. Pictured left to right is Barry Fink, Tulu, Brian Cramer, and Richard Rohrssen.

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### WVU engineer developing 'critical' rare earth elements from coal waste

WVU mining engineers are developing a method to create a self-supply of rare earth elements in the United States from coal waste.

"Rare earth elements are critical to the high-tech industry and to national defense, but we heavily rely on China to supply these elements," said Qingqing Huang, assistant professor of mining engineering. "Right now we have an urgent need to develop our own supply chain in the country."

While the knowledge of rare earth elements occurrence in coal material dates back more than 50 years, recent restrictions in the supply of rare earth elements has sparked a renewed interest in finding a method to extract these elements from coal and coal byproducts in an economical and sustainable fashion.

According to Huang, China supplies more than 80 percent of the global consumption of rare earth elements and possesses approximately 37 percent of the worldwide reserves. To prevent a disruption in the supply of these elements to the U.S., the U.S. Department of Energy is investing millions of dollars in projects to develop a domestic source from coal and coal refuse.

"We have been successful in the lab producing highly enriched rare earth products, now we are moving to scale up that testing," Huang said. "This is exciting because it is something that has not been done in the past and will provide a critical domestic source of rare earth elements if successful."

Over the past several decades, the global demand for rare earth elements has been on the rise, Huang explained. Rare earth elements play a vital role in not only national defense applications, but also the modern high-tech industries, including cell phones, televisions, batteries and clean energy technologies.

To further support her research in examining the occurrence of rare earth elements in coal and coal byproducts, Huang has been awarded the 2019 Freeport-McMoRan, Inc. Career Development Grant by the Society for Mining, Metallurgy and Exploration.

Grant recipients are chosen from all nontenured faculty members in the mining and mineral processing/extractive metallurgy field in the U.S. The program has been implemented to combat long-term challenges that threaten these U.S. academic degree programs, as well as the looming faculty deficiencies associated with retirement over the next two decades.

With the financial support given by the the award, Huang will be able to expand her research team and purchase new equipment to advance the



projects. She will receive \$300,000 over the course of three years to better participate in research activities which are necessary to achieve tenure and promotion.

"The SME Career Award is the most prestigious national recognition of junior faculty in mining, mineral processing and extractive metallurgy," said Vladislav Kecojevic, Robert E. Murray Chair and Professor of Mining Engineering. "Qingqing is an inspiring teacher and scholar conducting outstanding research in an exciting field. Her cutting edge research is not only highly relevant but also critical to a sustainable development of our mineral resources for the benefits of our communities, environment, economy and national security."

# WVU mining engineer receives prestigious international acclaim



Vladislav Kecojevic, the Robert E. Murray Chair and Professor of Mining Engineering at West Virginia University, has been awarded the Medal of Honor by the president and board of directors of TH Georg Agricola University in Bochum, Germany, for his contributions to strengthen the international academic network in education and research.

Established in 1816, TH Georg Agricola University of Applied Sciences is one of the most internationally recognizable institutions in mineral resources engineering.

"This award is significant because it recognizes both the individual and WVU for developing and expanding the international and multicultural character of an academic institution, its faculty and students," Kecojevic said. "This significantly contributes to internationalization of WVU, the Statler College and the Department of Mining Engineering."

The acclaim recognizes Kecojevic's contributions and commitments to global engagement and service throughout his career. A longstanding member of the Society of Mining Professors (SOMP), his 2015-2016 term as president of the society recorded an all time high of memberships. In addition, he has served on multiple SOMP committees. His efforts in these committees and mentoring of faculty through the tenure and promotion process have been documented in two peer-reviewed journals.

In his nomination of Kecojevic for the award, Jürgen Kretschmann, president of TH Georg Agricola and 2018-2019 president of SOMP, stated, "In the mining academia today, WVU is a global player with an excellent reputation and network. This is without a doubt result of the outstanding efforts of Dr. Kecojevic. He is one of the few truly global players in mining academia."

In July 2018, Kecojevic was unanimously elected by his international peers as the SOMP secretary-general for a five-year term. In addition, he was an integral part of the SOMP leadership team that developed the new strategic plan toward 2020 and beyond, stressing the need for global partnerships between institutions, the importance of integrity and ethics in educational and research programs and providing a climate that cherishes diversity.

"I am pleased to have been awarded this Medal of Honor because it recognizes the leadership role of WVU mining engineering faculty and the exemplary contributions to education, research and service to the international mining community," Kecojevic said.

### Alexander recognized for leadership

Dan Alexander, a lecturer of mining engineering, was recognized for his service and leadership as President of the Pittsburgh Coal Mining Institute of America (PCMIA) at the SME/PCMIA meeting at Canonsburg, Pennsylvania, in October 2019. The PCMIA was formed in 1976, and its objective is to encourage education and the growth of knowledge relating to coal mining including providing scholarships to advance study and research into mining methods and problems, to promote safety and efficiency in the coal mining industry, to encourage closer cooperation between the coal industry and state and federal government agencies, to disseminate information relating to the coal mining industry and to otherwise advance the mutual interests of the members of this association.



WVU held its third annual Day of Giving on Nov. 13. If you were one of the many alumni and friends that made donations, thank you! Your support is greatly appreciated.



It's not too late, however, to consider giving to the Department. We're sure you are overwhelmed with the number of requests you get to give to worthy causes, so why is this request any different? The bottom line is that one of the metrics that is used in ranking universities in several of the national systems is the degree of alumni support. This is reported as a percentage of alumni that have contributed and not as the amount given. West Virginia University ranks lower compared to our peers in this category, which is surprising considering the loyalty of the alumni base to all things WVU. Therefore, if you can donate even \$5 or \$10 to the Department, this will make a difference, so please consider giving something no matter how small. Any funds donated on the Day of Giving or after that are not specifically targeted for other programs will be used by the Department to supplement and improve equipment and experiments in the undergraduate laboratory. When giving through the WVU Foundation https://give.wvu.edu/statler please indicate that the funds are for the use of the Department of Mining Engineering; alternatively, contributions may be sent directly to the Department, c/o Karen Centofanti.

## **EXTERNAL SCHOLARSHIPS, AWARDS AND RECOGNITIONS**

A number of mining engineering students received external scholarships through professional societies, organizations and foundations. These include:

**SME Coal and Energy Division Scholarships:** Daniel Ausherman, Eric Blinkhorn, Selena Lewis and Molly McFarland (1)

SME Mineral and Metallurgical Process Division Undergraduate Award Scholarship: Selena Lewis (2)

SME Mineral and Metallurgical Process Division Outstanding Junior Scholarship: Daniel Ausherman (3)

Ernest K. Lehmann Memorial Scholarship: Molly McFarland (4)

**Eugene P. Pfleider Scholarship and J. H. Fletcher & Co. Scholarship:** Keegan Patrick (5)

SME Syd S. and Felicia F. Peng Ground Control in Mining Scholarship: Deniz Tuncay (6) WAAIME - Pennsylvania Western Section Young Award Scholarship: Andrew Moore, Toussaint Boulez, Thomas Wetzel, Erica McCauley and Zoey Carper (7)

**WAAIME Scholarship:** Richard Shipe, Daniel Ausherman, Rince Longo, Eric Blinkhorn, Morgan Kearney, Emily Horowitz and Danqing Gao (8)

WAAIME Graduate Student Scholarship: Sena Cicek, Mladen Dragic, Deniz Talan, Deniz Tuncay, Haochen Zhao, Jian Yang and Lazar Zujovic (9)

SME/PCMIA Student Grant Scholarship: Daniel S. Ausherman (10)

SME/PCMIA Claude A. Goode Memorial Scholarship: Alec Elliott (11)

Komatsu Scholarship: Mackenzie Stone and Andrew Moore (12)

Martin Marietta Scholarship: Takoda Kelly; Samantha Fowkes; Victor Valencia; Benjamin Safer; Emily Carroll and Alexis Hartman

### Students continue to garner awards for their design work from national contests.

WVU's six-student aggregates team comprised of (left to right) Emily Horowitz, Robert Harles, William Chmelik, Andrew Moore, John Dickson and Jeremy Deilhman (13) placed third in the second phase of the 15th annual SME/ NSSGA Student Design Competition at the 2019 SME Annual Conference in Denver, Colorado. National and international teams began the competition at their schools in fall 2018. For Phase I of the competition, each team submitted an operational feasibility report for an aggregates mine. After the review of the submitted reports, the top six teams were invited to Phase II in Denver where the teams were given expansion to the initial problem. After completing this additional work, the final solution was presented to the panel of judges.

WVU mining engineering students Andrew Moore, Daniel Ausherman, Eric Blinkhorn, Takoda Kelly, Jay Pollock and William Geldhauser competed in Phase I of the 2019-2020 SME/NSSGA Student Design Aggregates Competition. The results of Phase I will be announced in January 2020. WVU Mining Engineering students Selena Lewis, Robert Harless and Michael Kalski took first place in the 22nd Carlson Annual Senior Design Competition.

In 2019, Ricky Shipe, Keegan Patrick and Quentin Borum finished second in the 27th SME/PCMIA Senior Design Award competition (14). The competition is open to all U.S. ABET accredited mining engineering programs. WVU has taken first or second place in this contest 12 times in the last 18 years.



# **ANNUAL RECOGNITION BANQUET**

Students, faculty, alumni and friends of the Department were recognized for their achievements at this year's Recognition Banquet, held at the WVU Erickson Alumni Center at Morgantown in April (1). The special guest speakers were Ryan Murray (2), vice president of operations for Murray Energy Corporation, West Virginia Senator Randy E. Smith (3) and WVU President E. Gordon Gee (4). The following awards were presented:

The Charles E. Lawall Award: Victoria Dean (5)

The Charles T. Holland Award: Daniel Ausherman (6)

The MRAC Award: Daniel Nash (7)

The Old Timers Award: Keegan Patrick (8)

**The Student Chapter of the Society for Mining, Metallurgy, and Exploration Award:** Keegan Patrick (9)

The Calvin Kidd Fellowship Award: Tyler Faulkner

The West Virginia Coal Mining Institute Award: Erica McCauley (10)

The Careers in Coal Award: Richard Shipe (11)

The Mining Engineering Faculty Awards (undergraduate students): Robert Harless, Emily Horowitz, Shannon Seitz (12)

The Mining Engineering Faculty Awards (graduate students): Deniz Talan, Deniz Tuncay (13)

The Collegiate Mine Rescue Award: Daniel Nash, Keegan Patrick

The Student Chapter of the Society for Mining, Metallurgy, and Exploration Award: Berk Tulu (14)

The Student Chapter of the Society for Mining, Metallurgy, and Exploration Officers Award: Mark Sindelar (15)

Research Trust Fund Wells Fargo Scholarship: Dmitri Agnew

Robert Lee Raines Scholarship: Daniel Ausherman James Sterling Farinash Scholarship: Eric Blinkhorn

Robert Lee Raines Scholarship: Colin Bourn, Lucas Poe, Nadiya Robinson

Warren D. & Grace W. Sharpenberg Scholarship: Colin Bourn

Department of Mining Engineering Scholarship: William Burow, William Geldhauser, Jacob Godfrey, Emily Horowitz, Morgan Kearney, Lucas Poe, James Pollock, Nadiya Robinson, Karl Steinbach, Nancy Umutoniwase

Ralph & Geraldine F. Dado Mining Engineering Scholarship: William Burow, Jessten Smith

Watson Scholarship: Zoey Carper, Takoda Kelly

A. Wahab & Judith B. Khair Scholarship: Richard Campbell

Syd S. & Felicia F. Peng Family Scholarship: Richard Campbell, Morgan Kearney

Martin Marietta Scholarship: William Chmelik, Lauren Masterson, Victor Valencia, Keegan Patrick

Mineral Resources Alumni Chapter Mining Engineering Scholarship: Jeremy Diehlmann, Jacob Godfrey, Rince Longo, Daniel Nash, Mohamed Sakho

**R. Larry Grayson Endowed Scholarship:** Jeremy Diehlmann

Julius W. Singleton, Jr. Scholarship: Brett Duft

Jack & Pat Caffrey Scholarship: Robert Harless

**Peter's Creek Coal Association Scholarship:** Robert Harless Royce J. & Caroline Baker Watts Family Endowed Scholarship: Robert Harless

Raymond E. Salvati Memorial Scholarship: Takoda Kelly

Joseph W. Leonard, IV Memorial Scholarship: Selena Lewis, Lauren Masterson

Westmoreland Coal Company Endowed Scholarship: Selena Lewis

Doris H. & J. Banner Bise Memorial Scholarship in Mining Engineering Scholarship: Rince Longo

Carl Culp and Wanda Culp Memorial Scholarship: Molly McFarland

Northern WV Coal Preparation and Engineering Society Scholarship: Molly McFarland, Jessten Smith

**A. Hardy Tait COMER Endowed Scholarship:** Andrew Moore, Nancy Umutoniwase

Raymond H. Blowers, Jr. Scholarship: Daniel Nash

Dean Chester A. Arents Engineering Scholarship: Keegan Patrick

Alpha Natural Resources Mining Engineering Scholarship: Mohamed Sakho

Komatsu Mining Scholarship: Shannon Seitz

Jack White Memorial Scholarship: Richard Shipe





























## STUDENTS AND FACULTY ON THE MOVE

Mining engineering students and faculty have attended a number of professional conferences and visited several mines in 2019.

Our appreciation and thanks are extended to our alumni, friends and mine managements for hospitality and for hosting our students and faculty.



A group of 25 students and four faculty members attended the Coal Symposium in Charleston in January 2019, which included the opportunity to meet with industry professionals at the conference along with West Virginia Governor Jim Justice (1) and Attorney General Patrick Morrisey (2). We also shared our experience from the conference with WVU President E. Gordon Gee (3). During this trip, J.H. Fletcher hosted a visit to their Huntington facility (4).





Six students traveled to the annual meeting of the International Society of Explosives Engineers in Nashville, Tennessee, in January 2019. (5)







Rock mechanics/ground control class at Arch Coal's Leer Mine in West Virginia

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Undergraduate students Erica McCauley and Shannon Seitz took part in the Women in Mining Conference and visited a surface gold mine in Colorado. (11)

Aggregates production class students had an opportunity to visit Luck Stone surface quarry in Virginia. (12) attended a traditional West Virginia Coal Mining Institute Meeting in Charleston, West Virginia, in March (8), while nine students and four faculty attended SME/ CAS Spring Meeting (9) and visited the Department of Mining Engineering at University of Kentucky in April. (10)

A total of 15 students and five faculty





A total of 22 students, six faculty and one staff member attended the 2019 SME Annual Meeting in Denver, Colorado. (6)

Surface mining class students had an opportunity to visit Contura's Republic Energy surface coal mine in April. (7)



Aggregates production class students had an opportunity to visit Laurel Aggregates underground limestone mine in Pennsylvania in September. (13)





A group of 16 graduate students and four faculty had a unique opportunity to visit NIOSH Mining research facilities in October. (14)



Four faculty and 24 students attended this year's SME/PCMIA meeting at Canonsburg, Pennsylvania, in October. (15)

Sophomore students visited Murray Energy underground coal mine – Harrison County Mine (16).





A group of 24 undergraduate and four graduate students, along with five faculty members attended the Coal Symposium in Charleston, West Virginia, in November 2019, which included the opportunity to participate in technical sessions, meet with industry professionals, West Virginia Governor Jim Justice (17), Secretary for West Virginia's Department of Environmental Protection Austin Caperton (18) and Secretary for Mine Safety and Health Administration David Zatezalo.





Surface mining class students had an opportunity to visit Contura's Republic Energy surface coal mine in April.

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### BLACK DIAMONDS | Student News



### INDUSTRIAL INFORMATION SESSIONS AND JOB INTERVIEWS

The Department was pleased to host a number of mining companies in 2019 including Martin Marietta, Coronado Coal, RESPEC, GMS (above image), Blackhawk Mining, Komatsu, Alliance Coal and CEMAX. We appreciate them coming to campus to give info sessions and interview our students for both full-time positions and summer internships. Our students also had an opportunity to attend a career fair at WVU's Student Recreation Center and meet with the representatives of Murray Energy Corporation, NALCO, Arch Coal, Westmoreland Coal, Vulcan Materials and United Coal.



### MINING ENGINEERING GRADUATE SEMINAR

The Department was pleased to begin a Graduate Seminar Presentation Series for the fall 2019 semester under Dan Alexander's guidance, in which eight speakers were hosted. Mining professionals and alumni that spoke at the graduate seminar included Carrie Lilly (Redbone Mining Company); Joe Hatfield (Joe Hatfield and Associates LLC); Samantha J. Pretzel (Mepco); Bruce A. Bancroft (retired Manager Scientific Systems, Consol Energy); Thomas Kelly (Lima, Peru); Murali Gadde (Peabody Energy); Xinbo Yang (University of Kentucky); Emily Haas (NIOSH Mining); and Barbara Arnold (PrepTech, Inc.)



The Department chair and students have placed a significant effort into recruitment and outreach activities in 2019. They have given 18 presentations to the Fundamentals of Engineering class of almost 800 students on mining engineering; job opportunities with mining; student activities; and their summer experience working as interns for coal, metal and non-metal mines. Students Shannon Seitz, Ricky Shipe, Daniel Ausherman, Mackenzie Stone, Lauren Masterson, Sammi Fowkes, Jeremy Dielhman, Andrew Moore and Wiliam Chmelik did a great job in presenting our Department and mining profession to the class. Other recruitment events included High School Visitation Days in April and November. (2)

We would like to thank the Remember the Miners Foundation for raising money for mining engineering scholarships (1), WAAIME – WV Southern Section (3), GMS Mine Repair and Maintenance (4) and Gimme Foundation for the financial support to the Department and its students.



### THE SME STUDENT CHAPTER REPORT

WVU's Student Chapter of the Society for Mining, Metallurgy, and Exploration (SME) has continued its reputation of being an extremely involved student organization. The spring and fall semesters of 2019 have proven highly beneficial to active members, the future mining engineers, with monthly meetings and outreach events.

In spring 2019, we kicked off with a presentation by Lee Anderson from Victaulic (1), an active SME member and friend to the student chapter. Anderson talked about the key uses of Victaulic and the importance of piping solutions within the mining industry. The next speaker for our February meeting was Richard Lewis ('85), a lawyer with Steptoe & Johnson, who spoke on how his technical degree in mining engineering benefited his career as a lawyer. Lewis gave advice to the students on how to succeed in their careers and spoke of things he wished he had done differently as an engineering student (2). In February, the mining engineering department sent 14 undergraduate students to Denver, Colorado, for the National SME Conference. The conference was an excellent way for our members to stay in touch with alumni and see the new technologies sweeping the mining industry.

For our March monthly meeting we invited alumni Bill Lepro ('82) of Blue Mountain Energy. His presentation gave a retrospective view of his mining experience, what it takes to become a successful engineer and the importance of engineering fundamentals as they apply to the mining industry (3). We concluded our monthly meetings for the spring semester with a presentation from Pat Brady (4), corporate director of safety for Murray Energy, who spoke on the importance of safety in the workplace. Also in spring 2019, WVU SME assisted with Merit Badge University, helping seven scouts earn their Mining in Society Merit Badge (5). Fall 2019 was filled with company info sessions, outreach events and monthly meetings with WVU mining alumni speakers. For our first meeting, we invited Mike Sustar ('15) who spoke of his mining experience since graduation and gave advice on working internationally (6). During our second meeting, industrial Advisory Board Member Jim Turner ('98) gave a great presentation on his words of wisdom for mining engineering students (7). The last meeting featured a Young Alumni Panel consisting of Cory Krall, Rachel "Boz" Boothby, Zach Minton and Greg Parker, all 2017 graduates who gave advice on transitioning from school to the workforce (8).

We heavily focused on recruiting and outreach throughout the year. SME assisted Statler College at Discover/Decide WVU days as well as Statler College's High School Visitation Day. These events have allowed us to network with over 50 students interested in pursing a degree in mining engineering at WVU.

We are looking forward to 2020. We have several activities in the works and will work to maintain our strong presence in the University and mining industry.



BLACK DIAMONDS | Summer Internships

# SUMMER

# Coal mining in Australia

ERNSHIPS

BY DANIEL AUSHERMAN, MOLLY MCFARLAND AND RICKY SHIPE

### BY DANIEL AUSHERMAN

Mining is a business that accommodates opportunities to travel the globe. As part of my student career, I have been able to travel across the United States attending meetings and conferences. I was beyond excited for the potential to gain international work experience in Australia. At the airport beginning my roughly 24 hour journey, I began thinking about what commitment I had made. Contemplating what the experience would entail, how I would adjust and what I should expect. The lengthy flights leave plenty of time for pondering, but no amount of wondering would have been able to answer my questions. I was just going to need to "hurry-up and wait" for my experiences to answer my questions.

If someone had told me when I was beginning my studies at West Virginia University where I would go in the next four years, I would have told them, "You have the wrong guy, must be thinking of someone else." The opportunities and experiences that I have gained at WVU have been unparalleled and nothing short of awe inspiring. To date the highlight of my working career is my time with Peabody at their Wilpinjong Mine, in New South Wales, Australia. My time in Australia gave me a broader view of the global mining industry and a more informed perspective on international coal markets.

Prior to employment at Wilpinjong, I had gained experience at the Tunnel Ridge Mine, a large longwall operation near Wheeling, West Virginia. Working at Wilpinjong was an adjustment as it is a large strip-mining operation with an annual production of twenty-million tons. Great differences exist in Australian work culture from that which I was accustomed to in the United States. It has been said, "Americans live to work; Australians work to live." The most observable differences are in the two starkly different cultures governing the industry. Despite these differences, one thing remained constant. Coal people are the best people. I was met with the same kindness and welcoming fashion that is synonymous with coal mining hospitality.

The management at Wilpinjong immersed me in projects that were meaningful to the continued productive operation of the mine. I was able to work on projects relevant to both coal production and sales. One project focused on the ash analyzers that were used to determine ash content of the product being loaded onto the train. The accuracy of these measurements is of the utmost importance because coal was being given away that could have been sold to another customer. I also worked with the equipment maintenance team tracking the availability of critical equipment. I provided technical assistance for a haul truck weight study to determine the potential for additional production without expanding the fleet.

Additionally, I was involved with the budget process. The mine had been trialing electronic blasting initiation systems and I was tasked with determining whether or not they were a justified alternative to the conventional systems in use. I prepared presentations on year over year preparation plant utilization, yearly rail scheduling and bulk explosives usage. I also analyzed and prepared presentations on haul truck, production dozer and drill requirements. I tracked mine advancement, performed time studies and tracked operator performance. I completed end of month reconciliations between values reported by the production team and survey metrics. I also made monthly reports to the corporate office on coal reserve depletion.

I was able to travel. I visited Newcastle, a port city in New South Wales. Newcastle is the largest coal exporting port in the world with a throughput capacity of about 180-million short tons. It highlights a key difference in the infrastructure in Australia and in the U.S. In America we simply don't have the exporting capabilities that exist in Australia. It is an entirely different business model.

Working for Peabody allowed me to apply what I learned in the classroom to industry. In comparison to my prior experience in industry I was able to engage in a greater degree of engineering. I am proud to have been afforded with this opportunity. I am proud to be a student and future alumni of a program that provides its students with these unmeasurable opportunities.



#### BY MOLLY MCFARLAND

For me, summer 2019, was reversely, winter in a "Land Down Under." Earlier that spring, I had been selected as a participant in a mining internship with the company's Australia-based subsidiary. Located in NSW, it was a coal mine with both

surface and underground operations. There my function was to assist both technical services and operations. I primarily worked with surface to conduct an excavator study, monitor open-pit equipment purchases and prepare monthly reconciliation reports. Towards the latter portion of the internship, I was underground with maintenance from whom I learned how to perform power checks, change scoop tires and witness a longwall shield removal.

Comparatively, work life in Australia tended to be more relaxed. Due to the nature of the industry, the mine operates all day and all night; and though workdays were often long, people at the mine were amiable. Out of pure kindness, a truckie by the name of "Kath" took me to wineries in the Hunter Valley one weekend to enjoy the flavor of the region. Another noticeable difference was mining sentiment among the general public. Coal is one of Australia's main exports, and in that respect, a large contributor to both the local and national economy.

Regarding time outside of work, I traveled extensively most weekends and holidays. Most memorable were my excursions to Darwin and Indonesia. The older generations of my family served in WWII, so it was eye-opening to tour historical sites and tangibly understand the strategic importance of Darwin. I also went camping for a few days in Arnhem Land where I fished with local Aboriginals for barramundi in water teeming with crocodiles. In Indonesia, I rode a motorbike around the main island of Java for a week, visiting temples and tasting the local cuisine.

To my fellow underclassmen, my advice is for you to make opportunities available. Once you complete an internship, future ones are obtained with less difficulty, however, your first industry work experience is what ultimately creates opportunities for you. In fall 2017, I was a junior without any internship experience listed on my resume. It was then I realized that I needed to take the steps necessary to secure experience. By doing so, I worked in Nevada and most recently Australia. The possibilities all depend on you.

### BY RICKY SHIPE

This summer, I had a once in a lifetime chance to work in one of the oldest, continuously active underground coal mines in the world. The coolest part was that the mine was in New South Wales, Australia.

I'm from a super small town in Elk County, Pennsylvania, that nobody would know existed if it wasn't for the rotten sulfuric smell of the paper mill emitting from the sub-2,000 person town of Johnsonburg. I graduated high school with 38 people, so international opportunities are not very common. I had never even left the country before applying for this opportunity, I had to go apply for my passport specifically for this.

I knew all three students that went to Peabody Australia last summer very

well and I knew that this was what I wanted to do after grilling them on their experiences. It took about four rounds of interviewing to get the official job offer. Accepting it was one of the best decisions I've made. It really opened my eyes to a whole new world that I had never seen.

The Metropolitan Colliery sits in Helensburgh pinned between the Dharawal, Heathcote and Royal National Parks, which is the equivalent of a national forest in the U.S. These forests are essentially rain forests and make for some absolutely incredible scenery. I lived in Wollongong for the summer and had the option to take the Sea Cliff Bridge as a route to get to work. I lived three blocks from the ocean and had the mountains in my back yard. It was so unreal to think that there have been hundreds of years of coal mining going on here. One of the deputies I worked with on the 300 Mains, Dave "Johno" Johnston, told me a story

about how they discovered the Bulli seam. It is said that about 150 years ago, someone wrecked their ship into the cliff where the Sea Cliff Bridge is located while trying to get to Sydney and accidentally stumbled into one of the most attractive seams of metallurgic coal in the world. Being that the cliff dropped right into the ocean, they started digging into the cliff and using a barge loadout system while boring straight into the mountain.

SHIPE

There was so much history in that coal mine. The Koepe Winder was one of the original shafts into the mine, which was a two part pulley system that drops half the cage while raising the other half. There was an old rail system so naturally the man cars derailed all the time. Once you dropped into the mine, if you took a few turns into the really old sections of the mine, you could see the old horse stalls from when they used donkeys and horses to haul the coal out of the mine. There is still hay in those stalls. Keep walking a little bit and you can see old timbers that are literally whole trees that were cut to size with handsaws to use as timbers with DNI (date and initials) from shiftly inspections dating back into the 1930s.

During my time working in Helensburgh, I was able to take part in some really interesting jobs. Metrop was in the process of submitting an authorization to the Australian government to obtain the permits to expand the mine into an area underneath a military base. I was able to develop the projected longwall plans and maps that were submitted to the government

that were later approved. I also went on an inspection of the sandstone beds of the Woronora Dam, which supplies a large amount of the drinking water to the city of Sydney and we previously longwalled underneath. Australia has all of its tributaries feeding the dam fenced off and has for many, many years to prevent contamination of the waters. I was told that I was one of only approximately 50 non-Aboriginal natives to ever walk this land.

Prior to going to Australia, I researched to find a high quality powerlifting gym to train for the USPA WV Drug Tested State Championship in December 2019. I found Strong 24/7, about a 10 minute walk from the hotel I was staying at, and made my way there before I even started my first day of work. It was here that I made some lifelong friends. Being dropped into

another country without knowing anybody near you is definitely hard, but the folks at Strong made it easy. I quickly became friends with the trainers, coaches and owners of the gym. I traveled to Melbourne in July to watch the Powerlifting Australia National Championship and support gym owner Joey Zinghini and my friend Tara Gripton (who went on to break the Australia record for deadlift in her weight class). Here, the competitors immediately took me under their wings. I spent the whole weekend hanging out with huge names in the sport, including Liz Craven, currently the third best powerlifter in World Powerlifting by Wilks score. I was also invited to the post competition awards ceremony and got to eat dinner across from world renowned developer of the Wilks score, Robert Wilks. His formula is used in all powerlifting federations in the world to determine who the "strongest" competitor is. I still keep in contact almost every week with my friends Zac, Renae, Bec,

Josh and Cicc, and we continuously support each other with our goals. I was able to visit some private powerlifting gyms, including Paragon Strength and Performance in Sydney, managed by social media legends Nick Cheadle and Matt Bartholomeu and Iron Underground in Brisbane managed by Paul Thompson and Dave Keong.

Overall, the whole trip was an incredible experience. I was really able to learn a lot about myself and figure out how to adapt in a new and difficult situation by myself. The people of Australia were above and beyond incredible, I was welcomed with open arms everywhere I went. Working at Metrop was such a cool experience not only because of the history I got to see everyday, but also because of the people. The guys from the 300 Mains really made my experience great from playing marbles with the weights in the drop tags and making the most comfortable seats out of the chem boxes when the belts went down, and hitting a record 14 meters of advance in one shift. Working with the contractors on the Centenary project bolting up after blasting out for a bunker install was so much fun. Although it's not the easiest work, hand bolting from a basket on a scoop, the crew was so much fun to work with. I loved my time as an Aussie and I think it helped me to become a better worker, engineer, but most importantly, a better person. I cannot thank Peabody Energy enough for taking the chance on sending me all the way to Australia for the chance of a lifetime.

# Metal mining in Nevada

#### **BY SHANNON SEITZ**

In 2018 I was applying for internships wherever I could get them and was lucky enough to land an internship for Newmont Goldcorp at their Leeville operation in Elko, Nevada. I never had an internship, never been to Nevada, and never been in an operational underground metals mine. It was a summer of firsts for me, but I quickly came to realize that I made the right choice in studying mining. After a summer of working with their ventilation team I packed up my car to make the 36 hour drive back home to school.

I was thrilled to receive a call a few weeks later offering me another internship with them the following summer. The school year came and went, and before I knew it, I was on my way back to Nevada.

For summer 2019, I was tasked to work with the design engineers at Leeville. I had no experience designing there and minimal experience with the design software, but everyone was very welcoming and helpful. Before long I started to design jamlines by myself. Shortly after that I started designing cutsheets. Those were a lot more complicated. Each heading was like a new puzzle to figure out, and every time I thought I had it completed I would send it out for approval by the other engineering departments and would very quickly start receiving feedback on what I should change. Thankfully, everyone was patient with me, and they all wanted me to succeed and learn. So when they gave me feedback, they would explain exactly why they thought I should change it. From that I wound up learning so much about the different aspects of the mine.

I learned about the paste fill they used and how to design with that in mind. I learned about different types of roof support and when they are best used. I learned about planning with equipment in mind to make sure that the design was practical. Everywhere I turned there was someone else with other tips and tricks to teach me. The experience they shared with me was invaluable. By the end of those three months I had learned so much I was able to create instructions for them on how to design cutsheets so that people who had little to no experience could make one.

That summer also gave me the opportunity to see different parts of the mining process. We were taken on a tour of some of the mills and learned about how the ore we sent them became gold bars. And at the end of that, they arranged for us to watch a gold pour. It was a fantastic experience to see where the ore I helped to remove was going and what it was becoming.

Aside from the work itself, these internships gave me the opportunity to explore a part of the country that I hadn't been to and make fantastic connections within the mining community. From engineers and geologists, I worked with two other interns ranging from metallurgical to geotechnical. I was able to build up a great network of people.

Having internships is one of the best things a student can do for their career and their education. The connections I made and the practical knowledge I gained will help me my entire life.

# Underground coal mining in West Virginia

### BY ALEC ELLIOTT

How long does it take to make a major life change? Some may answer a week, some a month and some a year. For me, it only took a 30 minute presentation. As it turns out, that presentation would make me change my entire life plan and never look back.

My family has traditionally stayed in one area and I always assumed I would do the same. Coming to West Virginia University, almost five hours away from home, was already a leap I never could have anticipated. Without taking that chance I would have never discovered what I was meant to do for the rest of my life and I possibly would have never had the opportunities afforded to me by the mining department at WVU. shaft. Considering an underground mine may have only a handful of these shafts, being able to drop down into the shaft in a bucket with the head engineer and the shaft drilling companies foreman was a very unique experience.

After the month with engineering, my internship switched to the production side of things. Every day I arrived to work not really sure of what I might get into, who I might shadow or work with and where we might go in the mine. A portion of this time was spent with the CM coordinator. Each day would begin with numerous meetings between upper management and section foreman to talk about the day and what current projects were going

A short presentation from the Department of Mining Engineering was all it took for me to be hooked on mining and the mining industry. After making the switch into the major, I began taking introductory courses. In my first mining class, Underground Mining Systems, I was given the opportunity to take a trip to an underground coal mine in West Virginia. This was my first glimpse into the world of mining and is what made me want to pursue an internship in the industry. During the fall semester of my sophomore year I had my first formal job interview and in the end of February, I got a call that I was going to be offered the internship from that same company.

### Of course to most young people an internship is a great

opportunity to make money, however the hands on experience I gained from my summer in underground coal was immeasurably more valuable than any dollar amount. Every day I was eager and excited to see what I could learn. The first month of my internship was spent with the engineering department working on AutoCAD maps of the mine, design of future plans and projects, monitoring surface operations, managing environmental protection, and one of my personal favorites, overseeing the installation of a new ventilation

FULIOTT

eager to see a new part of the country as well as a different type of mining. This is the type of opportunity that was made possible entirely because of that short presentation my freshman year that inspired me to jump headfirst into mining engineering and the mining industry.

on within the mine. Then we would usually go underground to actually see how projects were coming along and assist. This was definitely more hands on and helped me to further understand the layout of the mine, what went into daily production, as well as more lengthy projects such as the installation of seals or the pulling of equipment as a longwall panel was nearing completion.

As far as my future, I am not really sure where I may end up after graduation. For this coming summer, going into my senior year, I have accepted a position to travel nearly 2,000 miles from home to Green River, Wyoming, to intern at an underground trona mine. I never could have imagined I would travel so far from home, although I am very eager to see a new part of the



### Surface coal mining in Mississippi

#### BY LAZAR ZUJOVIC

As an international student from Europe, I was thrilled to continue my education as a graduate student at West Virginia University. I found being here is a privilege and a tremendous career growing experience. On top of that, during my education, I had an opportunity to do two summer internships for the North American Coal Corporation.

My first internship with this exceptional U.S. mining company happened in Mississippi in summer 2018. Not only was I excited about the opportunity to work for this company during the summer, but also to move and live in the state of Mississippi for more than two months. It was my first time driving 13 hours through the U.S. I was working on developing interactive training for pre-shift safety inspections. I gathered crucial material for this project such as 360 degrees images and videos. While building consensus with staff and workforce, I experienced how all co-workers were staying patient with me. I learned a lot about mine safety and how a safe workplace and environment are major tasks for the company.

The second summer internship with the same company was even better. We knew each other from the previous year, and in summer 2019, we were able to finalize the safety and training project on which we were working on during the previous year. I had an opportunity to be involved in safety inspections and audits of the various mining equipment such as trucks, dozers and scrapers. I also spent two weeks at the other mine site, within the same company in New Mexico. There I enjoyed meeting and working with new people.

What amazed me, besides work itself, is southern hospitality. I spent a great time with people outside of work and made valuable connections. Having internships is the experience of my life. The knowledge, connections and communication skills I gained will undoubtedly help me both professionally and individually.



### Surface aggregates mining in Virginia

#### BY ANDREW MOORE

My first summer I was exposed to the operations side of aggregates at a Luck Stone quarry, where I was essentially a surface miner. I was given the opportunity to drive a CAT 775F haul truck to learn what the long ten plus hour shifts were like. In addition to driving a haul truck I aided in maintenance on the plant and the yard where I changed screens, spliced belts, laid conduit, as well as crusher rebuilds. Overall my experience opened my eyes to what a foreman and plant manager do daily, with some bits and pieces of what the engineering team does in order to make the mine run as efficiently as possible. The best part was how I quickly went from the "college boy" to one of the guys at the quarry and fit in so easily.

My second summer in aggregates was spent with Luck Stone in their quarry design team where I worked as a mine engineer. The early part of my summer I worked on prospecting greenfield sites and evaluating whether or not the property was worthwhile to purchase for mining. After the decision was made, I would either scrap the greenfield or work on the final pit cuts to finalize the long term plan for the mine. Towards the middle of the summer I discovered my passion for blasting and I was put on shots nearly every day of the week. When I was on shots I aided the blasters in laying out blast patterns and filling the holes with emulsion. While I was originally meant to be an office worker, the design team helped me pursue my interests and discover what I want to do after I graduate, which is working in the field with explosives.



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### Alumni Update 2019 YEAR IN REVIEW

PLEASE WRITE TO US! We want to know where life has taken you since you left West Virginia University. Complete and return this form with your news and comments. Pass this newsletter on, or let us know any alumni who are not receiving Black Diamonds.

Send to: Department of Mining Engineering West Virginia University | 365A MRB | PO Box 6070 | Morgantown, WV 26506-6070

Or, email updates to karen.centofanti@mail.wvu.edu.

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Suggestions/Comments:

Brief News of Professional and Family Activities for Future Newsletters:

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