

ANALYTICAL CHEMISTRY

ONE ON ONE WITH ISIAH M. WARNER

Grad student **Devin Swiner** talks with this analytical chemist about the importance of mentorship

A leading expert in fluorescence spectroscopy, Isiah M. Warner has spent the past few decades creating novel materials called GUMBOS—for “group of uniform materials based on organic salts”—which have a wide array of analytical and materials applications. Outside research, Warner is regarded as an exceptional mentor, having graduated about 70 PhD students, many of them women and people of color. More than 500 undergraduate students have worked with him in his research laboratory or educational programs. Devin Swiner spoke with Warner about his passion in both areas. This interview has been edited for length and clarity.

Devin Swiner: Hi, Dr. Warner! I am really excited about this interview. There is so much I want to talk to you about!

Isiah M. Warner: Hi, Devin! I'm excited as well.

DS: How'd you get into chemistry?

IW: It was my high school English teacher. She knew that I was very bright and got me into a summer chemistry institute that literally changed my life. Those who did well in the institute got to skip the first year of chemistry if they attended Southern University. That was an easy decision for me since I had a full scholarship to attend Southern. However, it wasn't easy jumping into sophomore chemistry. The chair, Dr. Vandon White, heard that we were grumbling about the difficulty and called us into his office for a pep talk. He told each of us our singular characteristic that would make us a great success, and when he got around to me, he said, “Mr. Warner, you will have your PhD before you're 30.” I had no idea what a PhD was, but once I did, I aspired to get one. So that is what brought me along; there were mentors along the way that helped and guided me.

DS: That's similar in a lot of Black students' stories. I went to the University of Pittsburgh, and “second-year Devin's” plan was to get a master's in forensics. I didn't know what a PhD even looked like. Like you, I had mentors, like Dr. Renā Robinson and Dr. Tara Meyer, who told me, “You're good at research. You need to consider this as a viable option.” So I agree, it is important for the next generation of Black scientists to have good mentors. What about analytical chemistry—what drew you to that?

IW: When I was graduating from Southern, Battelle Northwest came to interview. They were impressed with me and made me an offer, and I accepted it right there, no



VITALS

ISIAH M. WARNER

► **HOMETOWN:** Bunkie, Louisiana

► **EDUCATION:** BS, Southern University, 1968; PhD, University of Washington, 1977

► **CURRENT POSITION:** Vice president for strategic initiatives, Philip W. West Professor of Analytical and Environmental Chemistry, and Howard Hughes Medical Institute professor, Louisiana State University; Boyd Professor, LSU system

► **FUN PROJECT HE'S BEEN WORKING ON:** Writing a new book on mentoring

► **DREAM VACATION:** To visit the entire continent of Africa

VITALS

DEVIN SWINER

➤ **HOMETOWN:** Upper Marlboro, Maryland

➤ **EDUCATION:** BS, University of Pittsburgh, 2016

➤ **CURRENT POSITION:** PhD candidate, analytical chemistry, Ohio State University, working in Abraham Badu-Tawiah's lab

➤ **FAVORITE LAB TOOL:** I really love the P200 pipette! I work with small volumes in my research, and that's the one I almost exclusively use. I try to keep one stashed by the lab bench I work on.

➤ **GO-TO STRESS RELIEVER:**

I am a couch potato, so my go-to stress reliever is binge watching something on a streaming service. I watch different genres of shows, so I never run out of things to watch. I also love a good rewatch. I probably have seen *The Office* a total of 10 times at this point.



Devin Swiner is developing a new ionization source for mass spectrometry using cellulose materials for applications in clinical diagnostics. She is a cofounder of the #BlackinChem movement.

negotiations or visits. That was the beginning of a job that was largely analytical chemistry. I was a technician, which I did not really like. I ended up going on to graduate school to get a PhD, and because I had done analytical chemistry, that helped when I took cumulative exams. At the same time, I was always very curious—and that is certainly what you need in order to be an analytical chemist.

DS: I agree! I was that “Well, why?” child, and I think the beauty of it is that those are the questions that we answer every day in our research. What is your research group currently focused on?

IW: I'm nearing retirement, probably this year. Therefore, I am no longer taking any graduate students.

The only graduate student I have left is now working in industry and simultaneously trying to finish her PhD. I also have two postdocs who are great researchers and also working with the last few undergraduates in my laboratory.

DS: I hope that you look back on everything you've done in the last few decades and are really proud of it, because I know I am impressed. I read one of your reviews on GUMBOS, and I like that they are tunable. Being able to manipulate a material's property to fit an application is the perfect use of chemistry. Can you describe GUMBOS for readers?

IW: I worked in ionic liquid chemistry for a while, and those are organic salts that have low melting points—less than 100 °C. I was fascinated with this chemistry and how you can manipulate the chemistry of those liquids simply by changing the counterions. It occurred to me that if you were to do the same thing in the solid state, it would be just as fascinating. So that's what we are doing. We already have several acquired or pending patents in this area.

DS: I was reading that GUMBOS have been used for almost anything—sensing arrays, organic LEDs [light-emitting diodes], MALDI [matrix-assisted laser desorption ionization] matrices, etc. I'm a mass spectrometrist, so the fact that you can use them for MALDI was really neat.

IW: This area is better known now that we have pub-

lished several manuscripts. I'm reviewing papers in the literature where people are talking about GUMBOS chemistry. There was a paper that I reviewed recently where the researchers designed this GUMBOS complex so that it could go in solution and selectively fish out their molecule of interest for analysis. That was really cool and interesting.

DS: That's so awesome. Another research-related question: What has been your favorite GUMBOS research discovery?

IW: If I had to pick a GUMBOS idea, there's

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one thing that really sticks in my mind. Are you familiar with the quartz crystal microbalance?

DS: Yes, it's largely a weighing device, right?

IW: Right. You can weigh small amounts of materials by looking at the change in vibrational frequency of the quartz crystal. We discovered that by depositing a film of GUMBOS on a quartz crystal balance, we could determine the molecular weights of volatile organic compounds. We filed for a patent, and that was the fastest patent I've ever gotten.

DS: That's impressive! You've also been recognized as an amazing mentor, receiving numerous awards for it. What would you describe is the most rewarding thing about serving as a mentor to not only Black students but other underrepresented communities?

IW: It is the feeling that I'm helping someone. I wouldn't be on the path I'm on had there not been persons in place for me, so it's important for me to help others. I'm actually writing a book about mentoring.

DS: I recently asked some of my mentees to write blurbs for my website, and it's always funny when I read things they say. It's like, “Wait, you feel that way? I'm just being myself and actually caring about you and your journey.” I cry every time.

IW: I'm the same way. I read some of the things my mentees have said about me. I literally do cry, because I never looked at it from their point of view.

DS: What kind of advice would you give to other Black chemists as they're going through their journeys?

IW: The advice I would give would be to hang in there, do your best, challenge yourself, and look for positive mentors. Look for that person or persons who give you positive energy. Do not let that negative energy turn you off from science.