The Iowa Academy of Science awarded Dr. Dawn Del Carlo, associate professor of chemistry at the University of Northern Iowa, the 2017 Excellence in Science Teaching Award for Science Supervisory at the academy’s 129th annual meeting on April 21, 2017.

The ESTA Awards, introduced in 1969, recognize science teachers of all grade levels for their work and innovation in science education.

Interestingly, it was not until the end of her college career that Dr. Del Carlo realized that she liked teaching.

“However, at that point, to go back and complete the requirements for teacher certification would have added 2-3 years on to my program,” says Dr. Del Carlo, then a chemistry major who was about to graduate from Augustana College in Rock Island, Illinois. “So, I opted to go on to graduate school with the intent to also pursue my teacher certification.”

As she was working towards an M.S. in Inorganic Chemistry at Purdue University in Indiana, she fell in love with research. “I decided to stay on for a Ph.D. so I could do both research and teach at the college level,” she recalls.

She earned her Ph.D. in 2001, in Chemistry Education.

“While in Chemistry Education, my Ph.D. was actually granted from a chemistry department,” says Dr. Del Carlo. “Much like Chemistry has sub-disciplines like Organic Chemistry, Biochemistry, or Analytical Chemistry, Purdue’s chemistry department has Chemistry Education.”

The difference between a degree in chemistry education and a degree in other sub-disciplines depends on how a university lays out its program, she says.

“In the undergraduate programs at UNI, all secondary teaching majors are actually majors in their content departments,” she explains. “For example, a Chemistry Teaching major is a Chemistry major. As such, most science teaching majors actually have to take more courses than their peers because they have to take not only all the same science classes but also the education classes the state of Iowa requires in order to obtain a teaching license.”

Similarly, at Purdue, Dr. Del Carlo took courses in Educational Psychology, Educational Research, History and Philosophy of Science, and Curriculum and Instruction as part of graduate training in addition to the chemistry course and testing requirements.

One major difference is in the research project that one undertakes for one’s degree, she says.

“For my MS, the research was bench chemistry related, much like the other graduate students in the chemistry program,” she adds. “However, my doctoral dissertation was actually an educational research project, specifically focused on issues related to teaching chemistry content.”

It was her doctoral dissertation that forced her to think differently about the teaching of chemistry.

Was it also when she became interested in working with teachers?

“I’m not sure I can put my finger on when this started,” Dr. Del Carlo says. “Part of it was that it was simply something that ‘comes with the job.’ Part of doing research in a field is also sharing that information with others. Since my field is research in science teaching, it’s only natural that I would share that information with other science teachers, at all levels.”

Her work at UNI is multifaceted and multidimensional.

“Currently I function as an academic advisor to all chemistry teaching majors and some All Science and Middle Level science teaching majors,” she says. “In addition to general chemistry courses for science majors, I teach elementary education majors physical science in SCI ED 1300 and El Ed majors getting a minor in science in SCI ED 2300.”

Dr. Del Carlo is also the graduate coordinator for the M.A. in Science Education. The interdisciplinary program, offered by the College of Humanities, Arts and Sciences, is tailored for mostly in-service K12 science teachers.

“I advise students in the program with regard to their course work, program requirements and mentoring them in their final MA project,” she says. “I have also taught several courses in the program including Research Methods in Science Education, Misconceptions in Science Education, and Using the Science Writing Heuristic.”
Dr. Del Carlo has also been involved in several grant-funded professional development projects for in-service science teachers. “These projects focused on topics such as chemistry lab safety, chemistry lab instruction, using the Science Writing Heuristic, and most recently, integrating and writing curriculum for the new Iowa Science Standards/Next Generation Science Standards,” she says.

Dr. Del Carlo believes it is important that secondary science education faculty be embedded in science departments “something that not all institutions buy into.” “I think the importance is twofold,” she explains. “First, faculty in general share their expertise within each of their specific sub-disciplines. Science departments where education faculty are not embedded don’t have that resource available to them. And while teaching-conscientious faculty will go out and educate themselves, it’s much easier to integrate good teaching when you have a colleague or colleagues who support your efforts and can serve as a resource.”

“Second, and this is especially important at an institution like UNI where so much importance and focus is on teacher education, science faculty with education specialties serve as a constant reminder that K12 teacher education is a campus-wide endeavor,” she adds. “It’s quite easy for an institution to relegate ‘all things teacher ed’ to the College of Education and essentially wash their hands of training the next generation of science teachers. Science education faculty who maintain appointments in science departments are able to model the fact that teacher education is a science issue; not just a College of Education issue.”

Dr. Del Carlo believes a new science teacher should approach their first year “one day at a time.” “Live for the good days and realize that the not so good days were just one day, it’ll be better tomorrow,” she says.

For middle and high school students who aspire to study science education and become a science teacher, her advice is straight and simple: “Stay passionate and stay curious. Those are the two things that, if you can model and show others, will make you a great teacher.”

When asked what she would tell high school students if they ask her why they should major in any of the STEM fields for their bachelor’s degrees, she said there was no single answer to this question. “I guess my first response would actually be a question back to them: ‘Do you love it?’ Because if they love it (even just one part of science) then there’s no reason not to pursue it,” she says. “But they should also keep in mind that their initial path in science might not be the one they land in. That’s what makes it so awesome.”