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## Collaboration: Professor and former protégé are finding answers to nature's questions

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# COLLABORATION

Professor and former protégé are finding answers to nature's questions

Biologist Dave Angelini and collaborator Will Simmons '17J have published findings of their three-year study of the effect of pesticides on bumblebees and hope the results will have the scientific community looking for new solutions to the problem.

Starting with a bee population kept in tents on campus (see "Discovery," Summer 2015 *Colby Magazine*), Angelini and Simmons set out to see whether pesticides used on agricultural fields were compromising the disease-fighting ability of the key pollinators.

"We got data and we got the answer to the question," Angelini said of the study published March 21 in the journal *Scientific Reports*, which is affiliated with the prestigious journal *Nature*. "The surprising thing scientifically was that we had an effect of pesticide exposure—but in the opposite direction of what we had predicted."

Simmons was a sophomore when he brought the question to Angelini, assistant professor of biology, who studies genetic function in other insect species. The topic was timely as scientists were trying to figure out why neonicotinoids, a type of pesticide commonly used in agriculture, were linked to declining bee populations.

The pair devised the experiment, which dosed captive bumblebees of the species *Bombus impatiens* with the levels of pesticide they would be exposed to in an agricultural setting and then studying the effect on certain genes that act as a bee's equivalent to antibodies in humans. They found that those genes, linked to the production of antimicrobial peptides, were, in fact, affected.

"We assumed exposing them to the pesticide would cause expression of these antimicrobial peptides, the immune-related genes, to go down," Simmons said. "In the end, we saw the exact opposite response. ... That's research."

He should know. He's embarked on a very different project—a job at the National Institutes of Health in Bethesda, Md., doing genetic research connected to mutations that worsen sickle cell disease. "Honestly," Simmons said, "I couldn't have been more prepared for what I'm doing now."

He's working at the NIH for geneticist David Bodine '76, Sc.D. '13, who he first met two years ago at the Colby Liberal Arts Symposium. "I didn't know who he was at the time," he said. "He came up and grilled me on my poster."

It's a new direction for Simmons—and for Angelini as well. Introduced to bumblebee science by his student researcher, Angelini is continuing work with the "charismatic animal." When he visited Allen Island, Colby's research island off the coast of Maine,

Angelini noticed that the island was home to a robust colony of the Northern Amber Bumblebee, which is rare on the mainland. A new student research project is planned.

Angelini is moving toward ecology; Simmons into genetics. "It was a good pairing," he said. "I think both of us ended up going in a direction we wouldn't have expected."

—By Gerry Boyle '78

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—Will Simmons '17J