

Researchers use CARC systems to understand volcano shapes

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According to the [United States Geological Survey](#), Earth is home to about 1,500 potentially active volcanoes, with new volcanoes forming about once a week. Volcanic eruptions can be highly unpredictable and

pose a major threat to life and property.

Katherine Cosburn, a Ph.D. candidate in The University of New Mexico Department of Physics and Astronomy, is leading a research initiative that uses computer modeling to better understand volcanoes and, possibly, enable scientists to more accurately predict volcanic activity. Cosburn, along with associate professor Mousumi Roy and a small team of undergraduate researchers, has been working on a series of projects aimed at better understanding how the internal processes of volcanoes are expressed externally. The insights yielded from her research may help geologists mitigate the damage caused by volcanoes by predicting their behavior.

The sight of conical volcanos like Mt. Fuji is striking, but the internal processes these mountains hide are, perhaps, the real spectacle. The objective of this project is to better understand the connection between the flow of magma beneath the surface of a stratovolcano and the external shape taken by the overlying Earth. Since stresses induced by magma may change the appearance of the land around it, observing the surface of a [volcano](#) could tell us about its inner workings.

Cosburn, whose background is in physics, tackles this problem with a theoretical and quantitative approach, using extensive calculations based on real-world data to model how magma and surrounding materials interact. Her project has used UNM Center for Advanced Research Computing systems extensively to perform these calculations. In Cosburn's words, it is "very possible" that the theoretical modeling her team has conducted using CARC systems could have real-world predictive value.

This research focuses specifically on stratovolcanoes—the big, cone-shaped volcanoes. As Cosburn explains, "If you ever made a paper-mache volcano as a kid, this is the type of volcano you made."

Stratovolcanoes are particularly volatile and unpredictable, making them a looming threat to those who live and work near them. Many of the most disastrous volcanic incidents in human history, like the eruptions of Mt. Vesuvius, Mt. Pelée, and Mt. St. Helens, have involved stratovolcanoes. The ability to predict the behavior of stratovolcanoes has the potential to save lives and prevent [economic hardship](#).

Cosburn plans to present her team's research at several upcoming forums including the 2020 Seismological Society of America Annual Meeting taking place this April in Albuquerque, New Mexico and the 2020 American Geophysical Union Chapman Conference on Distributed Volcanism and Distributed Volcanic Hazards in Flagstaff, Arizona this September. This year's AGU Chapman Conference will be focused on modeling [volcanic activity](#) for the purpose of harm mitigation and will feature a "field trip" to the Springerville volcanic field. Cosburn will also be presenting this project, along with her related research, as her Ph.D. dissertation.

Provided by University of New Mexico

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