

IN THE SPOTLIGHT: JAE EUN SOHNG

Molecules, Minerals, and Microbes



A middle school teacher in her home country of Korea inspired Jae Eun Sohng's passion for addressing environmental challenges.

JAE EUN SOHNG is a PhD student working in [Dr. Sanjai Parikh's](#) Environmental Soil Chemistry Lab at the University of California Davis. Originally from Korea, Jae Eun began on her path to UC Davis in middle school, when her homeroom teacher encouraged her to participate in an environmental conference held by Korea's NGOs. This exposure opened her eyes to the pressing environmental issues that Koreans were facing, and sparked an interest in the science behind the problems. "Since then, many of my life decisions have been motivated by this interest," Sohng says, including her decision to leave Korea to pursue an education that will allow her to "directly address and solve these issues." So, after earning an MS degree in Forest Science from Seoul National University, Jae Eun left for Yale University, where she earned a second MS from the School of the

Environment at Yale University. During her time at Yale, Ms. Sohng was a research associate on a project investigating the effects of fracking on water quality, a project that piqued her fascination in the relationships between human activities and the organic and inorganic matter in soil and water. Now at Davis, Jae Eun has turned this interest toward her current work of finding practical solutions for soil carbon management.

X-Rays Aren't Just for the Doctor's Office

Billions of hectares worldwide are used for agriculture. "These broad lands can create an incredible opportunity to manage atmospheric carbon in soils, and enhanced soil productivity can help feed an increasingly populated world," Ms. Sohng says. However, although scientists know that soils can be a useful place to trap and store carbon from the atmosphere, the mechanisms of exactly how carbon forms

and stabilizes in the soil still aren't well understood. To add to the challenge, scientists also don't fully understand how the behaviors of carbon atoms in the soil may change depending on the soil type, the type and amount of microbes in the soils, and even the local climate. Here at Davis, Ms. Sohng is using electromagnetic radiation to understand the physical and chemical makeup of what scientists call "mineral associated organic matter," which is one of the largest sources of carbon in soil. One way that Jaeun will be working to identify how different forms of carbon get "glued" to different types of mineral surfaces is through using infrared and X-ray technology. Just like X-rays at the doctor's office make our bones visible, the hi-tech approaches Ms. Sohng uses will magnify microscopic soil carbon processes and make them visible to the human eye. Of her research, Jaeun notes "My research is zoomed in at the molecular scale, at the interface between different organic carbon sources, mineral surfaces of rocks and soils, and microbial activity." Ms. Sohng shares that a fine — indeed, molecular — scale resolution of the interactions between carbon and the organic and inorganic components of the soil will help in the effective farm-scale management of soil carbon.



A field research plot at the [Desert Research Extension Center](#) in Holtville. Photo courtesy Gilberto Magallon.

The Future of Soil Carbon Management

For her part, Ms. Sohng sees scientist-farmer partnerships as key to the future of soil carbon management.

"I think intense, long-term collaborations between scientists and farmers monitoring soil quality and productivity, as well as food quality, may be especially fruitful in generating new management practices that can effectively curb climate change and increase food quality in a sustainable manner."

Fortunately, these partnerships can be facilitated by UCANR, UC Cooperative Extension, the Climate Hub, and the Working Lands Innovation Center, all of whom can tap California's deep pool of researchers and engaged agricultural producers to support these efforts and get us closer to the "triple win."

Read More About Environmental Soil Chemistry Research at UC Davis

So, what are Jaeun and her colleagues in the Parikh Lab at UC Davis up to? [Check it out!](#)

The California Climate Hub will occasionally spotlight our collaborators or impactful research projects relevant to California agriculture, forestry, and rangelands. If you know of a researcher, resource manager, producer, or project that should be highlighted, please let us know. For recommendations or more information, contact Lauren Parker at leparker@ucdavis.edu