

# Interview with Dr. Rennie Kaunda

BY DALE THOMPSON

Dr. Rennie Kaunda is an Associate Professor in Mining Engineering and has been a faculty member at Colorado School of Mines since 2014. Originally from Zambia, he has studied at the University of Arizona and Western Michigan University. He is also a licensed Professional Engineer (PE) in the state of Colorado and spent seven years in industry. His research primarily focusses on Mining Geotechnics, Water and Environment. He has more than 50 publications.



**DT** To start, tell me about your background: where you're from, your education, and experience.

**RK** I am originally from Zambia in southern Africa. I went to school at the University of Arizona for my bachelor's in mining engineering and then went back to Zambia and worked for a mining company. After that, I came back to the University of Arizona in Tucson for my masters, again in mining engineering. My research was on rock mechanics. From there, I went straight for my Ph.D. at Western Michigan University in Kalamazoo, in geotechnics. After my Ph.D., I worked a little bit for the state of Michigan. And then I went into industry working for about seven years doing a lot of different mining projects. I joined Mines in 2014.

**DT** What piqued your interest in mining?

**RK** I knew I wanted to be an engineer when I was in high school because I loved math and science, but I couldn't make up my mind about what type of engineering I wanted to pursue. I enjoyed everything, and mining engineering is the kind of career where you have opportunities to try different things. If you like being outdoors, if you like being inside the lab, if you like working with computers, there's just a diverse number of things that you can do with your mining career based on your interest.

**DT** Can you give a brief overview of your research here at Mines? What are you researching, and what are your goals?

**RK** I specialize in an area called mining geotechnics. The simplest way of explaining this category of research is if you think about Earth as three spheres: there's the sphere that is related to water, there's the sphere that's related to rock materials, and there's the sphere that's related to soil-like materials. That intersection is mining geotechnics. I use a lot of interdisciplinary tools: skills from computer science, civil engineering, and so forth, to try and focus on problems that are related to mining geotechnics.

**DT** What is the research project you're currently most passionate about?

**RK** I care about the protection of the environment very dearly, because in the past, mining has had a bad rap of not really caring about the environmental surroundings. A research area that I've been focusing on is related to cleaning up contaminated sites. A lot of mines in the past have caused environmental pollution of water, soil, making the land not as productive as it was in the past. If you look at sub-Saharan Africa for instance, there are a lot of mines which used to operate but don't operate anymore because they've depleted whatever

they were mining, and those countries usually don't have money to conduct environmental mitigation and remediation. Every summer we take a couple of students to go and visit these old sites, and we look at the native plant species that grow in those areas and try to utilize them to clean up the mine waste materials through phyto-remediation. Then the goal is, can we use those plants to create biofuel and bioethanol?

**DT** It sounds like what you're working on intersects with environmental engineering. How does geotechnical engineering play a role in this new environmental remediation project?

**RK** What I've tried to do is to use my background and my experience in all these different areas of environmental remediation and mining geotechnics to try to understand the materials we're working with. In mining, typically it's, "How strong are these materials? Are they going to be a source of pollution downstream?" Whereas in environmental engineering, you are more interested in, "How can we clean this up quickly and efficiently and have fewer negative impacts on the surrounding?" So, the two intersect very nicely.

**DT** What are the backgrounds of the students in your research group?

**RK** We've had a range of backgrounds of the students who've been involved with this project. Students have come from geology, geological engineering, civil engineering, and environmental engineering. The focus really is to help the students learn things that are outside their comfort zone, and to demonstrate to them that you can learn more than you think you are capable of by being brave and sometimes working with unfamiliar methods. So, we welcome students from all kinds of backgrounds, not just mining backgrounds. I've also always had a balanced mix in my research group, where I've had been fortunate to have postdocs, Ph.D. students, masters students, and undergraduate students involved.

**DT** What do you look for when you're looking for new undergraduate students and deciding who you want in your team?

**RK** Passion is usually big for me. That's something you cannot teach. I've been lucky that the areas that I

tend to focus on gather a lot of interest from different students. Who doesn't care about the environment, right? The second thing is motivation. Somebody who's motivated and is a self-starter, they take initiative when they run into a problem. Somebody who enjoys research and learning and can get along with other students with different personalities from them. Someone who's very flexible and works hard.

**DT** To end off the interview, what would you say is your favorite thing about Mines?

**RK** I like the size of Mines. I like the fact that it's not too big for students to get lost, and it's not too small to not get things done. I think it is just that right healthy size where students can make friends and have access to resources that help them do good work and good research. I also like the culture of the students. I like the fact that most students are just respectful and kind and care for each other. You don't always see that at some of these big schools. They're just so respectful and so curious and kind and willing to help others.



Dale Thompson graduated from Colorado School of Mines with a B.S. in Biochemistry in May 2024 as the department's Outstanding Graduating Senior. She conducted undergraduate research on the use of peptide-

modified hydrogels in the treatment of growth plate injuries. She is currently working towards completing a M.S. in chemistry, to be obtained May 2025, conducting a literature review on phosphoglucomutase for her independent study project. Outside of academics, Dale competes as a pole vaulter for the Mines track team, and was a competitor at the 2024 NCAA Outdoor National Championships. In the future, Dale aspires to a career in medical science.