Dear colleagues, alumni and friends of Parsons Lab,

It is my pleasure to wish you happy holidays and write to update you on the news from Parsons. There has been no construction this year and on that front things have been quiet. We did have four floods over this past summer but luckily our ever inventive facilities department figured out how to stop the flooding. They built a small dam to keep the water from coursing down the hallway. One has to step over it to access some parts of the basement. It wouldn’t be Parsons if there wasn’t lots of water somewhere in the building.

Our junior faculty are news-makers. They have been amazingly productive this year. The Eric Alm lab has made exciting progress elucidating some of the earliest events in Earth history. They developed an algorithm called AnGST that helps them interpret the DNA from modern day genomes and compare information recorded in the evolution of those organisms to the geological record - using modern day genomes as Precambrian fossils. This work will appear shortly in the journal Nature. Greg Fournier, a postdoc in the Alm lab, is taking the project to the next level, looking at the evolution of proteins that predate the last common ancestor of all life! Another exciting development in his lab is the identification of a new class of drugs that may broadly target eukaryotic parasites such as malaria, giardia, and trypanosomes.

Roman Stocker was on junior leave in Australia and San Diego, made new research connections and enjoyed the traveling! Together with a former postdoc, Justin Seymour, they were able to shed some light on the microbial involvement in the sulfur cycle - published in Science over the summer. Together with Pedro Reis, they figured out how cats drink - including his own cat - published in Science just after Thanksgiving. You can visit the On Balance newsletter at http://cee.mit.edu/news to catch more details on this and other news stories.

According to Ruben Juanes, his daughter Sophia has starting teaching him how to count: one, two, three, nine, ten! His research group continued to grow, so Sophia will need to learn some more numbers. This year, Ruben was promoted to associate professor and his proposal 'Nonequilibrium thermodynamics of multiphase flow in porous media' received an inaugural early career award from DOE’s office of science.

Research in Janelle Thompson’s lab is going great. They recently sequenced the genome of a supercritical CO₂-tolerant bacterium that they enriched from a carbon dioxide sequestration pilot site. This unique ability to survive under supercritical CO₂ means this "bug" can help us understand how microbes might impact carbon capture and storage in saline reservoirs. They are now analyzing its genome to find genes that may help explain its ability to survive these extreme conditions that kill closely-related bacteria. This work has been funded by the DOE and is being done by postdoc and recent MLK scholar Hector Hernandez, and graduate students Kyle Peet and Adam Freedman, who is the newest member of the Thompson lab.

Thanks to his hard-working group Jesse Kroll's atmospheric chemistry lab became fully functional this year. Accomplishments included construction of a large (7.5 m³) smog chamber in Parsons for the study of atmospheric reactions; participation in CalNex 2010, an air quality/climate study in Southern California; and collaborative experiments at the Advanced
Light Source (in Berkeley, California) and the Sloan Automotive Lab (at MIT). This is just some news about our junior faculty.

Chiang Mei published a new book entitled “Homogenization Methods of Multiscale Mechanics” by Chiang C. Mei and Bogdan Vernescu, World Scientific Publishers, Nov. 2010. A copy of the book has been added to the Ippen Library. In the acknowledgement he speaks to his former students and colleagues in appreciation for “the wonderful journey of learning with them and from them.” Those of you who know Chiang and his research – or even better, those of you who have worked with him – this is both familiar and very special. Chiang is now professor emeritus after many years with the Parsons Lab and the Department.

Rafael Bras became a professor emeritus this past September and marked his retirement from MIT by becoming the Provost of Georgia Tech. Rafael’s tenure as Lab director and Department head spanned important years. They were formative years and much of what we see as the composition and character of the Lab and Department today were developed during that period. We all miss Rafael very much but are happy to share the same time zone once again.

Pete Eagleson continues to come to the office to work on ideas flowing from his recent book, “Range and Richness of Vascular Land Plants: The Role of Variable Light” (American Geophysical Union, 2009), and to gather material for possible memoirs of his years at MIT. He quips, “don’t hold your breath for the appearance of the latter”.

Dave Marks, former department head, retired after 42 years and moved to half-time on August 31st. A symposium was held in his honor on November 11, 2010 which included 13 speakers. Two of those speakers were university presidents: Jared Cohon of Carnegie Mellon University and Lawrence Bacow of Tufts University. Organizer of this event was Professor Kenneth Strezepek of the University of Colorado, a Parsons alum. Dave will continue to work on the Abu Dhabi, Cyprus and Portugal Projects and was back in the office at 7:15AM on September 1st.

Lynn Gelhar continues to follow nuclear waste disposal issues, particularly through the activities of the recently established DOE commission (http://brc.gov/); this winter he will be spending a few months on the Gulf Coast assessing possible effects of the Deepwater Horizon spill on populations of redfish, oysters, dolphins, bald eagles, pelicans, oystercatchers and the like through kayak-based observations along the coast.

Our senior faculty seems to be constantly on the move. Martin Polz and Charlie Harvey have had media attention and their pictures in magazines. Martin’s photograph taking samples of ocean water appears on the cover of the summer 2010 MIT Spectrum. Wee Denizens of the Sea is the cover story for that volume. The articles points out that Martin’s work could predict and prevent outbreaks of pathogenic microbes. He studies the bacterium responsible for cholera, which affects millions around the world.

Charles Harvey likes to joke that he is a working class hero. An article called “Charles Harvey: Water Detective” was written in the Miller-McCune Magazine. The article says: “As Charles Harvey sees it, arsenic contamination in Bangladesh is an example of a larger problem occurring in many places around the world.”

Phil Gschwend graduated two new PhDs this year, Loretta Fernandez and Dave Kuo. Loretta is now a postdoc at the EPA lab in Narragansett Rhode Island and Dave is headed for a postdoc at the University of Delaware. The Gschwend group continues to focus on toxic organic compounds in the environment, and as part of the effort to do this more effectively Phil helped organize and chaired a technical session entitled “Passive Sampling Approaches for Contaminated Sediment Management” for the annual SERDP/ESTCP symposium in Washington DC. In a nutshell, the research is showing that one can use strips of polyethylene plastic,
purchased from neighborhood hardware stores, to sample for the presence of substances like DDT, PCBs, and PAHs in the water and sediments of lakes, rivers, and coastal oceans.

Harry Hemond was very pleased to receive a Maseeh departmental teaching award this year. He is collaborating on studies of the atmospheric release of the greenhouse gas methane from freshwaters, and on development of sensors to provide rapid 3-D pictures of chemical contamination. A commercialization of the underwater cycloidal mass spectrometer invented in the Hemond lab was prominent in this summer’s mapping of the Gulf Oil Spill. Harry’s group is also working on trace metals and on solar thermal power. His wife and three sons stay busy as always: Carol continues her practice in child and adolescent CBT, Mike - who received his PhD in medical physics - is now working on his MD at Tufts, while Chris has completed his third year at Stanford Medical School. Brian anticipates defending his doctoral thesis in Mechanical Engineering soon after you receive this letter. Meanwhile, in his near-nonexistent spare time, Harry flies his partnership’s Cessna 172 and does carpentry on the house that he and Carol are almost finished building on the Cape.

In late June Ole Madsen took a group of three current and one former graduate student as well as a postdoc, all associated with his Singapore research project, to the 32nd International Conference on Coastal engineering in Shanghai, China, where they presented five papers. On September 3 at 10:28AM (Los Angeles time) Grace and Ole became grandparents and spent Thanksgiving week changing diapers.

Penny Chisholm received the Petersen Award from Leibniz-Institut für Meereswissenschaften IFM-GEOMAR Kiel, Germany. She is working on a second children's book about marine phytoplankton with Molly Bang (The first one, "Living Sunlight", is available from Amazon.com and is a must for everyone's Christmas List). Penny is teaching Ecology for the 34th year, which has 50 students from 13 different Departments (that's good for the Earth). She is unlocking the mysteries of Prochlorococcus and its viruses and retreats to her cabin on Lake Superior in the summer.

Dennis McLaughlin and Fatih Eltahir have started a new project with SM student Anjuli Jain Figueroa looking at how Nile river water could be allocated in a way that mutually benefits Egypt, Sudan, and Ethiopia. This project continues their efforts to apply hydrologic modeling and remote sensing technology to water issues in the developing world. Speaking of Fatih, we were very happy to have him back at Parsons. He spent the first seven months of this year in Singapore focusing on his research about the regional climate of the Maritime Continent as part of a Singapore-MIT Alliance for Research and Technology (SMART) project. During that period he also attended his first meeting as a member of the Scientific Council, the advisory body of the International Center for Theoretical Physics in Trieste, Italy.

Ed DeLong’s group has also been traveling the world on oceanographic research expeditions this year, from the Central Pacific, to the coast of California, off the Chilean coast, and to Easter Island. Several postdocs in Ed's lab left this December for their new Assistant Professor faculty positions at the University of Delaware and Georgia Institute of Technology.

Eric Adams was awarded the very special 2010 Ig Nobel Prize in chemistry for disproving the old adage that oil and water don’t mix. Adams and his co-investigators Scott Socolofsky S.M. ‘97, Ph.D. ‘01, and Stephen Masutani, U. Hawaii, shared the prize with British Petroleum, one of the funders of a research project completed in 2000 that demonstrated that most oil from a spill in the deep ocean would in fact mix with water, rather than rise directly to the surface. Eric continues research on the fluid mechanics of oil and gas plumes as well as
particle clouds. Pete Shanahan is still working with Eric and the MEng program and is one of the favorite lecturers in that program. Gayle Sherman has left the department after 9 years of service to work at MIT Sea Grant. Her role as MEng administrative assistant has been assumed by Lauren McLean.

Amy Mueller and Matt Orosz (two of Harry Hemond’s grad students) were part of a team that won the Conoco Phillips Energy Prize. Basically, the goal of the prize is "to recognize new ideas and original, actionable solutions that can help improve the way the nation develops and uses energy". Their project is aimed at developing a new form of distributed energy infrastructure, at a price competitive with photovoltaics and diesel engines, that can simultaneously provide both electricity and hot water to support rural institutions such as health clinics and schools. They believe that the most impact comes from helping these institutions improve their provision of basic services to the rural populous. We at Parsons are very proud of these two students.

Jim Long celebrated his 10-year anniversary as administrative assistant to Parsons Lab and continues to be an important person in all of our lives. Vicki Murphy still watches Parsons’ finances and that of six faculty. Her daughter, Lauren, lives in New York pursuing a career in entertainment. Vicki travels to New York to proudly watch her daughter’s performances in off-Broadway plays.

Sheila Frankel has been at Parsons so long, she can’t remember when she arrived. She knows for sure there were no desktop computers. Big news for Sheila during last year was that she finally married off both her children. A number of us from Parsons went to a party at their house to celebrate. Sheila will once again take 23 undergraduate students to do field research in Hawaii. Her husband Don, Heidi Nepf and Janelle Thompson will accompany her. The group will be studying the Waiulaula Watershed on the western coast of Hawaii and hope to determine an annual sediment budget. Coastal coral has recently been impacted by excess sediment from denuded hillslopes entering the estuaries.

This has been an eventful year for me as well. The Institute plans to launch an environment initiative to complement its existing energy initiative. The idea is that the environment is the source of some really challenging problems that can drive basic research in a number of departments. Also advancing along the path to solving some of environmental problems is doing science and technology work that really matters. Clearly Parsons Lab would play a major role in this Institute initiative. Penny, Martin and I served on the council that published its report last year. I continue to chair the council and plan to produce an implementation plan by end-February. As part of this initiative we held a workshop on Rethinking Water during May and a workshop on Future of the Oceans in December. These were events designed to form communities around these topics from across the five schools at the Institute. It was really amazing to experience the excitement the participants had in forming a community and working on these problems from different perspectives. Very exciting!

During last year the satellite project that I work on (SMAP – the Soil Moisture Active-Passive mission) advanced to the next phase. In NASA parlance we went into Phase B and Phase C is next year. At the start of Phase E they light the candle. Three years to go. But it is very nice to see the project in implementation after ten years of caring for it with many colleagues. I spend quite a bit of time in southern California for the project especially when it is cold in Boston.

It would not be Parsons if we didn’t have lively social activities. Our Halloween party, always a success, paid homage to an old tradition at the Lab. MIT punch was resurrected with a bright red color and dry-ice fuming vapors everywhere. Very eerie looking and it had a very interesting flavor as well. We still do barbecues on the plaza, baking contests (the MIT Campus
Police officer on duty is always the judge), TGIFs, and a weekly breakfast one morning a week. But we don’t just eat - I am beyond pleased to inform you that the faculty practiced day and night for an entire year, and managed to eke out a legitimate win at the registration day faculty-student softball game. Please do not pay any attention to anyone who claims that the minute the score became plus one for the faculty, they all quit.

Last year we sent twenty-two graduate students to conferences using the returns on the Ippen Fund. Students must present a paper based on their theses to be eligible to receive partial travel support. This is very important to the graduate students as I am sure you well remember your first conference. Replenishing this fund is essential if we want to continue this program. I encourage you to remember how important your first conference participation was to you and help fund it by donating at the giving.mit.edu web site. To find the Ippen Fund at the site search for:

    Ippen Fund # 3464500 - to support graduate and undergraduate travel for those giving papers at conferences on environmental research or traveling to conduct environmental research

For some the memory of that first conference presentation is mixed with a dose of anxiety. Maybe you prefer to recall friendlier memories of graduate life at the Parsons Lab. In that case you may prefer to give to this fund:

    Parsons Lab Fund # 3893100 – To enhance the life and education of graduate students

Last year was again a great one for the Parsons Lab. It is close community of students, staff and faculty with amazing creativity and productivity. There are diverse and ever-expanding variety of research and specializations. Yet the common goal to understand how the environment works keeps the group together. It does that by keeping them curious about how different approaches can work together to breakthrough and create a new insight.

We at Parsons wish you and your families a very happy holiday season. You have an open invitation to visit us.

Sincerely Yours;

Dara Entekhabi
Director, Ralph M. Parsons Laboratory for Environmental Science and Engineering