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John Adams: In his element

The chemistry professor earns high marks from students

Story by Nancy Moen | Photos by Rob Hill

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He needs time to prepare a presentation for next week's national chemistry conference, but instead, John Adams selects a table by the entrance and, coffee cup in hand, waits for his students to arrive.

Adams offers extra help every Wednesday to students of Physical Chemistry II, a course in basic quantum chemistry that can be brutal. It's the class that makes students realize they should have been more serious about learning calculus, Adams says.

On the border between physics and chemistry, quantum chemistry provides the mathematics to describe the fundamental behavior of matter at the molecular level.

It's a small world

At Adams' table, seniors Drew Backer, Collin Mayhan and Amie Norton investigate the small-scale world of atoms and molecules. They write formulas on paper or enter numbers on calculators while discussing atomic units, spin states, vectors, electrons and quadratic equations.

Adams' expertise is molecular dynamics. His research — computer simulations of how atoms and molecules interact — complements bench experiments and helps predict results. He is known for encouraging undergraduate students to join the research and then guiding them through publishable results in their first year.

Alicia Webb of Edwardsville, Ill., a freshman on Adams' research team, says she was "blown

away" by his ability to explain material: "He took the time to make sure I understood what he was talking about instead of just throwing new concepts and vocabulary at me."

Good moves

Adams teaches hard material with helpful analogies. At the study table, he resurrects his knowledge of ballroom dancing to draw a diagram that explains the movements of electrons: Like dancers, electrons use correlated motions to avoid one another. They can dance closer if their motions are correlated. If one partner goes in one direction, the other partner moves to stay together and to avoid stepping on the other partner's toes.

Watching the light turn on for his students is what Adams loves, and he has illuminated a lot of brain cells during 27 years of teaching 25 different courses, whether on basic concepts or deep knowledge. Department of Chemistry Chair Jerry Atwood says most contemporaries of Adams have taught a maximum of 10 different courses.

Adams' colleagues consider him a master teacher, an opinion corroborated by distinguished honors that include the 2009 University of Missouri System President's Award for Teaching Excellence — a $15,000 prize. Students concur and regularly give Adams outstanding class evaluations. Every student in last year's physical chemistry class ranked him at the highest level for lecture quality, enthusiasm for the subject and ability to stimulate interest.

In step with students

Adams' open door invites students into his office. "Faculty sometimes think they can separate the classroom academics from the whole experience, which includes advising and knowing what it takes to get a degree, but you can't," Adams says.

Student visitors find a nonjudgmental adviser who will stop what he's doing to listen to concerns about course work and credit hours. Just as often, he hears about problems with health, family, money, roommates and dating.

Spring 2008 students review Adams' class

Very organized lectures. Nothing is missed in segways between topics and detailed analysis.

Very enthusiastic about the subject. Great notes!

Highly enthusiastic, great ability to walk students through difficult/abstract subject material. I really liked how the course was taught.

One of the best lecturers.

Covers quantum mechanics very well.

Covered material well even though it is very hard to explain.

Best Physical Chemistry II Class ever.

Lectures were always well organized. He was always open for questions or further discussion on a topic.

Best lecturer I have had out of all chemistry classes from this school and other schools.

I love the way he went into detail about the material as well as how difficult points were clarified when questions arose.

Available for help frequently, gave appropriate tests. Struggled with being clear when answering questions.

Hardest course so far, but I appreciate it.

"Students will tell you things they wouldn't admit to anybody else," he says. "Sometimes they just need to talk to an adult."

Adams didn't pick up advising techniques from psychology courses or learn the complexities of curriculum navigation from his college professors. Without children of his own, he hasn't personally experienced the traumas of rearing young adults. He has learned by doing.

Adams pushes himself to learn as he pushes his students. If a student wants to drop a class, he asks if there was something about the course he could have changed to prevent the withdrawal. Going out of his way, he has met on weekends with students who don't realize professors have regular lives that include ballroom dancing.

Best foot forward

"John is the best teacher we have. That's the bottom line," says Associate Professor Steve Keller.

About 10 years ago, Adams became a mentor to Keller, a junior faculty member newly appointed to teach general chemistry to 300 students. Adams attended Keller's lectures and coached him on all aspects of his stressful new job.

Helpfulness is an innate characteristic for Adams, whose list of service activities, single-spaced, covers nearly four full pages — proof, he says, that buying lifetime memberships in service groups can be dangerous.

Awesome job. I was a little confused at the beginning about what was important to learn.

Most excellent.

This semester he was by far the best lecturer of my classes.

He's really passionate about what he's talking.

He makes things easy to understand. The analogies were helpful.

I learned the most in this course.

The labs could have been a little better.

Dr. Adams is extremely smart and knew anything that we asked of him. I can't think of any complaints. He was one of the best teachers I have ever had.

Very good course. Would recommend it to anyone.

Great overall.

The best.

Your turn to lead

Work at the study table has concluded, but before leaving, Collin, who plans to be a research professor, asks Adams why he spends so much extra time helping students.

Without missing a beat, Adams replies: "What fun is it if you don't learn the subject? Besides, I'm going to retire someday. You're supposed to replace me."

Finally, at 8:15, he heads home to dinner and that unfinished conference presentation.

About the author: Nancy Moen has been writing about the people and programs of the University of Missouri for nearly 20 years. She is director of special projects with MU Web Communications.

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