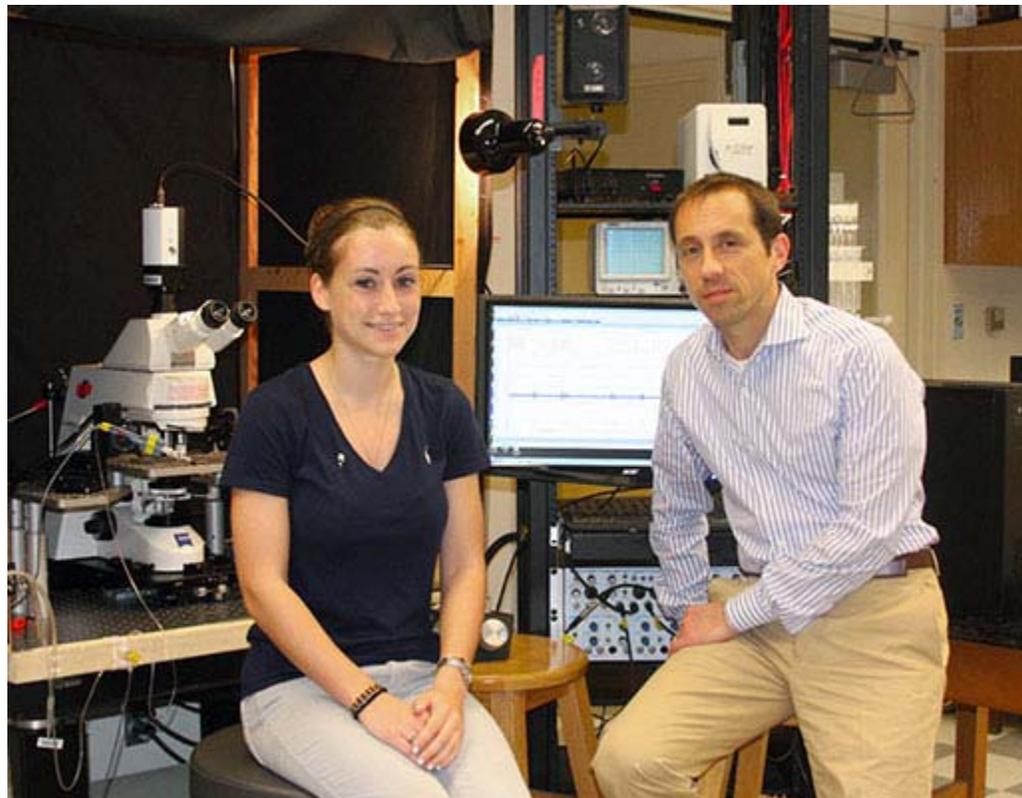


# WILLIAM & MARY

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## Early starters



**Going full-time:** Kaitlyn Dorst began working in Christopher Del Negro's lab while she was a student at Jamestown High School. After enrolling at William & Mary, she still works in the lab in the Department of Applied Science.

### High school students serve as interns in William & Mary labs

by Justine Whelan '14 | December 3, 2013

Local students are cropping up in William & Mary labs, performing research even before they've finished high school.

Pre-college students working with faculty can be seen all over campus in partnerships that can be the fruit of anything from formalized application processes to accidental meetings in the hallway.

Alexys T. Reddick literally was in the hallway, waiting for her mother, who was meeting with another William & Mary professor. Shantá Hinton spotted Reddick, looking bored, in the Integrated Science Center, which houses Hinton's lab. Hinton, assistant professor of biology, invited Reddick into her lab to show her a batch of cells that she had been working with.

"She became very excited, and actually ask me if she could possibly volunteer to do research in my lab," says

Hinton of that first conversation. Reddick possessed a serious interest in science, and more importantly Hinton said, was strongly independent.

### **14 years old...and moving into the lab**

The 14-year-old Lafayette High School student and the experienced researcher began working together. It wasn't long before the two had disproven a hypothesis, entered a contest and Reddick had won a scholarship.

"From conversing with her, I knew she was a very intelligent young lady," says Hinton.

Hinton funded Reddick's work in her lab by writing a supplement to an existing grant from the National Science Foundation. Reddick began her training by learning how to maintain the cells that Hinton works with, ensuring their growth and that they did not become contaminated.

Reddick says she was thrilled at the opportunity to be a research assistant so young and to work independently on her own project in relation to Hinton's research.

"I just thought I would be wearing gloves and assisting the undergrads in their studies, but I didn't expect to be conducting my own portion of the experiments," says Reddick. "All of my findings went into the big picture the whole lab was working on."

Hinton focuses on enzymes that control different signaling pathways within the cell. When these pathways aren't controlled correctly, says Hinton, Alzheimer's or different types of cancers may develop.

Hinton says she was impressed with Reddick's practical and substantive contributions to the research.

### **Disproving a hypothesis**

"I didn't want her to become just someone who would wash dishes; I wanted her to have her own independent project and it was just perfect timing," says Hinton. She assigned Reddick to investigate one of three different hypotheses of cellular activity.

Reddick investigated how a specific protein affects a cell in stress. When a cell goes into stress, RNA accumulates in one area of the cell. One possible mechanism is that RNA travels along microtubules. To test the hypothesis, Reddick provoked stress responses in the cells, and then introduced a protein that would inhibit RNA accumulation. She found, microtubules however, still remained intact.

Her work entirely eliminated the microtubule-transport theory, and the team was able to focus their attentions elsewhere.

Reddick was not only a valuable contributor in the lab, but also went on to win several awards for her work in Hinton's lab. She placed first in a national competition for the sciences, put on by Beta Kappa Chi and the National Institute for Science. She also placed first in the Regional NAACP Afro-Academic, Cultural Technology and Scientific Olympics (ACT-SO.) She then went on to place third in biology at the National NAACP ACT-SO, winning a \$1,500 college scholarship.

"I realize how much I love doing research. I want to take this into a possible career in marine biology and work

behind the scenes discovering cures for diseases, specifically in marine animals,” says Reddick.

### **Connecting to the community through lab work**

While Hinton and Reddick met through a happy and fruitful hallway accident, Christopher Del Negro, associate professor and chair of the Department of [Applied Science](#), was more deliberate in the way he established an ongoing internship program with high school students. He described it as an outreach initiative.

“I wanted to find a way to for the university to connect to the community,” says Del Negro. “It is the connection between the highest levels of scientific research and elementary level education that strengthens the science and technology workforce of the United States.”

Del Negro’s program began very small at first, as he used a personal connection at Jamestown High School to get in touch with one of a top science student who might be interested in working in a lab. Del Negro’s first student spent two summers learning the basic skills needed to work in a university laboratory.

The following year, Del Negro expanded his outreach and pulled one student each from Jamestown High School, Lafayette High School and Warhill High School, the three high schools in the Williamsburg-James City County School District.

“Ramping up the program from one student to three was a big deal,” says Del Negro. The students came in for two days of the five-day workweek, and also balanced their high school academics. “They learned more than just general lab skills and clean up.”

Beginning in 2008, Del Negro began an expanded search for qualified high school students. Within five years he had a full-fledged program of five to six official interns balancing undergraduate-level research, skill building and lab work.

Del Negro’s research focuses on the areas in the lower brain stem responsible for breathing patterns, particularly in regards to what he calls the collateral respiratory damage behind diseases such as Alzheimer’s.

### **An opportunity...to enroll**

Kaitlyn Dorst, one of Del Negro’s interns from Jamestown High School, ended up enrolling at William & Mary in the fall of 2013. She says the opportunity to continue her work here just seemed to work out for a reason, and she did not want to pass up that opportunity.

“I didn’t want to go away from this research anytime soon so it all worked out for the best,” says Dorst.

Dorst had been building up her lab skills with Del Negro for two summers before she was even an undergrad, and she moved from preparing solutions and washing dishes right into specimen preparation within an academic year.

Ultimately, Dorst would like to collaborate with Del Negro to have a paper on this research published. Until then, she’ll keep balancing her lab research with those general education requirements.

These special kinds of student-professor laboratory experiences aren’t limited to the immediate William & Mary

campus.

Amy Wilkerson is a laboratory and research manager for William & Mary's Applied Research Center in Newport News. She says she has been working with high school students who seek out lab opportunities since her arrival at the ARC almost 15 years ago. While most of the students find their way to the ARC through pursuit of their own independently directed interest, Wilkerson also keeps an eye out to identify potential untapped talent.

"Normally it is a word-of-mouth process and not something that is advertised," says Wilkerson. "The pieces just need to fall as they will."

For example, Wilkerson met one of her students in the fall of 2012 at a Boys and Girls Club event, and invited him to reach out to her during the school year if he had an interest in a laboratory aide position. Another student came to Wilkerson after his mother, an Eastern Virginia Medical School researcher, visited the lab and casually remarked that her son had a serious interest in science.

The students that work at the ARC all bring a diverse set of skills to hone and develop. Nick Arcand was one particular high school student from Hampton Roads Academy; Wilkerson quickly noted he was particularly good at rebuilding old computers and soldering components. Arcand's valuable hardware skills were quickly put to good use.

"This is a very important ability, as many of our characterization systems are older," says Wilkerson.

Wilkerson's job as lab manager is to oversee all activity in the labs operated by William & Mary at the ARC, and it's in this capacity that she is able to give students that come in to work a leg up on the crucial set of skills necessary to work in a lab environment.

### **Learning the basics pays off**

The ARC experience includes a substantial amount of training, from understanding general lab safety and security to specialized radiation and oxygen deficiency training. Wilkerson said that the training, in addition to the lab work itself, gives the students a leg up when they enter labs as undergraduate science students.

"Another priority is to teach them basic characterization techniques, such as optical microscopy, table top scanning electron microscopy," Wilkerson said. "Things of that nature prepare them for future science classes if they choose this field."

In addition to the examples given above, high school students can be found working with college professors all over William & Mary's campus, serving as real assets to the research going on within labs. There is no standardized official high school program, but that doesn't stop more and more of the college faculty from tapping into the resources that lie just off campus. 