

February 5, 2003

Mostafa El-Sayed,

Dear Dr. El-Sayed,

I much appreciate the opportunity to contribute to a Festschrift for Richard Bersohn in honor of his retirement from Columbia University. As a graduate student at Columbia from 1976-1981, I worked on the ninth floor of Chandler in the Bersohn group with my cohort: Joe Sommers and Alan Corin and later Gerry Ondrey and Sekhar Mitra. We were blessed by the presence of post-docs Harrison Chau, Sze Yang and Andy Friedman.

As a first year student, I took quantum mechanics with Rich and was nearly totally lost in my first exposure to a mathematically rigorous science course. I needed to decipher my guide, Eyring Walter and Kimball, paragraph by paragraph before any meaning was clear. Professor Bersohn's lectures seemed to be conducted in another language as far as I was concerned. With my struggles and doubts about whether I belonged at all in a graduate program, I was further disappointed to learn that the man I had thought I would work for, Sherman Beychok, was only taking one chemistry student that year, and Charlie Craik had gotten to him first. I was out of luck. Feeling a bit desperate as slots were getting grabbed up quickly, I shared my fears with the most wonderful departmental assistant, in the main office, Sharon. At once, she suggested I talk to Professor Bersohn, saying I wouldn't find a better research director in the entire world. She said he was smart, kind, and funded, and would surely make a spot for me in his laboratory. She was right on all counts and I owe it to her that I ended up in the Bersohn lab. I was terrified that my less than stellar grade in his class would discourage him from taking me and was worried about whether I would be able to understand him, since it seemed to me that he thought in mathematical equations. I can remember him asking me very politely if I knew how an equilibrium constant was related to a free energy change. I haltingly answered appropriately (surely he couldn't be asking me something this simple, where was the trick?) and he broke into a big grin, and enthusiastically took me on. At one particularly low moment, when I was feeling bad about the result of some experiment, or once again, feeling outclassed by my incredible graduate student cohort, he would protest my own self-deprecating remarks and tell me that I had more common sense in my fingernail than many people had in their entire body. My time in Rich's lab is a memory I treasure.

Rich didn't give advice, he was rather a person who instructed by example. He let you make mistakes, was generous in his support, and brilliant in his insights. His hands off approach to our projects made them truly our projects. Yet his door was open. He was tolerant above all.

My time in Rich's lab is a memory I treasure. I am not sure I would have persisted in a graduate program if it weren't for his quiet, rock solid support. He wasn't effusive in praise or condemnation, but treated us with profound respect. We wanted

desperately to live up to his own expectations for us. We worked terrifically hard and had an extraordinary community within the lab that was like a second family. At this point, 25 years later, I have directed nearly sixty students in undergraduate research projects. In every instance, I hold Rich's example of a basic respect for the student foremost in my mind. I try to push (a little) when necessary and pull (a little) when my students get discouraged, but I also try to realize that the journey is truly theirs, and that I am a guide, perhaps a translator, and most of all, a springboard to launch my students out into their own professional lives.

An original research paper I would like to contribute in honor of Rich Bersohn to J. Phys. Chem. is entitled: "Evidence for Evolution of Rigidity in Antibody Binding Sites from Tryptophan Fluorescence Lifetime Distributions". This work carries forward fluorescence characterization technique I began 25 years ago with Rich on Broadway and 120th and would be privileged to offer him in tribute for his support over the years. It is work that I have performed with several of my undergraduate students at Amherst College. The work involves measuring the frequency domain fluorescence from antibodies that are collected at different points in the immune response of a mouse. With four antibodies collected after a primary, secondary, tertiary immunization, we now have a panel of antibodies that give us benchmarks for the extent to which the highly fluorescent tryptophans in the active site are mobile both before and after antigen binding. By comparison of the changes in fluorescence before antigen binding, and the changes in fluorescence when antigen binds, we can address the hypothesis that antibodies become better binders of antigens over time by selecting for those antibodies whose sites are most complementary to antigen before binding and therefore have a smaller entropic cost to pay upon binding.

Sincerely,

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