Richard Armstrong – Scientist, husband, father, grandfather, skier, cyclist, extraordinary human.

By Kelly Elder

In early August, Richard Armstrong passed quietly and peacefully from ALS at home in Boulder, Colorado. The avalanche world and cryospheric sciences lost a humble icon.

Richard was born and raised in Casper, Wyoming. This part of Wyoming has never been famous for steep slopes and great snow, better known for wind crust and wind chill. In spite of this geographic reality, Richard was a four-event skier (slalom, giant slalom, jumping, and cross country), won a state high school championship, and competed in Junior Nationals in the late 1950s. Skiing remained an important part of his life as he competed in classic cross-country and skate events until recently. He was also an accomplished road and mountain biker, still touring the mountain passes of Colorado and Europe in his eighties with his wife, Betsy.

Richard left Wyoming for Boulder, Colorado and the University of Colorado where he earned three degrees in three different decades. When he finished his BA he took a job collecting meteorological data, which he loved, on Niwot Ridge. This experience led him to re-evaluate his career path. Richard began graduate school in glaciology with Jack Ives and Ed LaChapelle, ultimately spending six summers and contributing to the ongoing Blue Glacier Project in Washington State. During this time, Ives and LaChapelle wrote a proposal to study avalanches in the San Juans. In 1972, Richard was offered a job as the director of the Institute of Arctic & Alpine Research (INSTAAR) San Juan Avalanche Project by INSTAAR Director Jack Ives from CU Boulder, with Ed LaChapelle as chief consultant from the University of Washington. Richard worked with Ed, Rod Newcomb, Don Alford, Don Bachman, Betsy Armstrong, Jerry Roberts, Tim Lane, and several others on what has been described ever since as the ultimate avalanche field project.

In Silverton, Richard completed fundamental research that was foundational in our understanding of kinetic snowpack processes and the Rocky Mountain snow climate. Silverton was the birthplace of modern US avalanche education with the *Silverton Avalanche School*, and the project inspired Newcomb’s *American Avalanche Institute* as a fortuitous byproduct of hard work, great minds, and new insights into basic and complex avalanche phenomenon. For almost a decade Richard lived a life we all dream of, spending winters skiing in Silverton conducting snow and avalanche research and summers on ice and rock in Washington conducting glacier research. Richard met Betsy Rosen in Seattle and they became a formidable team, soon affectionately known as Dick and Betsy Avalanche.

Following the Silverton research, Richard and Betsy worked as researchers/forecasters for the Avalanche Project at the USFS Rocky Mountain Research Station. The project produced another significant push in basic and applied research in avalanches, again with a strong team including Richard and Betsy, Pete Martinelli, Art Judson, RA Schmidt, Richard Sommerfeld, and Knox Williams. Ron Perla and Hans Gubler were notable visiting scientists in the landmark avalanche think tank. An unfortunate administrative decision deemed avalanche science a “mature field,” meaning that no more research was needed and the project was dissolved.

Richard moved to the University of Colorado and the National Snow and Ice Data Center (NSIDC). At this point he had completed enough research for many PhDs. Betsy coerced him into putting some of it together and jumping through the hoops to get his doctorate. I had the good fortune of sitting in on his defense and it was like none other I have ever attended. It was a friendly discussion with his committee; they were really learning from Richard, rather than testing him. His thesis is one of the few I still have on my shelf and the only one I still open.

While at NSIDC and CIRES (Cooperative Institute for Research in Environmental Sciences), Richard turned his research towards remote sensing of the cryosphere. With a strong background in field research and snow processes, he was a gift to the field, which then was dominated by electrical engineers. He worked on a wide variety of relevant topics which included passive microwave satellite remote sensing of snow, ice, and frozen ground, quantifying climate change using fluctuations of seasonal snowpacks and glaciers, and validation and cross-calibration of satellite sensor time series data to assure accurate, defensible climate change detection. Ending his research career on a fine note, one of Richard’s favorite projects involved assessments of the individual contribution of melting seasonal snow and glacier ice to the water resources of high mountain basins. CHARIS (Contribution of High Asia Runoff from Ice and Snow) looked at glacier and snowmelt in the Himalaya-Hindu-Kush, Pamir, and Tien Shan Ranges (the Third Pole), which provide water to over one billion people (<http://nsidc.org/charis>). This project was typical of Richard as it was multi-scale, far reaching, innovative, and inclusive, and had a societal impact.

Richard was an outstanding scientist. He had the ability to look at problems in a multidimensional, multiscale, integrative way. He was fascinated with snow and made valuable contributions at multiple scales: metamorphic processes at the micro scale, linking snow structure to avalanche release at the slope scale, quantifying the contribution of snowmelt to seasonal runoff at the basin and regional scale, and linking polar snow and ice cover to climate change at the global scale. Richard’s science was effusive, with a steady flow over decades, permeating many facets of cryospheric research and chances are good that you have some of his knowledge in your quiver. He mentored students and colleagues of all ages. I know a half dozen accomplished scientists who say Richard changed their course in a positive, significant way. Science and academia everywhere would be a heathier, more welcoming, and more productive environment if more people emulated mentors like Richard.

Perhaps most important, Richard was a great human being. I never met another scientist less interested in drama. People that met or worked with Richard enjoyed a positive, peaceful experience. Interacting with Richard was always a learning experience, yet he never lectured. He made everyone feel welcome and included everyone as a valuable contributor. He was not a self-promoter, it wasn’t in his nature, and his science spoke for itself. He was a gracious and skillful scientist, and a graceful human, colleague, and friend.

Kelly Elder with help from Betsy Armstrong

 

