Feature Educator Highlight

David Wells

Interviewed by Laura L. Mays Hoopes

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Note from the Editor

Educator Highlights for CBE—Life Sciences Education show how professors at different kinds of institutions educate students in life sciences with inspiration and panache. If you have a particularly creative teaching portfolio yourself, or if you wish to nominate an inspiring colleague to be profiled, please e-mail Laura Hoopes at lhoopes@pomona.edu.

LH: What has been your most enjoyable experience with teaching at Yale?

Wells: Teaching the introductory biology course for nonmajors, which I've been doing almost since I arrived here at Yale six years ago. I really like teaching the nonmajors. It's less about the "Is this going to be on the exam" angst and more about the wonder of biology. I have felt that wonder myself, and I really enjoy inspiring others to feel it. I was so curious about biology, and if it's presented in the way we do it in this course, so are the nonmajors. They don't expect the course to affect them, but it gets through to them.

LH: That sounds like a miracle! So how do you overcome their resistance to science?

Wells: Well, I think these students must get interested in biological questions before you can teach them any biology. You might say that I trick them into liking biology, but if it piques their interest, it's worthwhile. I start with the nervous system and its diseases. Forget introductory biology. On day two of the class, I'm talking with them about neurodegeneration. I bring up Alzheimer's disease, Parkinson's disease, maybe a little Muscular Dystrophy.

I can ask them, "Who's heard about Parkinson's disease?" They all raise their hands, and I get some of them to describe some of the symptoms. Then I ask, "Who knows what causes it?" No hands go up. Now here comes the biology, the cell biology, the description of nerve impulse, the nerves and muscles.

When they start to glaze over, I bring it right back to Parkinson's disease. "So if one of the symptoms is a problem with movement, is this a problem with the muscle or the nerve? How do you think we can distinguish between these two possibilities?" They wake back up and get involved again.

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LH: What else do you use to maintain interest? Clickers? Online simulations?

Wells: Not in this class, at least not at present. But I do show video clips, and they are really amazing. For example, I have a clip of a patient with Parkinson's disease. The students see that he is standing but barely moving when trying to walk; a snail could beat him. Then, the clip continues and they see him walking rapidly around his yard, having no problem. I tell them that video was taken only 5 or 10 minutes after the first video, after he takes a dose of medicine. They are amazed, and we can discuss what the drug is actually doing

and that it wears off, that it has side effects, that the dose needed may increase with time, and so forth. They see this person more as a person, less as a disease. But now they have a handle on the biology behind the problem. We talk again about nerves, about how drugs work, how drugs are tested. We get into many ethical issues, which are of great interest to the students, but we keep coming back to the biology.

LH: Do you teach this course by yourself?

Wells: No, I teach it with two colleagues. Ron Breaker introduces the students to genetic concepts and things like DNA testing, while Tim Nelson uses the topic of Genetically Modified Organisms in food to generate some really interesting ethical debates. All of us generate the interest before we give the students the biology, though.

LH: How did this class get started? Did you begin it?

Wells: When I came, the department was discussing the possibility of an introductory course for nonmajors. I thought it was a great idea, and somehow it seemed like I had volunteered to teach the course. Several more experienced faculty members came up to ask me, "Why did you volunteer to teach this course?" They told me that usually the senior faculty do things like this, developing large courses for nonmajors. The two senior faculty who did volunteer wanted a third colleague, and I guess I was the most enthusiastic. Most Yale graduates are nonscientists and I thought it was terribly important that they become science-literate while they are here. I wanted to put my support

behind having this course. I could hardly believe we'd never had such a course before.

LH: Tell me about undergraduate research at Yale.

Wells: You can't get a B.S. without having done some undergraduate research. Because I do molecular work on memory, and that's a hot topic, I've had a lot of good students work with me, starting the first year I arrived. Many of these students are in graduate school or pursuing M.D./Ph.D. or M.D. degrees now.

LH: How independent are your undergraduate researchers?

Wells: I usually ask them to work with a graduate student for the first semester. Then, if they continue into another semester and a second year, they can branch out to conduct their own project and be independent. Often, it's a sub-project of the one they started to work on, but not always.

LH: Are your students well prepared to do research?

Wells: Yes, Yale prides itself on providing a lot of excellent laboratory work for undergraduate students, and so they've learned a lot before they even start to do experiments on their own projects. Of course, they learn a lot more during their first semester in the lab. It's hard for many of the students to get that time to spend on research; they want to participate in sports, play an instrument in the orchestra, etc. But some do find the time, and they always think it's been exciting and valuable.

LH: Thanks for sharing your experiences with readers of *CBE-LSE*.