

The Physical Chemist

It only seems appropriate that a boy born in Metropolis should achieve great things. Bob Compton, who retired this summer, was born in that very city in Illinois and went on to successfully navigate the territory between physics and chemistry, rise to the ranks of senior corporate fellow at Oak Ridge National Laboratory, and send students into the world to achieve great things themselves.

Despite his Metropolitan origins, Compton's story in many ways begins and ends with Oak Ridge. His family first moved there when his father was assigned to the Manhattan Project. Compton was in the first grade, which he laughingly admitted he almost had to repeat for lack of focus. That proved not to be the case, however, and he went on to be both a good science student and athlete at Oak Ridge High School. Finding a college, however, proved to be a bit more problematic.

"When I was in high school I was in a class with a bunch of high-achieving kids of Oak Ridge scientists. They were all going to big schools—Harvard, MIT, Caltech," he said. Despite being a good student, he wasn't receiving scholarship offers. With a lack of financial support and the academic year edging closer, he was one week away from joining the Air Force when Berea College intervened.

"Somebody at the high school—it could have been a coach; it could have been the physics teacher; it could have been anybody—found out I wasn't going to college," he said, and reached out to the Kentucky college offering a free education to deserving students through its labor-based program. Compton hadn't heard of Berea College at that time but said "it was something I could afford!"

He enrolled and excelled in the classroom and in track and field. (Professor Emeritus Bill Bugg has told of how Compton outscored the entire UT varsity in a track meet.) He also played basketball as a freshman but stopped to focus on science after the first year. The summers brought him back to Oak Ridge, where he worked at Y-12 and K-25. After graduating in physics, he headed to the University of Florida for

a master's degree; then to UT for a doctorate, working with Dr. Sam Hurst. Though Florida tried to keep him for his Ph.D., he said, "Basically what I wanted to do was get back and work at the (national) lab."

Compton did in fact get back to ORNL, beginning as a senior research scientist after finishing his Ph.D. in 1966. He rose through the ranks as a group leader and ultimately a senior corporate fellow, cited "for experimental studies in atomic and molecular physics, particularly developments in the field of nonlinear laser spectroscopy and the physics of negative ions." In 1979 he also started a mass spectrometry and chemical physics instrumentation company called Comstock with John A.D. Stockdale, which continues today.

In 1996 he left ORNL to become a full-time faculty member at UT in physics and chemistry. He said the transition wasn't that difficult as he had been a Ford Foundation professor in the 1970s and was taking on students at ORNL early in his career there.

"When I finally came over here full time, I found out how hard

people work at a university," he said. "There are always things to do: there are grants to write; theses to go over, etc. When people say it must be easy being a university professor, I say they ought to try it for a year."

Tennessee wasn't his only academic suitor. He accepted a faculty position at Clemson before intuition convinced him it wasn't the best fit. So after a visit there he called Tom Callcott, head of the UT-ORNL Science Alliance at the time, and talked over the situation. Callcott assured him they'd work out a solution at UT.

"I turned it over to Tom and the next thing I know, I was hired here. So Tom Callcott deserves the blame or the credit, whatever the case," Compton said laughing. "But it was the right decision for me."

The decision worked out well for UT as well. When he left ORNL, the agreement was that if he came to UT, the lab would pay half his salary for the first three years and he could have all the equipment he wanted.



Bob Compton retired this summer after a distinguished career in physics and chemistry at both ORNL and UT.

“That was a no-brainer,” he said. “To an experimentalist, to do things you have to have equipment.”

A Tough Man to Pin Down

Compton may be an experimentalist, but he isn't easily pigeon-holed.

“All my degrees are in physics,” he said. “I still consider myself a physicist. The hardest thing I've had to do at UT is teach freshman chemistry. I ended up in chemistry because there's an interface called chemical physics.”

Compton has spent a career expanding that frontier, with leading research efforts in electron and photon interactions with atoms, molecules and clusters; non-linear optics; chirality; and coherent control in chemistry. His work has impacted analytical chemistry and mass spectrometry and has in recent years moved toward hydrogen storage in nanomaterials. In fact, he said his Laboratory Directed Research and Development grant on buckyballs (cages of 60 carbon atoms) helped launch ORNL's nanotechnology efforts.

“When I was at the lab I can say myself and David Geohegan can take credit for the Center for Nanophase Materials Sciences,” he said. “There are a lot of people working in nanotechnology. At least at Oak Ridge we can take some credit for starting that.”

These are a handful of his research efforts, and his collective body of work has not gone unnoticed. He retired as the Paul and Wilma Ziegler Professor of Chemistry, was an Erskine Fellow at the University of Canterbury in New Zealand, and has won the William F. Meggers Award from the Optical Society of America and the Jesse W. Beams Award from the American Physical Society, Southeastern Section. Compton

also holds three patents and, with Chemistry Professor Jan Musfeldt, started a chemical physics program at UT that has sent many students into the professional world. So profound was this influence that this November the Recent Advances in Chemical Physics 2015 symposium in Memphis was themed to honor his retirement. The meeting included top physical chemists and chemical physicists from across the U.S. Many of his former students from around the world also came.

“I was really flattered when (Chemistry Professor and Department Head) Chuck Feigerle and about 20 others brought up many different areas of chemical physics that I had started,” Compton said.

Asked about his proudest accomplishment, however, Compton is quick to answer:

“The students,” he said. “Watching them succeed. And they're all doing really well. I think a professor should be graded not on what he's doing now but on where his students end up.”

His students have ended up as university professors, researchers at national labs, and industry researchers, as well as medical doctors. And Compton himself has not really slowed down. His textbook (*Laser Experiments for Chemistry and Physics*) co-written with M.A. Duncan, was published in November and he's working on his next one. He also plays music with friends in Oak Ridge, though he confessed he's “not ready for primetime yet.” The athlete in him is still there too. He runs every night and is looking at the possibility of master's track and field. The tennis-loving Bill Bugg might also need to warm up a racket.

“I've not been playing much tennis, Compton said, smiling. “But I will be.”



Bob Compton with the Berea College Track Team, circa 1960.