Tribute to Prof. Robert J. Silbey at the McVicar Day

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I want to thank the organizers and especially Prof. Silvia Ceyer for giving me an opportunity to render tribute to my undergraduate research advisor, Bob Silbey.

Let me start by saying a few words on how I met Bob. During my freshman year I worked in two research groups (in MIT terminology, so called UROP experiences), where I unfortunately did not fit quite well. In the first lab, devoted to organic synthesis, my task was to help a graduate student to mix some chemicals, but turns out that I was poorly skilled: I was clumsy spilling solvents all over the bench and wouldn't remember if I had already poured a specific chemical into some mixture.

[A mundane analogy is if you are baking a cake, and you put twice the amount of sugar. But as opposed to the baking analogy, when you mess up in a chemistry lab, indigestion is not the only accident that may happen!]

A few months later, the professor (whose name we won't mention) called me into his office and in a politically correct fashion told me, "Joel, I think you should take 5.33 before you come back to this lab." 5.33 was the last course of the undergraduate Chemistry curriculum, so what he really meant was, "Joel, please never come back to my lab again."

In the second lab, this time not an organic synthesis but an inorganic synthesis lab, to my misfortune, I was assigned again to mix chemicals! I soon foresaw the moment when my new boss would fire me, so I decided to have some self-respect and voluntarily resigned. To be fair, I was a terrible experimentalist and just wasted the time of my supervisors.

For a while, I was disillusioned about Chemistry. Yet, for two years at MIT, I had a wonderful time focusing on Humanities and Mathematics courses, as well as student clubs, which I believe, constituted the highlight of my MIT experience. When I arrived at my senior year, my academic advisor, Dan Nocera, convinced me that maybe I should try another type of Chemistry which would not involve mixing chemicals. I asked the graduate students around, and got the suggestion of contacting Prof. Bob Silbey, who was famous for his thermodynamics courses, his PChem textbook, but also for being Dean of Science and a nice guy. But people also warned me saying that Bob's research was "hardcore stuff." I looked up his papers online and I must confess that I didn't understand anything in them; some of them contained equations that occupied entire pages! Theoretical chemistry is, for all purposes, just physics, and my physics background was not outstanding, simply because

I hadn't taken many courses after my freshman requirements. Yet I wanted to try this out. I asked Bob for a meeting, and slowly after that, I became a theoretical chemist.

Working with Bob turned out to be a real pleasure, a great fit for my intellectual interests. The setting was very informal and relaxed. He pointed me to papers and textbooks to read, and asked me to come up with some project I could reasonably finish. We decided that I was going to work on the construction of effective Hamiltonians to explain absorption spectra of biological light-harvesting systems (you don't need to understand what this means). Even though he was really busy being Dean of Science, he encouraged me to meet him every week for about an hour or two to discuss my work. But Bob was the opposite of "all-business." To my surprise, during our meetings, he would pull out a piece of paper, and noticing my lack of knowledge, he would literally give me a private lecture on quantum mechanics, instead of delving into the agenda of producing science right away. I remember his handwriting being impeccable, and the flow of his ideas very coherent, in very simple terms, without much jargon, just like the way very knowledgeable people speak. He was a true theorist, a person who would be able to explain and make sense of things. I would ask him details of some theories, and he would do the derivations on the spot in front of me. Once I felt really comfortable with the material, we would start talking about actual calculations for my project. Being very honest, in retrospect I don't think I accomplished much in terms of research during my UROP with Bob, but I certainly learned quite a lot about quantum mechanics and spectroscopy, which has proven to be very useful for my graduate studies in theoretical chemistry.

At some point, I remember telling Bob how I had miserably failed as an experimentalist, a comment to which he replied, "I was also a bad experimentalist! I quit experiments after I broke many dewars in grad school in Chicago". Then he smiled and said, "Luckily, there is still plenty of room for people like us!" Bob told me "The only requirement to be a good theorist is to be a good student, and from your coursework, you already are!" I really liked the attitude of this man. He was always friendly, smiley and loved to tell stories. I could see that he really liked doing Science, escaping once in a while from his bureaucratic duties as the dean of Science. Ironically, even though Bob didn't pursue an experimental career, his theory remained always closely related to experiments.

When Bob died, many people who had met him at some point or another shared posts in Facebook. Let me quote two people in particular, Shervin Fatehi, who was a UROP for Bob a few years before me, now postdoc at UPenn: Bob sowed the seeds of my sometimes joyful,

often frustrating, always stimulating engagement with theory. I can't thank him enough. Another comment by Alán Aspuru, my boss at Harvard, commented, "Robert Silbey was a true scientific gentleman and one of my local scientific mentors. He will be missed"". Now that I am finishing my PhD, I can ascertain that Bob Silbey was a real intellectual leader in the Physical Chemistry community, whose presence is still palpable up to these days, when some of his seminal papers keep being highly cited. Curiously, the article I am currently writing is based on a theory Bob developed in the 80s with Bob Harris.

A few days ago, I was having lunch with a friend, and I casually commented on how wonderful it must be to be a professor at these top universities, MIT and Harvard, because you get the best students who already know everything and are ready to do research. He disagreed with me. For him, an important part of the intellectual enterprise is to be able to teach those students who are not the best yet and help them grow to their full potential. I reacted to this comment with shame, not having remembered that when I met Bob, I was certainly not the top physics student and needed a lot of refinement. With his encyclopedic knowledge and impressive publication record, Bob could have easily told me, "Joel, I'm sorry, you're not qualified to work with me, come back when you have already taken five quantum mechanics courses, I am busy publishing my next big paper." But he did not. Instead, he assigned me readings, gave me homework, and met with me every week. Bob was an example that even in top research institutions such as MIT, one can also be a good teacher. Hence, today, when we celebrate the MacVicar day, we also celebrate the memory of Bob Silbey, a great teacher who has inspired many of us across many dimensions, as a scientist, as a teacher, and as a human being.