



It's

6:15 p.m., and after a 13-hour day, chemistry Professor **John Adams** will soon preside for two hours over a study table in Memorial Union's Bengal Lair.

HE NEEDS TIME to prepare a presentation for next week's national chemistry conference, but instead, 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 tough course in quantum chemistry that explains in greater depth the concepts students learn in freshman chemistry classes.

Somewhere between physics and chemistry, quantum chemistry provides the mathematics to describe the fundamental behavior of matter at the molecular level. There's no dancing around it; this basic knowledge is required for advanced study in chemistry.



'He loves his job, and it flows through his teaching'

Study groups were becoming popular when Adams was a college student in the era of disco dancing. He joined one for a few sessions, then realized he was spending most of his time explaining concepts to the

group, which, of course, he's still doing.

Although the hum of subdued voices fills the room, it's quiet at the chemistry table as three students mathematically investigate the small-scale world of atoms and molecules. Seniors Drew Backer, Collin Mayhan and Amie Norton write formulas on paper or enter numbers on calculators.

While the students work, a biology major and former student of Adams walks near the group and overhears conversation on atomic units, spin states, vectors, electrons, quadratic equations and nanometers. He pauses to give Adams and the group a friendly greeting: "Wow. This is brutal. I want nothing to do with it."

The quantum chemistry students stay on task, barely glancing up from their assigned class problems. They study the numbers, shake their heads, erase or delete, and try again. This is the class that makes students realize they should have been more serious about learning calculus, Adams says.

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



'Great lectures; they keep me awake at 8 a.m., so they must be good'

Adams teaches hard material with helpful analogies, a technique he has used for years. At the study table, he resurrects his knowledge of ballroom dancing to draw a diagram and explain the movements of electrons: Like dancers, electrons achieve balance through complex, 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 step-

ping on the other partner's toes.

Nicholas Materer, BS '90, now a chemistry associate professor at Oklahoma State University in Stillwater, remembers similar examples of Adams' clear and patient explanations of abstract concepts in quantum chemistry and spectroscopy. In Materer's words, Adams never showed a "hint of annoyance for having to repeat the answer using different analogies until I finally understood the underlying concepts."

Watching that light turn on is what Adams loves, and he has illuminated a lot of brain cells during 27 years of teaching 25 different courses. Those course subjects range from basic chemistry to the deep knowledge of quantum chemistry and chemical kinetics. Department of Chemistry Chair Jerry Atwood says most contemporaries of Adams probably have taught a maximum of 10 different courses.

For two decades, Adams has directed undergraduate studies. He has developed online advising materials, shaped new classes and directed a major revision of the undergraduate chemistry curriculum — important work for a department that serves 8,000 students each year.

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. Previous honors include a \$10,000 William T. Kemper Fellowship for Excellence in Teaching in 1993 and an Amoco Foundation Undergraduate Teaching Award — the only occasion the award was presented to an assistant professor — in 1987.

Atwood nominated Adams for the President's Award after years of witnessing his commitment to students and to the cause of improving teaching. Adams touches students' lives and enriches their college experience by pushing them to levels of achievement they may not have thought possible, Atwood says.

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



was “blown away” by how good he was at explaining the 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 without realizing that I am still an undergraduate.” Webb uses computer software to model and analyze interactions between a host molecule and various guest molecules. The research could affect future methods to extract species selectively from waste streams or to deliver drug molecules selectively to sites in the body.

Still, it’s not just multiple awards that reflect a professor’s reputation for teaching. Adams regularly receives outstanding student evaluations. Every student in last year’s quantum chemistry class ranked him at the highest

level for lecture quality, enthusiasm for the subject and ability to stimulate interest.

Atwood tells the story of a teaching intern who was assigned to observe Adams’ class and report on his teaching style. After completing the assignment, the intern had to explain why there were gaps in his notes — he had simply become caught up in the class material Adams was presenting.



‘Many office hours devoted to students’

When he’s in, the door to Adams’ office remains open as an invitation for students to enter. “Faculty sometimes think they can separate the classroom academics from the

Professor John Adams answers questions about quantum chemistry during an informal study session with seniors Amie Norton and Drew Backer.

whole experience — which includes advising and knowing what it takes to get a degree — but you can’t,” Adams says. “Students don’t; they know they’re all linked.”

Working in a room with an open door guarantees that Adams will have little uninterrupted time in his office. Those who enter his office encounter a welcoming bowl of chocolate candy and 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 on subjects of health, family, money, roommates and dating.

"Students will tell you things they wouldn't admit to anybody else," he says. "Sometimes they just need to talk to an adult. There have been a few times that it's pretty clear I can't do anything, but in those cases they don't expect you to solve the problem; they just want you to listen."

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 daily traumas of rearing young adults. He has learned by doing and through serving on the College of Arts and Science Committee on Curriculum, Instruction and Advising since 1993.

The A&S student government honored Adams twice with Blue Chalk Advising Awards, most recently in 2009. The Missouri Academic Advising Association also named him an Outstanding Faculty Academic Advisor.

It's no mystery why plaques and certificates for advising decorate the walls of Adams' office or why he's asked to instruct other faculty members on the intricacies of

'I believe we make our own immortality. Some do it through their kids. I don't have children, so I have to do it some other way — through the next generation.'

MU degree programs. Adams pushes himself to learn as he pushes his students, and he goes out of his way to help them. Literally. He once delivered a form to St. Louis for a student who couldn't make the trip.

If a student comes by to drop a class, he asks if there was something about the course he could have changed to prevent the withdrawal. He has met on weekends with students who don't realize professors have regular lives that include ballroom dancing or cooking club.

Few students, after all, would expect a chemistry professor to work on mastering dance steps, but Adams and his wife, chemistry Professor Carol Deakyne, enjoy leisure dancing, particularly swing. The couple danced some of their first steps together as husband and wife on tabletops at their wedding reception. Eighteen years later, people still stop to watch their foxtrot or tango.

In the kitchen, however, any culinary experiments are mostly solo, with Adams performing a close approximation of bench chemistry by adapting recipes as he cooks. His best effort? Bourbon pecan torte, Deakyne says, and she cleverly makes no move toward learning the process.



'Went to great lengths to be available for help'

"John is the best teacher we have. That's the bottom line. Not only is he really good in the classroom, he's versatile. That's pretty unusual," 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, from lecture pacing and visual aids to crafting exams and setting up laboratory equipment.

"It was tremendously important for me at the time, and it remains valuable because there are still things to learn from others," Keller says. The mentor-colleague line has blurred into a friendship now.

But Adams' mentoring isn't restricted to chemistry faculty. For four years he and Deakyne have participated in Colleague Circles, a social group for first-time faculty members or professors new to Mizzou. In groups of eight or more, they meet monthly at restaurants or in faculty homes.

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

Most faculty members give back to their professions through professional organiza-



Relaxation for Adams is a Saturday afternoon in the kitchen. On this occasion, he prepares stuffed trout for a cooking-club dinner.

Right: Adams gets pumped about chemistry concepts while delivering a guest lecture for the Honors College course Warm Little Planet.

Bottom right: Adams works in his office with chemistry majors Matt Breite and Alicia Webb, who joined his research team as freshmen.

tions or with student groups. Adams logs multiple hours, year after year, as an officer for numerous organizations, including the American Chemical Society, where he is a prominent figure. Sandwiched somehow into his schedule are guest lectures, manuscript refereeing for professional journals and science textbooks, and proposal reviewing for agencies such as the National Science Foundation.

That's a full dance card. "I'm well over-committed," Adams says. "I just got used to doing it."



'He made chemistry easy to understand'

Work at the study table has concluded, and the students are gathering their papers and books. Before leaving, Mayhan, 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.

Note: All subheads in this story are quotations from Professor Adams' student evaluations.

READ MORE OF WHAT STUDENTS SAY ABOUT PROFESSOR ADAMS. MIZZOOMAGAZINE.COM

