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United Nations touts Virginia Tech mining engineering class as model of sustainability education

The UN-affiliated Sustainable Development Solutions Network recognized the course for its promotion of 17 Sustainable Development Goals that have been adopted by the UN's 193 member nations.

By *Tonia Moxley*

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Emily Sarver (left) and Festus Animah in the mock mine pits currently under construction in Holden Hall. Photo by Tonia Moxley for Virginia Tech.

A Virginia Tech professor and a handful of international collaborators have gone global with their work to educate a new generation of mining engineers – and they've garnered United Nations recognition for it.

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Emily Sarver, an associate professor of [mining and minerals engineering](#) in the Virginia Tech [College of Engineering](#) has been developing the transdisciplinary course, Sustainable Development of Mineral and Energy Resources, since 2013.

With help from instructors in Colombia, Chile, and Colorado, Sarver teaches students from four institutions the importance of developing socially responsible, environmentally sound mining operations that benefit companies, host communities, and the world.

Recently, the global development community took notice. The U.N.-affiliated Sustainable Development Solutions Network (SDSN) recognized the course for its promotion of 17 Sustainable Development Goals that have been adopted by the U.N.'s 193 member nations. In June, the SDSN designated the class as an official case study in education that incorporates the goals – including climate action, clean energy, and economic growth – making it a model for sustainability-focused education around the world.

“For me, it feels like a little validation that we’re doing something different, something right,” Sarver said. “And recognition from outside the field of mining, in this case, is particularly important. That’s a key element of sustainable development work: It needs to be broadly meaningful.”

Few things are as globally important as mining.

Much of the technology powering sustainable development depends on extracting critical minerals, such as copper and cobalt. Everything from



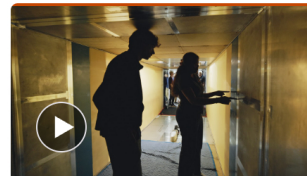
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solar panels and wind turbines that generate renewable energy to lithium ion batteries that power electric cars rely on mining these materials.

But done irresponsibly, mining can be destructive. For Sarver, “the driving question is, if we’re going to do something that we can never undo, how can we make sure that everyone that should benefit, does – and certainly that no one is harmed by our activities?”

And for the next generation of mining engineers and researchers, such as Virginia Tech doctoral student Festus Animah, ensuring those resources are extracted in ways that protect the local environment and uplift smaller economies is paramount. Animah specializes in mine ventilation research, an area of study particularly important in his native Ghana.

“I want to be helpful to my country because my country has a lot of gold mines where they have a lot of dust issues,” Animah said.

To be a skilled professor, researcher, and mining consultant, Animah said it was important for him to take a mining development course that not only crosses continents, but transcends disciplines. “This is the way forward for future teaching and learning,” he said.



The course is taught jointly by Sarver, Oscar Jaime Restrepo at [Universidad Nacional de Colombia in Medellin](#), Emilio Castillo at [Universidad de Chile](#) in Santiago, and Nicole Smith, a cultural anthropologist in the Colorado School of Mines. Students at each site participate in weekly discussions and activities during class meetings and

participate in weekly discussions and activities during class meetings and work on collaborative term projects.

The curriculum incorporates not just traditional mining-related topics like environmental engineering and mineral policy and economics, but it also emphasizes the importance of community approval.

“One of the largest challenges for large-scale mining developments is what we call social license to operate,” Smith said. That means developing mines that minimize community disruption and benefit the people living there. Community approval of a mine project can prevent conflicts and production delays.

“I teach engineers to think about these social impacts, and how we can design mines better, so that we can get greater community acceptance,” she said. “But also so that the mining industry can contribute to sustainable development in and around the communities where they operate.”

To date, the course has enrolled about 150 students of at least 10 nationalities.

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