Science Societies

Classroom to career: Gaurav Jha

By Alison Jennings

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Photo courtesy of Gaurav Jha.

Our Classroom to Career series spotlights members who began as students and grew into thriving professionals. This installment features member Gaurav Jha, who shares his experience creating lifelong colleagues through the Societies and gives graduate students tips on how to make the most out of their degree.

Agriculture has always been a part of Gaurav Jha's life. He grew up playing in rice fields and orchards in India where he tasted sweet, sticky mango fruits all summer. His childhood love of plants and soils stayed with him in his collage years. In school, he visited many soil science research labs where his curiosity surrounding agricultural systems grew. The discovery that agriculture is backed by continuously evolving scientific research motivated him to keep learning. He realized that there was so much more to those nostalgic rice fields beyond childhood entertainment and was determined to find out more about agriculture and soils.

Jha went on to get his bachelor's in Agriculture from Visva-Bharati University in 2014 before getting a master's from the Department of Soil Science at Punjab Agricultural University in 2016. He began his Ph.D. in Plant and Environmental Sciences in 2017 at New Mexico State University where he worked all over the Navajo Nation. "I learned about the respect they have for water, crops, soils, and everything that our nature provides." During this time, he made Madhubani paintings—one of the folk arts of

India—depicting the agricultural stories he learned while in New Mexico.

Soil scientists usually have some kind of analogy for the “dirt” that our crops grow in—Jha prefers to call it “soul of infinite life” because of the endless microbes hidden underground. “There's so much life that we cannot imagine that’s around us, like with the agriculture that we are growing,” says Jha. He has dedicated his career to better understanding the physical and technological aspects of soils and crop production for food security.

Conference connections

Dr. April Ulery, Professor of Environmental Science at New Mexico State University and 2021 President of SSSA, was Jha’s Ph.D. adviser. She brought Jha to his first Annual Meeting (now called CANVAS) in 2017. He was initially very nervous: Not only was this the largest conference he had ever been to, but it was also the first one he had ever been to in the United States. “In terms of its magnanimity, I felt it was huge.” But he went out of his comfort zone to present a poster about his research and engage with fellow members of the Societies. And it was a huge success.

"You know how satisfied you are when something goes well? That was the feeling I got [when presenting my first poster at CANVAS]. ‘Yes, my research has value!’ And

the Societies showed me that—how important it was."

"I still remember those two hours. It was non-stop talking," says Jha. "Literally at the end, at 6:00 pm, I felt, 'Oh, this was great.' You know how satisfied you are when something goes well? That was the feeling I got. 'Yes, my research has value!' And the Societies showed me that—how important it was."

That conference also taught Jha how interconnected each member of the Societies really is. "There is an interdisciplinary science that's happening [across the Societies] by default," he explains: In agriculture, everything starts with nutrient-rich soil. The plants take up the nutrients from that soil. Those cultivars, along with other factors like the weather, then have to be managed. Jha's says his first Annual Meeting "helped me understand the integrity of the integration of all of these components in the Societies."

Now an Assistant Professor in Precision Agriculture at Kansas State University, he still collaborates with the contacts he made at his first ASA, CSSA, and SSSA conference. Maintaining large networks of collaborators is very important for his line of work: As the PI of the Digital Agronomy Research Team (DART), he leads a sizable interdisciplinary group of data scientists, soil microbiologists, and crop scientists in addition to collaborating with Kansas farms (primarily with Flickner Innovation Farm and Roth Farms) for onsite research.



The Digital Agronomy Research Team (DART) uses technology, like drones, to collect large amounts of water resiliency data. Photo courtesy of Gaurav Jha.

Precision agronomists use technology to maximize agricultural production while minimizing its environmental footprint. Specifically, Jha's lab studies how soil microbes affect water resiliency on Kansas farms. They stitch massive amounts of data together from drones, satellites, soil health indicators, and other sources to assess exactly how much water an alfalfa, corn, or soybean farmer needs in certain parts of their field without waste. "Every field that you're walking in, the soils vary. The crops that grow in that soil would vary as well," he says. "So, as you walk from one field to the other, the soil pH, organic matter—anything changes. According to that change, the inputs also need to be changed."

His work helps make agriculture more sustainable in the wake of global warming. "Whatever era or time we are moving towards, climate change is there," says Jha. And these warming climates are currently causing issues in agriculture, from yield reductions to water stress. That's why Jha's lab guides Kansas policymakers with

scientific data. “We try to have a site-specific approach to research and then also make sure that those [findings] are tied up to the policies that the state has,” he says. DART tries to have timely research projects that inform policymakers on urgent issues. “Right now, we are working on a technology—which is a radar-based irrigation system and satellite system—to optimize the water use in the Ogallala Aquifer region, which is depleting at an alarming rate,” he says.

This impressive ability to connect with and work with others was a skill sharpened by Jha’s interactions with members of the Societies, especially at the Annual Meeting. He now leverages these networking skills to form and manage large teams of scientists and coordinate research results with policymakers to sustainably produce Kansas crops.

Tips for current (and future) graduate students

Jha concludes with some tips he gives his students and postdoctoral researchers about graduate school, the early career phase, and how to make the most out of Society membership as a junior scientist.

Refine your communication skills

When you’re presenting work, whether it’s through a poster presentation, oral presentation, or conversation over coffee, Jha says it’s important to keep the audience in mind. And that even at CANVAS, you need to use clear, general language about your research.

“We all do science, but sometimes we talk about heavy jargons. Even being in this field for so long, there are so many things that just bounce off my head in a talk. So, I just feel like

communicating and understanding the audience is so important. We all need to understand who we are talking to and how simple or how complicated we need to be for a particular talk," says Jha. "Communication skills are extremely important in any field and as you advance in your career."

Celebrate success whenever you can

It's important to take time for yourself—whether that's through hobbies, resting, or celebrating little wins with friends and family. Excess stress just compounds into more and more stress, so it's good to breathe and remember the good work that you do.

"Communication skills are extremely important in any field and as you advance in your career."

"A tiny success is important. It could be more personal or professional. You write down two paragraphs, and you feel so good about it. Celebrate that with your friends," says Jha. "Or if you swim and you completed a good mile, or you sprint and you completed a good marathon—celebrate that with your friends [and] family."



One of Jha's Madhubani paintings depicts a woman collecting corn pollen (tádídíín). This pollen is used in Navajo religious ceremonies. Image courtesy of Gaurav Jha.

In addition to celebrating small wins, you need to take occasional breaks, or else "your mind will be fatigued at some point," says Jha. "Trying to pacify your stressful moments is very, very important." That's why Jha started creating Madhubani paintings, and why when he has time, he travels to different national parks. "It's the best way to be in nature and get that calm, composed mindset to be back to the office again."

Make the most out of the CANVAS meetings

One of the best—and easiest—ways to create career-advancing connections is to take advantage of all CANVAS has to offer, says Jha.

"All my students are here. And they are all over the place. One of my students was [attending] a leadership conference, another one was going on tours and making networks. [And] they're presenting their research, getting more ideas."

After a packed day of attending sessions and workshops, he encourages his students to take a break in the exhibit hall when they feel conference fatigue. "That's where a lot of networking starts." The exhibit hall is where Jha connected with the editorial board of *Agronomy Journal*—he's still an associate editor today.

Maintain the connections you make

But lastly, you have to put in the work to maintain these connections, Jha remarks. “When you're exchanging cards, you'll have a stack of them. Make sure to identify the most important ones. And once you go back [home], at least reach out to the most important collaborators to see who can be your long-term collaborator—even after you've graduated and are becoming a faculty member.”

Having a support group of all kinds of people (students, graduate advisers, and other mentors) can help as you navigate developing methods for an experiment, interpreting a dataset, or even applying to new positions.

“I’ve had unofficial mentors as well. One is Dr. Sindhu Jagadamma; she is at Tennessee State,” says Jha. She helped review his application package when he started applying for faculty positions. “I know as faculty how busy she was, but still she gave me that time, giving me comments.” Jha is thankful that he was able to make and maintain that connection to this day. “That relationship developed with the Societies, and I still feel like I have built that strong connection,” he says.

There are many reasons to want to find a professional home. To many members of the Societies, the people are what make membership worthwhile. Jha was determined to make the most of his interactions with other ASA, CSSA, and SSSA members, which has turned into a thriving career in a field that he loves. And just like his Ph.D. and postdoc advisers Dr. Ulery and Dr. Mallika Nocco, he is training his students to be able to do the same.

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