

Mountain Views

Chronicles of the Consortium for Integrated
Climate Research in Western Mountains
CIRMOUNT

Celebrating Kelly Redmond (1952-2016)



Memorial Issue • January 2017



Kelly Redmond by Lake Tahoe attending a workshop on “Water in the West” in late August of 2016.
Photo: Imtiaz Rangwala, NOAA

Our mountain climate-science community mourns the passing in early November of a key leader, colleague, and friend, Kelly Redmond. Among many other circles, Kelly was foundational to CIRMOUNT. He made many important contributions locally and nationally in mountain-climate monitoring, climate communication, and climate implications for resource management and policy. We feature a memorial section about Kelly that includes recollections and stories contributed from some of Kelly’s many, many friends.

Front Cover: Tufa towers, Mono Lake, by Kelly Redmond.

Editor: Connie Millar, USDA Forest Service, Pacific Southwest Research Station, Albany, California.

Layout and Graphic Design: Diane Delany, USDA Forest Service, Pacific Southwest Research Station, Albany, California.

Back Cover: One of Kelly's beautiful moon photos.

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Celebrating Kelly Redmond

(1952-2016)



Kelly on Hardscrabble Mountain, Bridger Mountains, Montana, 2013

An important innovator and one of our foremost leaders of mountain-climate science in general, and CIRMOUNT specifically, has passed. Kelly Redmond died Wednesday, November 2, 2016, at his home in Reno, Nevada, 2½ years after diagnosis of pancreatic cancer. Kelly was Regional Climatologist and Deputy Director of the Western Regional Climate Center, and Research Professor in Climatology at the Desert Research Institute, Reno, Nevada. Foremost to CIRMOUNT circles, Kelly was a mountain-climate scientist, fascinated by the challenges and importance of understanding climate processes and trends in complex topography. In the early 2000s, Kelly and a handful of other climate-scientists of the West (including Dan Cayan, Mike Dettinger, Henry Diaz, Malcolm Hughes) and mountain ecologists (including Dan Fagre, Lisa Graumlich, Greg Greenwood, Connie Millar, Nate Stephenson, Tom Swetnam) worked together to develop an informal network that would bring together mountain scientists of diverse disciplines to focus on climate and climate effects on ecosystems. Thus CIRMOUNT was born, and with it, CIRMOUNT's flagship effort, the now-biennial *MtnClim* climate conferences.

Kelly had been a devoted participant to the PACLIM workshops, which focus on climate science of the Pacific Ocean and the West, attending and presenting annually since the first meeting in 1983. Kelly loved the informality, interdisciplinary nature, high-quality and current science, small group size, and retreat-environment that characterizes PACLIM. He championed a parallel event focused on mountain-climate issues for mountain scientists and those interested in climate-related management

and policy of mountain regions. At both PACLIM and *MtnClim*, Kelly became the regular and much-anticipated opening keynote speaker, during which he would present a synthesis of climate events across western North America since the last meeting of the group. In CIRMOUNT's early years Kelly led many efforts to promote CIRMOUNT, for instance, shepherding as PI the submission of a research coordination network proposal to the National Science Foundation (which was rejected, with the justification that CIRMOUNT was already too coordinated!). Even in his last year, worn down by illness, Kelly was advocating CIRMOUNT efforts, practicing and promoting mountain-climate monitoring, and actively consulting and collaborating with national park managers and other resource managers concerned with mountain issues. Those of us who attended *MtnClim 2016*, held in mid-October in Leavenworth, WA just weeks before he passed, were blessed to have Kelly once again in our midst – Elder of the clan – presenting his regular kick-off lecture, discussing the latest science over posters and beers, making newcomers feel welcome, admiring the magical mountain beauty of the Cascades, and talking late into the evenings with old friends.

Kelly grew up in beautiful Gallatin Valley of southwest Montana in Belgrade, next to the Bozeman Airport, where his father worked for the FAA for 27 years as a Flight Service Specialist. His father also recorded the official weather records for the Bozeman airport during this time, and passed his love of mountain weather and challenges to young Kelly. From his Montana home, surrounded by mountains on every horizon, Kelly spent many days hiking with his four brothers and parents. Those early hiking days influenced his interest in mountain climate, observing at an early age that “mountains make their own weather” and that “mountain weather could be so different from that out in the middle of the valley”. Kelly earned a B.S. in Physics from the Massachusetts Institute of Technology (1974), and M.S. and Ph.D. in Meteorology from the University of Wisconsin-Madison (1977 and 1982). Before moving to DRI, Kelly was Assistant- and then State Climatologist of Oregon for seven years. In this position, Kelly had ample opportunity to develop and hone what became his remarkable talent and passion for communicating climate information to the layman, and to resource-management and policy audiences. In his words, “I had about 35,000 one-on-one conversations with people from every walk of life about nearly every facet of climate. Maybe 10-20 of these conversations were about climate change; the large majority was just about the ongoing effects of climate variability.” Kelly was always engaged and enthusiastic about new scientific

findings and methods but merciless about holding every one up to the clarifying light of real-world observations and usefulness. His insistence on real-world usefulness, derived from his thousands of conversations with real people, set the standard for us all.

For his wide-reaching climate-science impact, Kelly was recognized as Fellow of the American Meteorological Society in 2009, and earned many professional awards for his work, a number of which are related in comments and links from colleagues below. His CIRMOUNT colleagues were particularly proud that Kelly was nominated by the American Geophysical Union as the annual 2014 awardee of the Tyndall History of Global Environmental Change Lecturer (John Tyndall being not just a climate scientist but also a mountaineer and lover of mountains). Kelly was selected as the Tyndall Lecturer in recognition of his outstanding contributions to understanding of global environmental change, and he delivered his lecture during the annual Fall AGU meeting on December 18, 2014 (link to video below). The lecture was vintage Kelly—informative, humorous and insightful—and is well worth viewing.

Kelly's wide interests and voracious reading habits roved to topics far beyond climates and mountains, and he was fond of discussing, and then speculating, on problems of metaphysical and cosmic dimensions. There seemed to be no topic for which he didn't have appetite and knowledge. In his words, "My basic affliction is an interest in everything, something that Richard Feynmann called 'the pleasure of finding things out.' I am interested in every part of Nature."

More than anything, Kelly's friends loved his wit, warmth, and easy, gregarious nature. Kelly welcomed everyone who came within his wake into earnest conversation, and he was interested in learning from each person's experiences and perspectives. Many students spoke of how he drew them into his circle, put them at ease, and introduced them to important opportunities. Old friends invariably mention late night emails and phone conversations—wandering from the initial cause for communication onto topics as big as the universe. From PACLIM and *MtnClim* weather roundup talks to those easy one-on-one chats, our world is greatly diminished by Kelly's absence.

A memorial service for Dr. Kelly Redmond will be held on Friday, January 13, 2017 at 2:00 pm in Reno, Nevada. Details and RSVP here: <https://www.dri.edu/newsroom/news-releases/5431-in-memorial-dr-kelly-redmond>. Information about donations to the Kelly Redmond Memorial Fund may be found at the same link.

"In fond memory of Kelly Redmond" by John Fleck, Inkstain, Nov. 4, 2016: <http://www.inkstain.net/fleck/2016/11/fond-memory-kelly-redmond/>

"Nevada climate change expert Redmond remembered as expert communicator" by Henry Bean, Nevada Review Journal, Nov. 4, 2016: <http://www.reviewjournal.com/news/politics-and-government/nevada/nevada-climate-change-expert-redmond-remembered-expert>



Kelly's Tyndall Lecture AGU, 2014 video: <https://www.youtube.com/watch?v=SjSwPMvBsCM>



"RevkinInterview" A video interview in August 2016 with Kelly Redmond by Andy Revkin, Pace University Researcher and dot.earth blog editor; posted with permission from Andy Revkin, Nov. 2016: <http://drive.google.com/file/d/0B88iFXWgVKT-YkhQSW9yZ3o0UEk/view?usp=sharing>

Introduction to Kelly's Talk for the Applied Climatology Award, August 2008 http://www.fs.fed.us/psw/cirmount/publications/pdf/IntroductionAppliedClimAward_Aug2008.pdf

Kelly's Talk when receiving the Applied Climatology Award, August 2008 http://www.fs.fed.us/psw/cirmount/publications/pdf/KellysPresentationForAppliedClimAward_Aug2008.pdf



Kelly in his DRI office, by Phil Pasteris.

Recollections of Kelly from his CIRMOUNT Friends and Colleagues

REMEMBERING KELLY REDMOND

In crisp autumn light, liquidambar
turning scarlet, bright blue sky,
I learned another colleague
has died.

I ran into him last year:
his wan smile, thinning hair.
Among the conference posters
we talked about the drought,
the blocking ridge of high pressure,
El Niño's promise,
and the shocking pace of climate change.

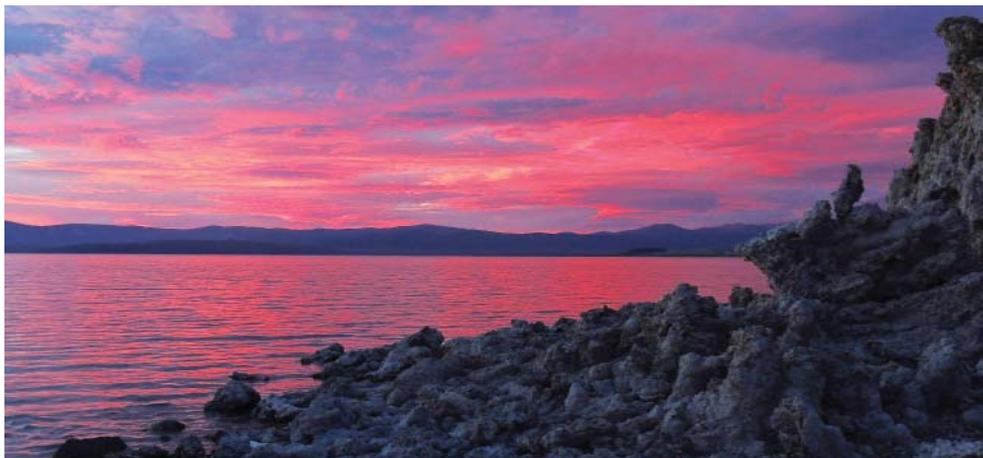
Then he spoke of the crab in his pancreas,
and the chemo, how hard it was.
He was steadfast and cheerful
though we both knew the odds.

He would have loved this change of seasons:
the clear Washoe light,
Mount Rose frosted with new snow,
mares' tails streaming in from the Pacific
and high over-head,
wild geese calling.

—**Robert Coats, Hydroikos Ltd.**

November 2016

Sunset over Mono Lake



Kelly Redmond, August 2014

Martha Apple, Montana Tech

Kelly had a great influence on many people. Just tonight I mentioned some of his sayings and quips to my friend who lives in Oregon, and she is planning to tell other people. And so it goes, with his wise thoughts and eloquence traveling out into the future. Eloquence seems like an overly fancy word to use, though, for someone who was so easy to be around and who had such a great sense of humor.

One time James and I saw Kelly on a corner in San Francisco (I think it was somewhere near Union Square and outside of that gallery where they used to have the Chagall paintings). Anyway, we stopped to talk about Montana since he grew up in Bozeman and one of his brothers went to MTech. He told us a great little story about stopping off in Butte to get new tires.

During his talk at *MtnClim 2016*, Kelly showed a picture of a Glory that he had taken from the airplane, showing the airplane's shadow and a small circular rainbow directly opposite of where he was sitting. He said something to the effect of, "There's my glory, and I was sitting right there. Glories are always right across from you."



Kelly's Glory

Jill Baron, U.S. Geological Survey

Leonard Cohen's Hallelujah is going constantly through my mind, and I am breaking into tears almost at random these days, so this tribute to Kelly comes at a particularly low point.

I did not know Kelly well, being a relative newcomer to the MtnClim circle of warm and loving mountain people. I've never been to a PACLIM meeting. Kelly didn't care; he welcomed me into his sphere anyway. In his wonderful matter-of-fact way—oh, Jill's one of us now—he made me comfortably at home among so many eminent scientists with whom he had shared many more years of camaraderie. We need to spread Kelly's warmth and quiet faith in people more than ever now. I will carry him in my heart.

Leonard Cohen, Hallelujah: <https://www.youtube.com/watch?v=YrLk4vdY28Q>

Erik Beaver, U.S. Geological Survey

Although I have known Kelly for the better part of two decades (having done my Ph.D. and first postdoctoral research in Reno, where Kelly was based at DRI), I have had the pleasure of getting to know Kelly on a more-personal level in the past several years as well.

Things that make me smile as I remember Kelly include his ability to literally (not figuratively) fit over 120 slides in a 25-minute presentation (with only a handful of pictures), yet still not feel like too much information was being shoved down the audience's throat or that the presentation was rushed. I also loved his ability to weave together different scales of examples to illustrate any given point, from remarkable temperature gradients across a single valley in western Nevada that were quantified with sensor arrays, all the way to synoptic patterns across the entire West that spanned several decades.

Kelly and his colleagues catalyzed work that proved an invaluable inventory for many of the U.S. national park units. I worked for 2.5 years in the NPS Inventory and Monitoring Program, and I saw first-hand that a lot of the analyses, approaches, suggestions, syntheses, and interpretations not only were hugely instrumental in shaping the initial direction of climate and weather monitoring in NPS, but the legacy of that influence can still be pervasively seen across the Nation, even today.

I loved the pensive nature of Kelly, and how he would respond to questions not only in person but also over email. Scientifically, Kelly had a playful, gentle, and tireless sense of curiosity that sparked him to accomplish many great things.

We are a more depauperate community without him.



Hardscrabble Peak, July 2013, by Kelly Redmond

Andy Bunn, Western Washington University

I had the great pleasure of being able to be present for what turned out to be Kelly's final scientific presentation. As one of the organizers of the *2016 MtnClim* conference I had worked to bring Kelly in for his traditional talk reviewing the state of mountain weather in the west. I knew Kelly was frail and tried to give him an easy out if he wasn't feeling well enough to travel. But of course, he was having none of it. He arrived just in time for his talk and had spent the day driving around the east side of the Cascades taking pictures and being the keen observer of the world that he was. Towards the end of the meeting I was chatting with a contingent of folks from the Northwest Indian College who were new to *MtnClim*. Kelly had gone out of his way to have lunch with them and welcome them to the conference. One of the students remarked to me that Kelly was clearly an important elder in our community. He was. We all knew it. I hope that Kelly knew it. I'll miss him as a scientific mentor but mourn the loss of Kelly as an elder for our community even more.



Kelly speaking at *MtnClim* 2016, by Imtiaz Rangwala

Link to Kelly's *MtnClim* 2016 presentation: <http://www.fs.fed.us/psw/cirmount/publications/pdf/KellyMtnClim2016.pdf>

Dan Cayan, Scripps Institution of Oceanography

Kelly loved atmospheric measurements and unraveling the structure and processes they revealed. Of course he dealt with an enormous bundle of these in his office life, but he also carried this to a very personal level. Years ago he introduced me to the thermometer he had tethered to a readout on the dash of his Volvo (which, though more than 10 years more aged, I think is still parked in his garage). After retrieving me from the Reno Airport, he proudly demonstrated this device, which he hung out his window as drove through the surface streets. He operated this as a profiler, his brain being the recorder. On our drive to his house it quickly became clear that this was a survey across the hilly terrain that he did routinely to the point that he could enthusiastically predict how much change the nighttime layered atmosphere would present as we descended the next valley.

Kelly fit very well the position he occupied (invented, I guess) at Western Regional Climate Center, which I will call "Chief Climate Scientist for the Western U.S". This gave him license to poke into a vast universe of interesting problems. His personal statement says that he "*maintains an interest in all facets of climate and climate behavior,*" which indeed was true. I have to confess that, being a co-investigator on various projects, I sometimes got a bit frustrated with Kelly's less-than-straight line trajectory in achieving deliverables. But this was part of the Kelly-package, which was, in the end, a great virtue, because of the experience he brought from high level issues he contributed to and real-time monitored, and the impeccable standards he maintained.

The Western landscape was one his intense fascinations. He tromped and catalogued weather stations across many of the National Parks in the West, and he personally surveyed and located several of the NOAA Climate Reference Network station sites. This on-the-ground knowledge made him a really effective advocate for better observations and for improved regional modeling. In attending the astounding number of meetings and conferences he was invited to, he made a lot of flights, and he always took a window seat. Here's how he spent his air time—

From: Drought Monitor Discussion Group [DROUGHT@LISTSERV.UNL.EDU] on behalf of Kelly Redmond
[Kelly.Redmond@DRI.EDU]

Sent: Saturday, February 21, 2015 10:55 PM

To: DROUGHT@LISTSERV.UNL.EDU

Subject: [DROUGHT] a few photos

“Took a couple hundred photos coming and going to Boise.

A lot of people fly over the Great Basin and think it's just a big wasteland.

Some of us find it totally fascinating. And it wears drought on its sleeve.”

7478 Lake Mead, Overton Arm, it's helpful if boat ramps reach the marina

7443 old droughts and shorelines of Lake Bonneville, looking east into Utah

7479 drought outline on Lake Mead, still dropping, 73 % of normal inflow now expected

7485 Lake Mead, Boulder Dam, electricity from water, new bridge, Black Canyon

7491 Lake Mead bathtub rings.”

Kelly would be classified as a Type 10 Workaholic, but he had so much fun that I'm sure to him it wasn't work, just part of his continuing voyage of discovery. I think he saved phone calls until after he'd dealt with the mountain of emails, press queries and office interactions he maintained. Often, at the very end of an already long day my phone would ring and there would be Kelly and we'd be off on an hour conversation, inevitably off-topic, but always a delight. How I'll miss those and that gentle inquisitive soul!



Airborne view of the White Mountains and Long Valley, CA, December, 2013, by Kelly Redmond

Chris Daly, Oregon State University

Kelly ranks as one of the top three most influential people in my professional career. He achieved that status by helping to promote my early work within the larger community, providing a steady and encouraging presence, contributing novel (and sometimes hilarious) ideas, and perhaps most importantly, contributing his time and energy to help out when things looked bleakest. I know that I am not alone, which makes his influence all the more remarkable. At meetings and conferences, I would watch Kelly go over to the young participants to introduce himself, and ask really great questions about their work. Everyone was important and worthy. I will strive to honor Kelly's legacy by trying to do more of that myself. Of course, this is in addition to working through the list of great things he thought I should be doing! That will certainly keep Kelly in my thoughts for many years to come. Rest easy, my friend.

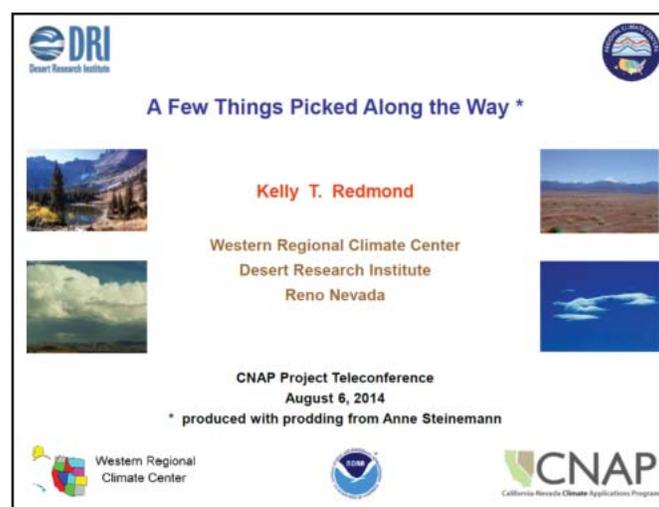
Mike Dettinger, U.S. Geological Survey

For the community, Kelly was the ultimate team player and philosopher scientist. And it is sure going to be a lot less fun out there without Kelly at the dais.

On a more person-to-person basis, Kelly and I have been working together regularly since the late 1990s. I think we worked well together, and certainly he always always made it fun, but at some level we were always a bit wary of each other: I tend to be a loose cannon and Kelly always retained that careful state-climatologist thing. As recently as last fall, we put together a public forum in Carson City to talk about what the Great El Niño of 2016 was going to mean...Kelly kind of called that one, arguing "who really knows?" Who indeed? The upshot for me is that Kelly's passing means another "professional friend" gone and that maybe its time to internalize his care and caution as best I will remember it. And again a lot of the fun will be gone from meetings from now on. I'll miss him.

I think that the "pull quote" from Kelly that is most cited in the literature and that will last longest into the future may be from his "Depiction of Drought" commentary in BAMS in 2002, wherein he wrote "What is meant by drought? Early definitions focused on purely meteorological or hydrological causes...[but] through time I have come to favor a simple definition; that is, insufficient water to meet needs." So simple and yet really game changing, much cited, and sure to stand the test of time. I see it mentioned in talks and in articles all the time.

Kelly's BAMS article on drought is here: <http://journals.ametsoc.org/doi/pdf/10.1175/1520-0477%282002%29083%3C1143%3ATDO%3E2.3.CO%3B2>



Cover slide from Kelly's presentation at CNAP (courtesy of Anne Steine)

PDF of Kelly's presentation here: <http://www.fs.fed.us/psw/cirmount/publications/pdf/AFewThingsPickedUpAlongtheWay.pdf>.

Henry Diaz, emeritus NOAA

If my memory serves me, I first met Kelly at one of the earlier PACLIM meetings—likely in the late 1980s. Since then, our paths crossed many times, at numerous American Meteorological Society conferences, at the annual AGU conferences in San Francisco, and many, many workshops all around the country. Kelly kept his travels mostly within the confines of the USA, and he travelled quite frequently. When he passed away recently I reflected on my times and experiences with him and our many friends and colleagues. One thing that always struck me as I now look back on our various peregrinations is the realization that whenever we were together during those late afternoon and evening social gatherings, it was clear how Kelly enjoyed the camaraderie, the scientific, political and cultural discussions, and the personal feedback and learning from those groups of people that his travels afforded him.

We became an extended family, and we shared personal news and plans for the future. And when we got together again at some later time, we would bring each other up to date on the things—personal and professional—that had happened to us in the interim.

I will miss Kelly's friendship and his unique talents as a great science communicator and message taker to the greater community of fellow citizens.



Kelly enjoying friends at his last *MtnClim* conference, October 2016, in Leavenworth, WA, with Imtiaz Rangwala (left) and Sudeep Chandra (center). Photo by Jill Baron.

Deanna Dulen, National Park Service

Writing from Bhutan:

Dear Kelly's spirit soared to lofty heights, embracing the wisdom of a sage and knowledge of a scholar, all of which he shared with colleagues, and all with a twinkle in his eye. I dearly appreciated how, during our interagency group developing management implications of climate refugia, he said with his wry wit that we most certainly need a refugium for climate scientists.

Kelly also wrapped scientific complex physics into clear concepts like the climate refugium concept for Devils Postpile National Monument along the San Joaquin River corridor and all the moisture laden rain and snow releasing on west wall of Mammoth Mountain to make the right combination of topography, geology, wetland, river, and shade, with no known analog.

Thank you Kelly, and may your spirit continue to soar. Namaste

Sasha Gershunov, Scripps Institution of Oceanography

I will miss Kelly's intrepid philosophical attitude and optimism about humanity and love for Life and his thirst for knowledge in many diverse fields that he so generously shared. Every conversation with Kelly was a priceless gem, especially the late-night ones he loved so much, when the most essential questions of human existence percolated up to the surface. He truly stood out among us all unique human beings.



"Greetings, earthlings," from the east end of the Extraterrestrial Highway, Nevada Route 375, near Hiko Nevada, by Kelly Redmond.

Jessica Lundquist, University of Washington

My favorite memories of Kelly are of how he always monitored meteorology during his travels to any meeting. He would begin with, "So, I had my thermometer on my car as I was driving on I-80 this morning, and as I went over the pass from Reno, it got cooler at exactly 4,000 feet and got warmer suddenly when I passed an elevation of 5,000 feet, but when I descended on the other side, there was no such cold pocket..." and he would rattle off exact temperatures and elevations and patterns with such precision that I was always seriously concerned that he was not watching the road at all and was going to crash his car. The same observations could be seen in the photos out his airplane window that accompanied every weather year in review.

In the field, Kelly taught me how to site weather stations—make sure you're not next to a building or in the shade of a tree, try to find a nice big clearing, not too windy if measuring precip, but at the very top of a mountain if you only want temperature and wind.

In the breaks between meetings, Kelly taught me what it meant to be a good citizen scientist, telling me, "No matter what, you have to keep working to explain your science to everyday people. It's hard to do, but it's the most important thing we can do. We have to make sure people understand what we're doing and why it matters."

And his book recommendations were always spot on -- I still haven't finished the list from the Tyndall lecture.

He loved the weather in the mountains, and he loved people, and I really appreciate having Kelly as a role model from graduate school onwards.



First Yosemite Hydroclimate Workshop, 2002, Yosemite Valley. Photo from Bruce McGurk.

Bryan Mark, The Ohio State University

I'm pleased to share a few words; the mere moments I had with Kelly were poignant. He so very quickly impressed me as a man of integrity and kindness.

I was fortunate to have met Kelly just before his death, while attending the *MtnClim 2016* meeting in Leavenworth, WA, in October 2016. I had only two conversations with him, and I was unaware of his condition. But in the midst of our discussion, I related that I was taking over the role of State Climatologist for Ohio. He took great interest, and followed up with personal reflections on the job. His advice was direct and simple, and bears sharing here: "be patient." He assured me that I would find moments to voice how climate is important, and it will make a difference, but it can often seem to be a difficult and uncertain path. The prophetic truth of that is only beginning to become clear given the uncertain times we live through. I left inspired and encouraged. I've subsequently learned how Kelly was a valued mentor for my former graduate student, Karin Bumbaco, who is now Assistant State Climatologist of Washington.

With my sincere gratitude for Kelly's life, and condolences to all.

Bruce McGurk, McGurk Hydrologic

As the organizer of the Yosemite Hydroclimate meeting, I solicit presentations from respected and favorite researchers to speak at the annual meeting. Kelly Redmond represented both of those attributes: everyone looked forward to hearing his musings on the past winter, and what the new water year would bring. Kelly had a special place in the lineup because he was part of the group of scientists who started these annual meetings in the Park in 2002. He had been to every meeting, and always brought his special brand of thoughtful presentation and insightful questions for the other attendees. His talks were full of colorful graphics from the Drought Tracker, El Niño/SOI status and trends, precipitation extremes, trends in wintertime minimum temperatures, and more. He could interpret those complex patterns and issues, and make everyone feel like they understood what was going on. And just for fun, he would then add a plot of the Lake Tahoe water level and how it had declined during the drought and how long it had been below the rim. His musings on the coming winter were often preceded by a cartoon featuring a fortune teller's shop with a sign such as "Madame Olga's Stochastic Scenarios." Kelly would smile as people laughed, but would then marshal all the bits of evidence and weave them into a great forecast. Kelly was an amazing scientist, a terrific communicator, and a delight to sip beers with at the bar when the meeting was over. I was lucky for the time I got to spend with him, and miss him very much.



Madame Olga's scenarios in Kelly's slide show.



"So Far So Good", another of Kelly's lighter moments from one of his Yosemite HC talk. Both images sent by Bruce McGurk.

Connie Millar, USDA Forest Service

Trying to remember when I first met Kelly, I had been distraught in not being able to find that memory. My oldest mental images are of times when we were already close friends. In reading stories about Kelly, I realize that one of those memories surely was my first acquaintance: it is just like Kelly to make everyone feel like an old friend from the start. I respected Kelly for his science, capacity to communicate climate information clearly, and dedication to his work; I loved Kelly for so much more. Trained as a forest geneticist and evolutionary biologist, when I first ventured to learn about climate, I had absolutely no background that would provide a basis for interacting with climate scientists. Add to that a big dose of personal insecurity, my first participation in a PACLIM meeting in 1994 (when these were held on Santa Catalina Island, CA) was filled with trepidation. This, I think, is where I met Kelly, and one of those "old-friend" memories is from the boat ride back to the mainland. With ocean spray flying, we huddled on the deck and talked about topics metaphysical and only vaguely related to credible science. Of course Kelly was extremely widely read, so he had basis for his conjectures; he let me ramble on with my wild speculations, which were based on little known evidence. From there on, all our interactions had this comfy and easy manner, filled with awe at the beauty and wonder of Planet Earth and Beyond.

Kelly clearly loved his homelands of Montana, and spoke often and fondly of the mountains, the community, life in his early days in that region, his beloved parents and brothers, and, more recently, the nieces and nephews of his clan who meant so much to him. I think his heart was grounded in Montana, even though, Wallace-Stegner-like, he embraced every nook and cranny of the West through which—or over which—he traveled. In that I am far more parochial and see little beyond the Great Basin, I reveled to talk with Kelly of the hidden mountains ranges, isolated tree populations, and American pika sites I had explored in the Great Basin. Kelly would listen intently to my stories of "new places". Then he would add his own comment on a canyon or peak nearby that he had visited, and there would come pictures of these as well.

I visited Kelly at Renown Hospital in Reno in the days following his first surgery in 2014. Although it was clear that his cancer was terribly serious with little hope for long-term treatment, Kelly was calm and circumspective, relaying the medical details from his doctors, and the near-term plans to hold the cancer at bay. Soon, however, the conversation left the bedside, and starting roaming Kelly-esque to big topics: speculative, philosophical, existential. I was comforted by Kelly's perspective and capacity to talk as we always did, even with the terrifying news in his lap.

While I am more than a little embarrassed to confess, I secretly harbored the notion that I was special to Kelly. As I talk to friends and colleagues, I realize that many felt this way. Now I see the beautiful truth that we *all* were special to Kelly, each in our own way, just as he was special to each and every one of us.



For you, dear Kelly: a view from an American pika's front porch of the Sierra Nevada crest from near Rickey Peak on the day before Thanksgiving 2016, with love from Connie.

Toni Lyn Morelli, DOI Northeast Climate Science Center

Although I knew him half as well as most of you, I'm grateful for the calm, friendly, and wise man that I got to know over the last 7 years, and consider myself lucky to have had those times.

I also had the experience of both learning from him and butting heads (a little) with him on scientific matters, for which I consider myself very lucky.

In this moment of national and scientific upheaval that was left after Election Day, I find myself playing the game "What Would Kelly Say?" and wishing that I didn't have to guess.

—Toni Lyn, burgeoning climate scientist, inspired by Kelly and all of you to keep giving it my all



Phil Pasteris and Kelly, by Rosemary Pasteris

Phil Pasteris, Global Water Resources, CH2M Hill

I first met Kelly in the early 1990s when he made a presentation at the local AMS chapter meeting in Portland. As usual, Kelly was fully prepared with a stack of color overheads containing graphs, tables and all manner of images to illustrate the climate of Oregon and the Pacific Northwest. This could have been intensely boring to a mixed audience, but Kelly worked his story telling magic and after just a few minutes had their undivided attention. Kelly made climate, hydrology and meteorology come alive and relevant to all he met. He did that because he listened before he talked.

When I transferred from NOAA NW River Forecast Center to the SCS Snow Survey and Water Supply Forecasting Program in July 1990, Kelly was right there in Reno to help me when I visited. He had just moved from Corvallis where he was the State Climatologist to the Western Region Climate Center. He and I immediately hit it off. He knew I had plenty to learn and suggested that I attend the American Association of State Climatologists annual meeting in Atlantic City, NJ that next week. Wow! Talk about jumping into the deep end of the pool. With Kelly's help I got to meet the "climate gang" and was given 10 minutes to outline some concepts to create a national climate service. A regional and national climate service was something Kelly had in mind too and the saga began.

Kelly's work with Greg McCurdy and Dick Reinhardt at the Western Regional Climate Center (WRCC) resulted in a regional climate service making data and applications available to process and interpret climate data. The timing was right because the Internet was in its infancy and that a wider audience was possible to fulfill the WRCC mission. This concept aligned precisely with the USDA concept for a nationwide climate service for all USDA agencies. Kelly threw his full support into creating a Unified Climate Access Network (UCAN), now the Applied Climate Information System (ACIS). As part of the UCAN Design Team, Kelly gladly shared all his knowledge gained from the WRCC system to ensure UCAN provided data processing methods that were scientifically correct. The rest is history. ACIS is now fully integrated with National Weather Service webpages and provides meteorologists with the historical context for climate events nationwide with NOWData.

Kelly stayed in touch with the Oregon State crew. Chris Daly and George Taylor were cooking up a way to map climate nationwide. The existing maps of the West were a hodge-podge created by a variety of entities. The contours never matched at the borders and the period of record used for the analysis never matched either. Kelly threw his full support behind the PRISM project and hosted a

special State Climatologist forum in Reno to get expert comments to improve the PRISM process. That was the turning point for the project and Kelly was very pleased that the forum was a success. Input from the State Climatologists and others resulted in a suite of state climate maps that were congruent in period analyzed and edge-matched at the borders. Kelly's vision to support the process resulted in the WestMap – Climate Analysis Toolbox, which provides a full suite of maps and time series information.

Kelly's contribution to the National Integrated Drought Information System (NIDIS) once again was critical to its success. He provided the necessary perspective to put the complexities of drought into both scientific and human terms. He worked closely with all of the NIDIS cooperators to ensure that they were all heard and the process kept on track. His weekly comments to the Drought Monitor team were more often than not written in a style of an author Kelly studied and loved - Mark Twain. Kelly's "Demise of an orphaned rain drop" will be published in a separate article.

Kelly and I talked for hours on the phone and when we attended conferences. I don't know of a kinder person who ever roamed the planet. Being half Italian, I would get excited about something that didn't happen the way I hoped it would. We would talk it out together and Kelly always provide the opposing perspective that would settle me down. Rosemary and I loved to visit Reno and Lake Tahoe. We always tried to track Kelly down and take him to dinner. Bertha Miranda's Mexican restaurant was one of his favorites and he loved to listen to what we doing with our life and with our kids, Julie and Karri. Kelly and Karri shared an interest in Mark Twain and would exchange e-mails on some of this writings and observations.

News of Kelly's ailment caught me cold. I thought that if anyone could beat a bad set of dice, it would be Kelly. On the other hand, Kelly knew the diagnosis and probabilities. He decided to move on with what he did best, climate, and live the life he had left to spread his knowledge to as many as he could. Kelly had always met a deadline for a paper or presentation, but this was something he could not control and I am sure he was dismayed that he had not accomplished all he set out to do.

Kelly was in Portland in August 2016 to watch his brothers ride bikes in the annual Bridge Pedal, something he had participated in over the years. I met up with him and we walked the parkway near the Willamette River. His sense of humor was still there, as dry as a D6 drought. We knew that this might be our last time together on the planet, but did not dwell on the topic. I was in Joliet, IL when Kelly passed. I left him a voicemail message that we would meet again and that I loved him. That was the best I could do.

I recently attended a concert and "The Grand Canyon Suite" by Ferde Grofe was performed. If there was a piece of music that could be identified with Kelly, that is it. The piece has wonderful textures the five movements – Sunrise, Painted Desert, On the Trail, Sunset, and Cloudburst. Kelly played the trumpet in high school and I play the clarinet so we shared an interest in music. I think of Kelly whenever I hear this piece. Kelly understood the textures and variety of the Western climate like no other person.

Mark Twain once asked "to acquire, by courtesy of the press, access to my standing obituaries, with the privilege - if this is not asking too much - of editing, not their Facts, but their Verdicts. This, not for present profit, further than as concerns my family, but as a favorable influence usable on the Other Side, where there are some who are not friendly to me." He offered to correct them, "replacing them with clauses of more judicious character."

Kelly, you had nothing to fear from the Other Side. Your many friends that remain on this earth will testify to your selfless dedication to your craft. You have amassed and disseminated a storehouse of climate knowledge that will benefit generations to come. We will miss you.

Rest in peace my dear friend.

"I do not fear death. I had been dead for billions and billions of years before I was born, and had not suffered the slightest inconvenience from it." – Mark Twain



Kelly in his office at the Desert Research Institute, Reno, NV, by Phil Pasteris.

Dave Peterson, USDA Forest Service

I didn't have a lot of interaction with Kelly over the years, but we did coauthor one paper, so I'll base my comments on my experience with that:

In the 1990s, we developed a reconstruction of the lake level of Crater Lake, which is not only a gigantic "rain gauge" (no inlets or outlets), but has an unusually long record of lake-level measurements. We were well along with the analysis when Kelly joined the project at the recommendation of a colleague at Oregon State University, where Kelly worked at that time. This was the first time that I had worked with him, and suffice it to say that he kept our feet to the fire on statistical aspects of the study. He had a gentle way of telling us that some of our early inferences were incorrect, without making us feel like idiots. And of course the final analysis was much improved by his advice. I'm proud to say that I published a paper with Kelly Redmond:

Peterson, D.L., D.G. Silsbee, and K.T. Redmond. 1999. Long-term hydrological patterns at Crater Lake, Oregon. *Northwest Science* 138:121-130.

Roger Pulwarty, NOAA

(Extracts from letters that Roger has written about Kelly prior to his death): Dr. Redmond has been a fundamental contributor to and producer of innovative research in the field of climate variability and change, and their impacts in the Western United States. He has also been an intellectual stalwart in the effort to sustain climate monitoring and to confront and improve models through the development of stronger data records.

Dr. Redmond is exceptional for the quality of his publications and his dedication to ensuring that research is not done in a vacuum but informs choices made for the public good. Such is Dr. Redmond's proficiency and expertise in the area of climate research that he is widely-referred, by academic researchers, natural resources managers, and policy-makers at a variety of levels across the Western U.S., as "the Climate Ambassador of the West".

Dr. Redmond's is a voracious, yet critical, consumer of new ideas in communication and the use of science for decision-making. His enthusiasm and his desire for rigor are infectious to all around him. He will continue to stand as an inspiration to many, including young innovative thinkers with a modern view of use-inspired research in field of the physical and environmental sciences, especially climate.

Dr. Redmond stands above others and he has led the way in developing pathways that have then been adopted by Federal and State agencies, private sector interests, and across the academic community. He has always been a willing and gracious collaborator, embodying the increasing recognition that research-based solutions to complex environmental problems exceed the capabilities of any single researcher, or the purview of any single discipline.

Email forwarded by Roger from Jim Angel (State Climatologist, Champaign, IL):

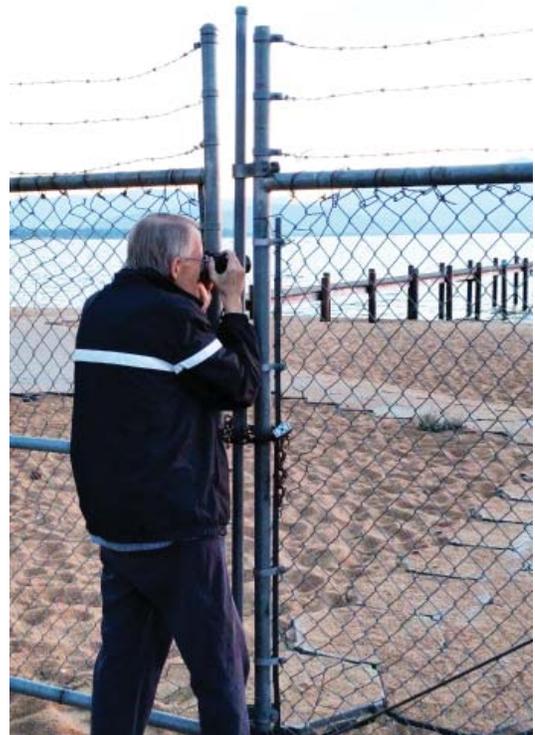
"Of the millions of emails I've read over the years, this one written by Kelly Redmond to the Drought Monitor in September 2001 is by far my favorite. So much so that I kept it in my desk over the years to take out and read. I retyped this from the paper copy this morning and had a little trouble with watery eyes - must be those seasonal allergies. Enjoy ...

"Our ticker for the Water Year is still 2.04 inches, and not counting. Sure is dry. Can't even keep up with Death Valley, which in the same time had 2.46 inches, and now has parrots and orchids and coconuts and cantaloupes, draped in a smothering blanket of kudzu.

We had 0.00001 inches (e.g., a trace) in August. The drop that fell, August 8th, was reportedly about 0.6 mm in diameter, striking the gage with a resounding "plink" at about 3 degrees from vertical. Like comets, all our drops are named after their discoverer, so this one was known as Raindrop Dapm. Athletic and educated, but sensitive and shy, it was described as "a bit of a loner," grew up in a good neighborhood but kicked out by its parents when it couldn't carry its own weight. When the medics arrived, the badly injured droplet was undergoing dehydration and heat stroke; despite mouth to mouth resuscitation, all hope soon evaporated. The drop was survived by no ancestors or descendants. Cremation occurred at death, and its molecules scattered to the four winds. One was seen near Kentucky just the other day."

Imtiaz Rangwala, NOAA

Knowing Kelly is to reaffirm the basic goodness and beauty that life has in store for us. When I first met Kelly as a shy and wary graduate student, I was deeply struck by the amazing openness and attention I received from him. And that I received time and time again, and all those who were fortunate enough to cross path with him. No wonder that he was the persona par excellence when it came to the vocation of climate services. He demonstrated better than anyone I know the importance of listening and respectfully receiving the viewpoint from the other side. And, then there was the deep wisdom and humor that ever oozed out of him. It pains me deeply that I will not have the joy of his company anymore, and this loss will only grow with time. I am a different person now because I once ran into one Kelly Redmond.



Kelly at Lake Tahoe, August 2016, by Imtiaz Rangwala

Nate Stephenson, U.S. Geological Survey

Here are two from emails I have from Kelly to share, the first written to me:

3/16/14 “Hey Nate, Thanks for the thoughtful note, appreciate that very much. Am doing ok, just mild to moderate pain these days, really helps to have so many brothers and a lot of friends who have been wonderful. There's still another ring or two to add to this tree.

Now in between the initial operation and the chemo treatments.

Have had a chance to finally see a day go by at its natural astronomical pace. Kind of a treat.

More later. Thanks a lot. -Kelly”

The second is an excerpt from an email to some of us here in the southern Sierra Nevada about our attempts to understand recent climate and its trends. It is Kelly at his best, talking about the efforts of us frail humans to understand something as unfathomably complex as the climate system:

1/22/14 “So it’s like a case of uncertainty multiplied by uncertainty, uncertainty squared. Amidst all this noisy stochastic behavior, actually what is somewhat amazing and gratifying to my little speck of a mind is that we are still able to nevertheless discern some elements of regularity in system behavior. Nature is tossing us enough tantalizing crumbs that we succumb to our curiosity and keep looking for more. And though the previous might come off as somewhat pessimistic, I think there are good reasons to think we will keep finding better crumbs. And some of those crumbs will be useful.”

Scotty Strachan, University of Nevada, Reno

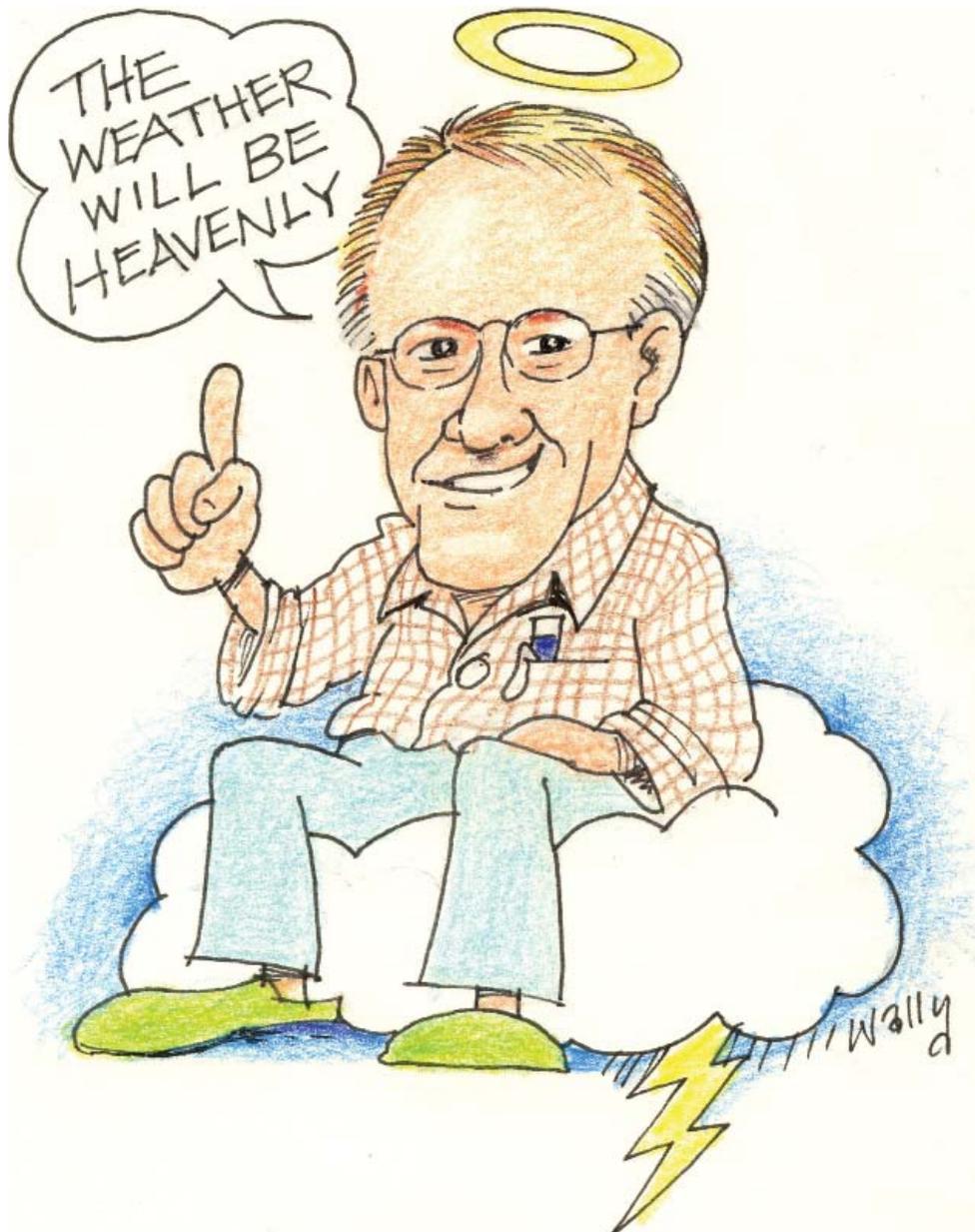
Kelly Redmond represented a kind of person and scientist that is altogether uncommon, combining a keen inquisitive nature with great stability and even keel. Sure, he possessed the ability to wander a sinuous conversational path or presentation as well as the next curious intellectual, but always his next comment could snap back to the crux of the matter with razor-sharp agility. Kelly understood the Big Picture in ways that few of us do, and knew how each of the little parts fit into it. More importantly, he cared about all of them. Kelly cared about young and old alike, and was not above investing his personal time in letting folk ramble on with crazy ideas. After patiently listening, he would share a few of his own—fostering interchanges that were not bounded by scientific or political dogma. Kelly lived beyond such restrictions, and his personal and scientific legacies reflect that transcendence. He maintained a selfless vision of people and the world that drove his actions, and while the first abrupt hospital bed detour forced deep reflection and a certain re-prioritization, he never wavered. In fact, Kelly's last years with us may have brought out the best Kelly. May all of us keep the example of Kelly's grace with us now, as we continue the journey.



Tufa in dusk light, Mono Lake, by Kelly Redmond, August 2014.

Bob Westfall, USDA Forest Service

I've observed that he engaged with everybody. That was especially evident at AGU and PACLIM poster sessions. Any comments he made were straight to the point. I also appreciated his wry humor—he expressed that both in his presentations and in conversation. He still showed that at *MtnClim 2016*, even though he was obviously in pain. Also—even though he held a very important and prominent position, he carried himself as an ordinary guy.



Kelly Redmond, by Wally Woolfenden USDA Forest Service (retired), November 2016



Kelly T. Redmond

Applied Climatology Award



*For his vision and dedication to the advancement of climate services, scientific contributions to applied climatology, and promotion of climatic issues unique to the Western United States
August 2008*



Kelly's poster award for the Applied Climatologist, by the American Meteorological Society, August 2008

Reprinted from Autumn 2014, *Mountain Views*.

An Interview with Kelly Redmond; 2014 Awardee of the Tyndall History of Global Environmental Change Lecturer, American Geophysical Union

Kelly Redmond is Regional Climatologist and Deputy Director of the Western Regional Climate Center, and Research Professor in climatology at the Desert Research Institute, Reno, NV. This summer he was selected as the “Tyndall History of Global Environmental Change Lecturer” for the Fall 2014 meeting of the American Geophysical Union in San Francisco. This award recognizes the life and work of physicist (also mountaineer), John Tyndall, whose measurements in the late 1850s and early 1860s verified the importance of the greenhouse effect that had been proposed by Fourier in 1824. Kelly was selected as Tyndall Lecturer in recognition of his outstanding contributions to understanding of global environmental change. Specifically, this lecture focuses on the development of the science underlying global environmental change and provides a historical perspective. Kelly will deliver his lecture during the December meeting (Thursday afternoon, Dec. 18), which will also be available as a webcast and as an archived presentation on the AGU website. As a founder and key coordinator of CIRMOUNT we are tremendously excited about this award, proud of Kelly, and offer our sincere congratulations. We look forward to his thoughts in the Tyndall lecture as we do his insights on all things climatological during the many other lectures Kelly presents annually.

—Editor



“The wind is a musical instrument with a certain range of tones, beyond which in both directions we have an infinite silence”

—John Tyndall

Connie: Give us some personal history – what first got you interested in climate as a research focus and what motivated your passion to communicate climate information and knowledge so broadly?

Kelly: I grew up in Southwest Montana in Belgrade, next to the Bozeman Airport, where my dad worked for the FAA for 27 years as a Flight Service Specialist. He also recorded the official weather records for BZN airport during this time. In Montana, everybody a) is interested in the weather, or b) is dead. My dad had a lot of weather material from his training, and I memorized it all. I remember well a 5th-grade science project on clouds. My freshman advisor at MIT, Fred Sanders, was a highly respected and motivated meteorologist. As a physics major (astrophysics, which I still follow closely) I took some courses in meteorology, and hung around the map room often. My undergraduate advisor, Rainier Weiss, who along with Kip Thorne was one of the two co-founders of today's LIGO project, told me that he considered climate prediction to be among the hardest problems in science. This just totally intrigued me, because I love hard problems. Astronomers are often clouded out; rather than look *through* the atmosphere, I decided to look *at* the atmosphere. Further, I am interested in every part of Nature, and climate eventually touches all other earth science disciplines, has deep connections to fundamental processes, is strongly nonlinear, and is hugely important to society, so this appeals very strongly to me. My basic affliction is an interest in everything, something that Richard Feynmann called "the pleasure of finding things out."

As state climatologist for Oregon for 7 years, I had about 35,000 one-on-one conversations with people from every walk of life about nearly every facet of climate. Maybe 10-20 of these conversations were about climate change; the large majority was just about the ongoing effects of climate variability. I always

received a lot of positive feedback from these encounters, and spent more and more time giving talks and presentations, always very well received, which provided further encouragement. Also, I feel very strongly that society does not support science and climate studies just so that we can indulge our personal passions (although, it should for that reason as well), but so that it will receive useful payback on its investment. Also, it is a wonderful challenge to learn how to transfer intact a thought from one mind to another. It helps greatly that the public has a direct and intimate connection with climate and weather, a natural and major advantage for our profession.

Connie: OK, great. Like John Tyndall, mountains are clearly important in your work. In what ways do you find mountain climates – their process, patterns, and challenges -- so compelling?

Kelly: I grew up in the beautiful Gallatin Valley, something I would not trade for anything, surrounded by mountains on every horizon, spent many days in them with my four brothers and my mom and dad. I was fascinated by the way mountain weather could be so different from that out in the middle of the valley. Mountains make their own weather, and modify much of the rest of weather. There are exceptionally sharp spatial gradients in so many atmospheric and climatic properties, something not widely appreciated by those who do not live, work, and play in such surroundings. My job covers the 11 western states and Alaska and Hawaii, with mountains galore and complex topography a defining property of that entire region. It's one of many reasons why I really love this job. Throughout the West, we are strongly affected by mountains, even if we do not directly live in them. And there is the simple fact of how inspiring they are. Meteorology becomes far more complex in such terrain, and more difficult to observe. We specialize in observations, and mountain observations probably take 2-3 times, or more, effort and resources to produce successful high quality measurements. We also suffer from insufficient density of long-term high quality observations, because of the many difficulties involved.

Connie: What do you see as urgent problems to be tackled or needs to be addressed in the near future in relation to our work in mountain climates and ecosystems in order to make important progress on societally critical issues of anthropogenic global warming?

Kelly: We need to learn how mountain climates work, fundamentally, in the absence of climate change. Climate change is simply another source or type of variability. An important issue is how large-scale patterns (global, continental) of atmospheric variability translate to the small-scale realm (meters



Kelly shares a light moment with Chris Daly at the recent *MtnClim 2014* conference. Photo: Scotty Strachan.

to a few kilometers) in complex environments. Orographic enhancement of precipitation is affected by topographic details, wind patterns, vertical stability, and other subtle factors, a subject about which we need to learn more. Elevation and aspect effects on insect pests and pathogens are still in need of further understanding. Mountains reach up and "grab" water from the sky, and serve as reservoirs that meter this water out over the warm season and maintain base flows for streams. How will this function be affected by changes in temperature and precipitation? A big challenge is to close the surface water budget on scales of a kilometer or less. Especially important is assigning better numbers to groundwater flows and reservoirs, and better understanding the physical processes by which this is accomplished.

Mountains were once regarded as largely unapproachable and forbidding environments (e.g., read Mary Shelley's *Frankenstein*). Improved physical, and now electronic, access has greatly changed this attitude. Now, by contrast with the past, mountains are increasingly being populated, with pushes to higher elevations, and the wildland-urban interface, and the exurbs, are leading to fire and wildlife issues in places where formerly few people lived. Climate change, and warming temperatures, may act as a force driving people to higher and cooler elevations. For much of human history, mountains were regarded as mysterious and sacred places. In my own view, this latter distinction may have decreased, even though (again, my view) we should be regarding all of Nature, all biomes and climates and settings, as sacred.

Connie: How would you suggest CIRMOUNT scientists can contribute best to these challenges?

Kelly: The MtnClim Conferences are one great tradition to keep going. We might be ready for a next rendition of Mapping New Terrain [CIRMOUNT's early document], though many things in that publication are still relevant and timely. Keep up a tradition of interdisciplinary communication. Mountain Views Newsletter is one of those forms of communications, and you all have given an excellent start and example to that. Continue to advocate for monitoring.

Connie: So what about the El Niño we hear about for winter 2014? Isn't summer too early to be predicting ENSO? [I had asked this question earlier this year to Kelly]

Kelly: As of this writing (early Nov 2014) a weak to moderate El Niño still seems on track. This year a potential El Niño for winter 2014-15 was suggested at a very early lead time (May or so, highly unusual), leading to much speculation about a possible strong El Niño come winter. Then the situation slipped during summer as El Niño, especially a strong version, appeared much less likely. In the last few months, models and other signs have

consistently pointed to about a 2/3 probability of a weak to moderate El Niño. The ocean temperatures have been showing mildly warm conditions in the ENSO area on the equator, giving credence to expectations of a minimal to modest El Niño. As we have pointed out in a recent fact sheet, various indicators caution us not to expect a savior on a white horse in the form of El Niño to end the severe drought conditions. El Niño is only one factor that can affect western U.S. winter climate.

Connie: Anything else to add in light of your Tyndall Award and its significance?

Kelly: I am very much honored and surprised by this. It's an excellent fit to my interests. Tyndall worked on three main facets: the physics of radiative transfer in the atmosphere (CO₂ effect), he was a lifelong accomplished mountaineer and has a peak named after him in the Sierra Nevada, and most importantly he felt a duty to translate science to the citizenry and took this responsibility very seriously. This award gives me motivation to expand my thinking on several fronts, and the talk will be something of an experiment.



Kelly atop Hardscramble Peak looking northwest. Bridger Mountains, Montana. Photo: Patrick Redmond.

Studies in Granite

Moonlight on Kearsarge Pinnacles, Adrienne Marshall



Half Dome, Yosemite National Park, Kelly Redmond



Second Lake, The Palisades, Sierra Nevada, CA, Jeff Wynneken



Study in Granite, Wally Woolfenden



