

# GRADUATE AG RESEARCH SPOTLIGHT



## Omar Zayed

*“Understanding plant tolerance mechanisms to overcome abiotic stress — and providing a new technique to help plants to be more resistant to salinity — could be the only future solution to secure food for the world.”*

*—Omar Zayed, PhD candidate, Horticulture and Landscape Architecture*

**THE STUDENT:** Residents of Omar Zayed’s hometown near the Egyptian capital have a view of the 7,000-year-old Great Pyramids of Giza across their fields. Zayed’s family works in agriculture, producing crops, sheep and cattle. Most of the area’s farmers depend on water-intensive crops like rice and alfalfa for their own food and to feed their animals. However, the government has regulated water and limited the growing of such crops. “In order to help them, I started to think about how to make our crops tolerant to abiotic stress,” Zayed says. That interest took him to Menofia University, where he earned bachelor’s and master’s degrees in agricultural genetics. A research assistantship in the genetics department there laid the groundwork for his fellowship at Purdue with Jian-Kang Zhu, Distinguished Professor of Plant Biology. “I heard about Dr. Zhu’s lab as one of the biggest labs working in abiotic stress in the U.S., and I came across many of his highly qualified papers,” Zayed says. He arrived at Purdue in January 2014.

**THE RESEARCH:** Zayed studies cell wall proteins that activate intracellular signaling pathways to enable plants to grow in the presence of salt. He contributed to an article published last year in the Proceedings of the National Academy of Sciences and recommended as a new discovery by F1000Prime. “We found a novel regulatory module that is important for plant growth and salt stress tolerance in plants,” Zayed explains. The study provides insight into how plants regulate growth and salt stress response by monitoring cell

wall integrity. The information is important because the Food and Agriculture Organization of the United Nations estimates that salinity affects 20 percent of irrigated land. That figure’s projected increase to 50 percent by 2050 will require producers to double grain yields to feed the growing human population.

**AT HOME AND ABROAD:** His PhD study marked Zayed’s first trip to the U.S. He felt at home, he says, because “Purdue provides an international environment that is very friendly to all cultural backgrounds.” He was struck by the level of scientific activity occurring in Zhu’s lab and has become especially interested in the new genome-editing tool CRISPR. His research has taken him to conferences in Asia, Africa and Europe. “You can listen and discuss with people who share the same interest as you,” Zayed says of the meetings. “You also experience new people, new cultures and new places.”

**FUTURE PLANS:** After completing his program in May, Zayed will return to Egypt. “My plan is to give back to my country, to start working as a university lecturer and researcher,” he says. In addition to teaching undergraduates and guiding graduate students in their research, he will work to apply his own Purdue studies to crops in his home country — “to get the research results directly to the Egyptian farmers that are suffering from salinity.” In his spare time, Zayed enjoys traveling, learning programming languages, watching TV and walking outdoors.