LAS CRUCES — A New Mexican since 1995, David Rockstraw, New Mexico State University Chemical and Materials Engineering department head, has truly embraced the charms of the Land of Enchantment. The native of Indiana bought an historical adobe home in 2009 and has devoted himself to preserving the architectural history of the southwest.

“They are beautiful works of art, created by craftsmen and artisans. Each structure is unique,” Rockstraw said. “The first time I had ever been here was when I came for my interview. I immediately fell in love with Las Cruces and it has been the best decision I have ever made,” he said.

He was compelled to buy an adobe home in Mesilla in 2009. It is the former home of Don Rafael Bermudez, one of the first settlers in Mesilla. Originally, Bermudez lived behind San Albino Church, just off the plaza in Mesilla, but an 1871 riot in which about a dozen people were killed in the plaza, caused him to move for safety. In 1875 he finished building the home that Rockstraw now occupies, several blocks away from the plaza.

“When I bought the home, I felt I had an obligation to care for it. This house became the inspiration for my passion to begin researching how to maintain and preserve these old structures,” said Rockstraw. His research led him to Mesilla Valley Preservation, an organization dedicated to preserving the architectural legacy of the Mesilla Valley in Southern New Mexico. And, like everything he does, Rockstraw went all in. What he describes as “playing with mud” is really a research project.

When I first joined the organization, I felt kind of out of place with all of the artisans involved. I was the only scientist. “But Eric Liefeld [president of MVP and NMSU alum, 1985] assured me, there will come a time …”

That time came when he joined fellow members to research what causes the mud walls to become compromised. The common theory was that moisture was the culprit. The thick adobe walls wick moisture from the ground which migrates to the outer walls and evaporates. But many walls over the years begin to crumble through a naturally occurring process called salt attack. Salt attack is a natural process resulting from alkaline soils and arid climate, a combination found in the American west, and in the Mesilla Valley in particular.
Rockstraw, Liefeld, and fellow MVP board members Gregg Henry and Pat Taylor, began to investigate, taking core samples from the walls of one of the most historic sites in town, the Armijo Gallagher House, dating back to the 1860s. They inspected the samples with an electron microscope that revealed salt crystals that had filled the pores, cracks and crevasses of the adobe, eventually causing it to fracture and crumble. The deterioration can destabilize the wall through a condition called coving.

Using his background in chemical engineering, Rockstraw developed a relatively low-cost method for measuring salt loads in the field. Along with other tools, this approach allows contractors and preservation specialists to rapidly identify and precisely measure salt attack in adobe walls and other materials, and design targeted remediation.

Commonly used remedies, points out Rockstraw, can actually make the condition worse. Many adobe owners use Portland cement or elastomeric stuccos on the outside of the walls, thinking the hard or rubbery coatings will keep moisture out. In fact, this method has the reverse effect, retaining the water content and causing the salts to destroy load-bearing adobe structure more rapidly.

Rockstraw and fellow MVP members promote a method to protect the walls from salt damage, by applying a sacrificial rendering — a layer of mud or lime plaster that will absorb the salt and protect the original adobe wall. The layer of sacrificial plaster serves to migrate salts out of load-bearing structure, and allows them to be collected and discarded — minimizing damage to the adobe wall and setting the clock back for the building.

Hoping to share their research with local adobe structure owners, the group applied for and was awarded a $25,000 grant from the National Center for Preservation Technology and Training, a unit of the National Park Service, to educate people on their preservation techniques. In addition to development of the toolkit and methods, they produced a series of eight YouTube videos entitled *Salts of the Earth*. Topics include the history of adobe structures in the Mesilla Valley, how to identify and detect salt damage, how to take samples and analyze them, and how to maintain and preserve adobe structures. Search for Mesilla Valley Preservation on YouTube to view the videos.

The group also has made several presentations at the Earth USA international conference focused on architecture and construction with earthen materials. While adobe structures are popular in the southwestern United States, they are widely used throughout the world. Adobe bricks are sustainable, inexpensive and easy to make and they are used in construction on every continent. About one-third of the Earth’s population lives in some form of earthen dwelling.

“We’re desperately trying to get the word out so that we don’t lose more of these beautiful structures.”

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Eric Liefeld, president of Mesilla Valley Preservation, shows an adobe wall suffering deterioration after being painted with elastomeric material. (Photo: Photo courtesy Mesilla Valley Preservation, Inc.)

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