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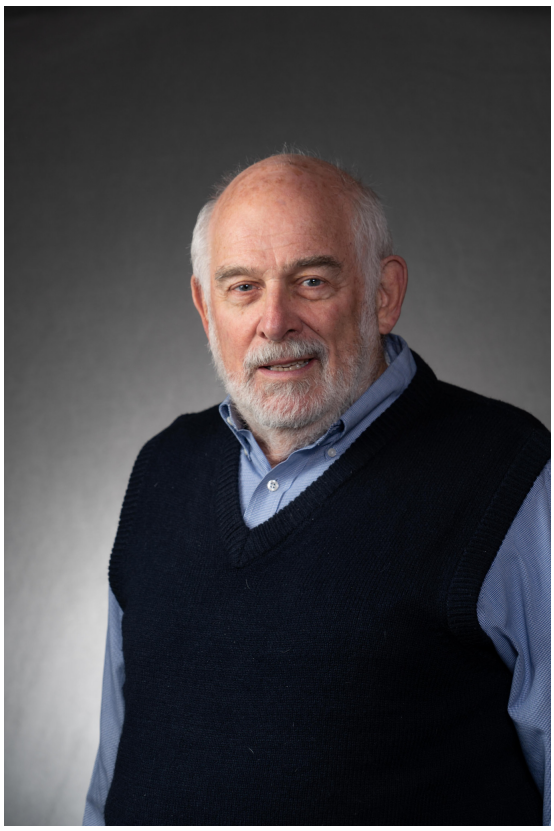

1 TELL US ABOUT YOURSELF, SUCH AS WHERE YOU WENT TO SCHOOL, HOW YOU BECAME INTERESTED IN YOUR MAJOR RESEARCH AREAS, AND HOW YOU FOUND YOUR WAY TO DU?

I attended UCLA and Stanford respectively, with a postdoctoral year at Oxford University studying molecular biophysics. My training was centered heavily around an instrumental technique called electron spin resonance (ESR) or electron paramagnetic resonance (EPR), which shows up in much, but not all, of my research. I learned very early that one technique does not suffice to prove something unequivocally.

How did I find my way to DU? I must have had a leaning towards Colorado. I interviewed at both CU medical school and CSU for my first job; then later in my career again at CU biochemistry in the medical school when I decided that I would leave the Ohio State University to pursue a department chair position. After several opportunities in the interim, when I could obtain full retirement from OSU in 2001 I again interviewed for chair positions and DU was the best choice of what was open to me at the time. Moving from a large research powerhouse to a medium sized primarily undergraduate institution was a learning experience. The chair position at DU turned out be more like a department manager which was somewhat disappointing but nonetheless challenging given the constraints. I never regretted moving my Ohio family to Denver, however, as we wouldn't now have the wonderful new grandchildren who live nearby, great friends from the DU faculty and phenomenal culture that the environment has to offer.

2 WHY DID YOU BECOME A SCIENTIST? WHAT DREW YOU TO THIS FIELD? WHAT MAKES YOU GET UP IN THE MORNING?

I always wanted to become a chemistry major from when I was eight years old with an interest in magic tricks, and, at the time you could get a real chemistry set with "dangerous chemicals!" My interest went from making fireworks to scaring kids trick-or-treating during Halloween. Fortunately, safety glasses saved me from potentially severe injuries during one of my chemistry set experiments. What should drive one to wake up in the morning is the fun of 'playing' with a scientific apparatus in the lab while hopefully occasionally stumbling across some new unique observations that might result in an actual discovery.

3 WHAT ARE YOUR TEACHING INTERESTS? WHAT IS YOUR "TEACHING PHILOSOPHY"?

I enjoy teaching lots of subjects in both the scientific and interdisciplinary arena. At the graduate level, this has been advanced biochemistry and areas that cut across my research. At the undergraduate level, I taught fresh-

man chemistry for more than 30 years as well as some intermediate and advanced undergraduate topics. But I found the greatest rewards in small seminar courses where we critically discussed topics, such as bioethics and ethics in research. My teaching philosophy is to both challenge students and not overload them with facts that they can't totally digest. I really prefer the seminar course model, but this doesn't really work in large classes; from my perspective, there is no difference between 50 students and infinity! I would still try to have some interchange with students in my large courses, either by walking around the classroom while they are working on a challenging assignment, and leaving time at the end of the class for individual questions. I don't think that one way lecturing without feedback is going to be effective learning for many students. The best medium is office hours, with one-on-one free tutoring if the students have the time to meet.

4 WHAT SPARKED YOUR INTEREST IN THE FIELD THAT YOU WORK IN?

It's different for everyone. And I think that being open minded and learning new approaches and techniques are the key to creativity. I always tried to shift and expand my research at least every 10 years. Many of the students working with me also influenced my research directions as well.

5 HOW DO YOUR INTERESTS IN WHAT YOU TEACH IN THE CLASSROOM CORRELATE TO THE RESEARCH YOU DO?

I'd say very directly. However, teaching assignments in university departments are sometimes based on aspects other than the expertise or interests of the faculty member and can be subjective, sometimes even punitive, to the detriment of the students as well.

6 HOW HAS THE PROCESS, OR THE PROFESSION OF RESEARCH, CHANGED OVER THE PAST FEW DECADES IN YOUR FIELD?

Having spent over 50 years in academia at two academic institutions as well as several sabbatical years around the world, I have a unique perspective. The 'product' that an academic scientist is 'expected' to provide is publications, research dollars, from which the institution gets about 50% 'overhead', service to the institution, profession, and community, and -we almost forgot- teaching at principally undergrad as well as graduate and postdoctoral level. Unfortunately, many institutions don't have the time or expertise to evaluate the quality of scholarship, such as publications, and focus almost entirely on quantity and numbers of dollars, which they also glean from undergraduate teaching. I sometimes think that a research faculty member is like a used car salesperson or contractor: the management is only interested in the quantity not the quality of units sold and the dollar income number. Obviously my scenario sounds pretty glum, yet I would be the first person to tell you that the academic world is one of the best jobs one could have; just be aware of the politics and expectations. I also want to emphasize one of the prerequisites, which is a sabbatical year every seven years. While some people categorize these as a "congressman's junket abroad," in every case I entered and brought back a new area that enhanced my research.

7 DESCRIBE YOUR RESEARCH IN LAYMAN'S TERMS:

Enzymes and proteins are principal 'machines' in living organisms. Understanding their structure and how they work, or their mechanism, is critical to understanding disease and genetic disorders everywhere from heart disease to cancer to dementia. We have studied several of these over the years as well as developing potentially important diagnostic methods as well.

8 WHAT WOULD YOU CHANGE TO IMPROVE HOW WORK IN YOUR FIELD IS DONE? IN OTHER WORDS, WHAT LEGISLATION MIGHT YOU PASS OR WHAT POLICIES WOULD YOU CHANGE AND WHY?

I've been both on grant committees as well as advising government granting agencies including lobbying Congress for supporting scientific research and education. I think that the federal agency granting trends have focused too much on 'productivity' or quantity rather than innovative "pie in the sky" ideas that might result in greater impact to society than numbers of journal articles. This is certainly the course that venture capitalists or very successful companies take: fund ten projects at modest budgets and claim success if more than one is successful. But a new faculty member can't get tenure without grants and publications, meaning that 'safe science' might be the better choice. Fortunately, we still get some innovative impactful results. Unfortunately, some faculty carry on the same safe science into their later years without any risk-taking or forays into more challenging, unknown areas.

9 CAN YOU SHARE A TURNING POINT OR DEFINING MOMENT IN YOUR WORK AS A SCIENTIST?

I've been fortunate, almost totally due to serendipity, to have stumbled across some interesting research areas that ended up with some significant impact that I never

expected. Suffice it to say that if a scientist produced several hundred publications and only one or possibly two impacted the field and society, that wouldn't be very rewarding from my perspective. Yet having just a few publications with a major impact is all that one might expect. The potential turning point for me was encountering one or two scientists who we shared our results with, go and publish the same experiments in advance of our carefully repeated work. That was devastating and I momentarily lost my interest in the profession; but we continued on. Amazingly the unethical scientists' results were wrong in the end!

10 DESCRIBE YOUR CAREER TRAJECTORY AND ANY ZIGZAGS YOU ENCOUNTERED.

Actually, my first project was in solid state physics using this technique where we built a special instrument to do experiments under high hydrostatic pressure, but for several reasons I became less interested in this area and asked my supervisor for another project. As we learn in life things don't go in a straight line, rather a crooked one that sometimes even circles backwards before proceeding ahead. And, due to serendipity, assuming that you are willing to follow an assumedly uncharted path, some amazing opportunities can arise. Thus, my interests shifted to studies of protein structure and conformation as well as enzyme mechanism.

11 TELL ME WHAT YOU LIKE TO DO WHEN YOU AREN'T WORKING ON RESEARCH.

Travel, gardening, theatre and opera, and especially most recently playing with my grandchildren.

12 VIEWS ON CURRENT PUBLIC POLICY ISSUES IN SCIENCE (CHEMISTRY, MEDICINE, ETHICS)?

I think that I covered most of these earlier. However, the ethical issues have been become more relevant in the current millennium and I've experienced that up front as an Editor-in-Chief of two international Journals. The old saying "publish or perish" appears to now be both figurative and literal. There are institutions that give large financial incentives for publications in prestigious high impact international journals with amounts that can exceed one's annual salary. This is particularly prevalent in China but also other countries. In fact there's a few in the USA that provide nominal rewards. The worst thing is plagiarism and falsified data in publications. We try to filter these early with plagiarism software but duplication of results or fabricated articles can only be detected by expert peer review. Obviously some 'leak' through the process and some escape eventual discovery and retraction but the problem seems to remain and increase rather than the opposite. This would involve aggressive action by governments, scientific societies and research institutions and the amount of enforcement varies widely. If we don't persevere then more scientists will start to waiver in order to improve their situations.

13 WAS THERE EVER AN OUTCOME IN YOUR RESEARCH THAT WAS UNEXPECTED, OR DID YOU EVER ENCOUNTER A SURPRISING SETBACK? HOW DID YOU REACT AND ADAPT?

Mostly the former fortunately. One has to be astute enough to know when to drop a project that's not going to be fruitful.

14 IF YOU COULD GO BACK IN TIME AND GIVE ADVICE TO YOURSELF BEFORE YOU BEGAN YOUR CAREER WHAT WOULD IT BE?

I dare to say "you learn along the way; otherwise, it's not going to be fun or interesting."

15 WHAT IS THE MOST FRUSTRATING, AND MOST REWARDING ACTIVITY, RESPECTIVELY, IN YOUR DAY-TO-DAY WORK?

Administrative responsibilities and endless meetings with no clear direction. Trying to convince students that research and advanced learning is not a game but real life. Supervising and watching students succeed at their work and become more expert at their projects or work than me.

16 WHAT DO YOU THINK IS THE NEXT BIG DISCOVERY OR PROBLEM SOLVED IN YOUR FIELD?

The Alzheimer's like disorder. What I'd like to see finally tackled is a solution to the devastating symptoms of diabetes. Albeit complex, it's been around a long time and there's even an NIH institute dedicated to the disease.