Hello, friends and family!

December, 2014

Merry Christmas and a Happy New Year!

This year marked the 25th anniversary of an important event – a blind date that worked. Better yet, it was Bob's and my blind date, and it worked even though I had the temerity to fiddle with the air conditioning in his car and he had to try three times to find his way to Chinatown (never mind that the "best" restaurant in Chinatown – when we finally found it – had ancient linoleum and insolent cockroaches, along with great food). In thinking back, we've marveled at how things change in our lives but stay the same and how lucky we are to be part of it, together.

The big change is professional and all good. Bob is spending more time working with mathematicians around the world to understand how ions get in and out of cells. I've worked more this year than ever before, which continues to amaze Bob and surprise me.

The grandkids are growing up, in that steady change that eventually turns kindergartners into college students. Chris is now a junior at Columbia College of Chicago and James is a senior in high school and already taking college classes in Honolulu. Holly started high school and Henry and Alastair are taking grade school by storm. Their parents, Ben and Jill, and Sally and Emily are all the same this year (and not a bit older, of course) and doing well.

Bob traveled frequently to talk about cells and ions. I went along when possible. Our stellar adventure was visiting Suzhou, Xi'an and Shanghai, China with friends. Our friend Chun planned what sites to visit and lectured at each one. (The official guide for the tour later called Chun and thanked him for the education!) We saw things many tourists don't see, with a deeper understanding, and in a totally compatible group. How often does that happen?

Bob and I also made a second-honeymoon trip to Southern Utah in November. Despite the unseasonable cold, the geology was as stunning as ever and we're already planning a return in the spring.

Two of our adventures involved grandchildren James and Holly. Each came for separate visits with us during the summer. We took James for a college visit and escorted Holly to Philadelphia and New York for an art tour and time with friends and family.

My own special trip this year was to Boise for a college reunion of sorts. In the 60s and 70s, about 50 Idaho men went Columbia University and two women went to Barnard College across the street, because of recruiting efforts by one Columbia alumnus. About 20 of us, and assorted partners, descended on Boise for a marvelous weekend of catching up, telling stories and getting to know each other again. Everyone has made contributions to their part of society, and it was breathtaking to hear how unnoticed efforts can make the world better. As one person said, "We could have drunk Kool-aid and had ramen noodles, and it would have been a good time." Yes, indeed, as was the chance to reflect on a turbulent time in my own life and in history, and appreciate where and who I am.

Aside from more work and pondering aging a little more, the rest of our lives is much the same: symphony for us; ballet and theater for friends and me; and working out pretty regularly. This has been a good year for us and we hope it's been for you, too.

From Bob: (click on underlined ***links*** in red bold italics to see references)

A year of satisfying travel physically, intellectually, and emotionally. It started with a visit to Purdue to give seminars in Math and Chemistry Departments and lecture students in ECE (Electrical and Computer Engineering) tucked between appalling snowstorms that had natives reeling. Then a fine Biophysics Meeting in San Francisco and a few wonderful days respite from the snow and cold in Santa Cruz. A working visit to State College with Chun Liu was remarkable since no one else was there, everyone, including most restaurant owners having left the snow, leaving me to find extraordinary sandwiches at Jersey Mike's, sharing the restaurant with four or five behind the counter!

A visit to Iowa Physiology was satisfying and rewarding, meeting an old friend from Duke days (1965-8) unseen since then, and being stimulated to write a paper ***Shouldn't we make Biochemistry an Exact Science?*** for a newspaper for biochemists and molecular biologists. I would not have dared to choose that title, or probably written the article, except for Charlie Brenner (Chair of Biochemistry at Iowa). The article is in my CV which (along with other stuff) is linked on my home page *Home Page* , that is to say

http://www.phys.rush.edu/RSEisenberg/physioeis.html

Any of you who want to struggle with the science part of my life, biography, explanation, and papers are in ***my CV*** in a form easy to download, thanks to John Tang. If you have any trouble, downloading or understanding, just email ***beisenbe@rush.edu*** and I will try to help.

A spectacular trip to China, led by Chun Liu, starting with a week of math and biology in Suzhou, shared with Pancho (Francisco) Bezanilla and Nani (Ana) Correa (et al) is written up in Ardyth's remarkable China book you can download from

https://spideroak.com/browse/share/Bob_Eisenberg/Ardyth_China_Book_2014

with lots more photos at

https://spideroak.com/browse/share/Bob_Eisenberg/BobEisenbergChinaPhotos2014

Summer had a joyful visit introducing Holly Trowbridge (granddaughter: born in 2000; living in Honolulu; Mom Jill) to the wonders of the Barnes and the Philadelphia Museum of Art (where TWO Cezanne **Mt. St. Victoire, as seen from**

Les Lauves are hanging next to each other for I believe the first time in history, the one I call Greenie is at

http://www.ibiblio.org/wm/paint/auth/cezanne/st-victoire/799/

(be sure to click on the image)

and the other is at

http://www.artchive.com/artchive/C/cezanne/mt_s-v_4.jpg.html

Holly's brother James (born in 1997) shared a happy hectic August with us, with a birthday party for Doug Henderson in Sandy, Utah, soon followed by a never to be forgotten drive, a random walk with Chun and post-docs from State College PA to Niagara Falls, then to a spectacular math meeting at the Fields Institute in Toronto, extended to a new collaboration in a second visit in November.

September was shared with brother Ed Eisenberg and wife Barbara, visiting the Clark and the Norman Rockwell museums and towns in the Berkshires.

And my first visit to South America could not have been more memorable, celebrating Pancho Bezanilla's 70th birthday at a symposium "For squid lovers only". October brought work at State College, populated this time by filled restaurants, soon followed by a visit to Chemistry at the University of Utah, and a trip to Escalante and Capitol Reef. For those of you who are unbelievers, YouTube under Burr Trail, Escalante, Highway 12, etc will show you what it is like, with a photo below. December finds me writing this letter and eager for our Christmas visit to Paula Drive, Honolulu.

Fortunately, there is not room for much discussion of science here, but I cannot write without mentioning the following. I apologize to ***Weishi Liu***, ***Claudio Berti*** and other collaborators that I cannot mention everyone in this limited space!

1) my new senior collaborator Jinn-Liang Liu from Hsinchu, Taiwan, who has shown how an old idea of quantum physics—the Fermi distribution—allows us to deal with ions that have finite size and so can only fill space or a channel to saturation. See ***Liu3_JCP_2014.pdf*** and search ***my CV*** for more detail. **Stay tuned, much more is on the way:** we are reaching for a grand-slam, knowing of course, that reach exceeds grasp, ... most of the time!

2) ***my paper*** in ***ASBMB News*** showing that the classical nearly universal treatment of chemical reactions (called 'the law of mass action') does not conserve charge or obey Kirchoff's current law and so has (how can I say this politely?) certain difficulties. (Nonscientists: conservation of charge is true to about a part in 1,000,000,000,000,000,000 = 10^{18} at all times and on distances from less than 10^{-20} meters to those only astronomers can estimate). Scientists know that the law

of mass action was originally designed for uncharged gas particles at infinite dilution, and that its incorrect use in charged systems in nearly all of biochemistry and much of chemistry must drastically limit the range of validity of conclusions in an enormous number of papers. Rate constants measured in one set of conditions with an incorrect law will not work in other conditions thereby preventing biochemistry from being an 'exact' science.

3) the success of the Lancaster Group (search my CV for Kaufman, McClintock, or Luchinsky) in showing ***Coulomb blockade*** in calcium channels that is a candidate for the physical cause of rapid openings of single calcium channels to definite levels of current, independent of duration of opening or time within the opening.

4) the wonderful feeling of finally understanding some things I have worried about for 55 years while opening new fields of collaboration between scientists and mathematicians, using the power of both to find out how living things work. We are moving towards an important goal. We want to control living things as successfully as we can control the machines and technology that make our lives possible as we live them.

Typical Formation at Capitol Reef at least 300 meters high.
Just as spectacular formations are found over an area of some
100 miles × 100 miles =10,000 square miles
along Hwys UT 24, UT 12, and the Burr Trail.

Redwoods, some 100 meters high