

## 2012 MEDALS & AWARDS

### GEORGE P. WOOLLARD AWARD

Presented to  
**Robert B. Smith**



Robert B. Smith  
*University of Utah*

#### *Citation by G. Randy Keller*

It is a distinct honor and pleasure to give the citation for the presentation of the George P. Woollard Award to Professor Robert B. Smith of the University of Utah. I have known him for 40 years and have followed his research activities for many years because he is always pursuing something that is innovative, interesting, and involves employing geophysical techniques to address geological problems. Through his scholarly activities, he has long been a highly respected researcher, teacher, mentor, and member of the scientific community.

Bob's research career began when he was fresh out of high school and worked as a science technician in Yellowstone in 1956 and was sparked to go into geophysics by experiencing the 1959 M7.5 Hebgen Lake earthquake. He has conducted seismic and geophysical research globally, first serving as the U.S. Exchange Scientist with the British Antarctic Survey followed by conducting geophysical surveys throughout Europe, a career of collaborative university teaching and research focusing on studies of geophysics and geology of active extensional tectonic regimes, geodynamics of the Yellowstone hotspot and advocating integrated research on earthquake and volcano hazards for the emergency management agencies and the public on the Yellowstone-Wasatch-Teton area. Bob has always advocated and practiced collaborative and integrated research in

geophysics and geology as the best means to solve earth's complex geologic puzzles.

Bob has conducted research on Yellowstone earthquakes and volcanoes since 1956 and is considered a leading expert on Yellowstone earthquakes, deformation and tectonics. Bob serves as the Principal Investigator and Director of the Yellowstone Seismograph and GPS Network and as the Coordinating Scientist of the Yellowstone Volcano Observatory. He provided the guidance and incentive of instrumenting Yellowstone with modern seismic and GPS instruments beginning in 1987 and planning and permitting the Yellowstone seismic and PBO magmatic GPS network.

Bob taught 44 years at the University of Utah, Department of Geology and Geophysics and Computer Science, including teaching more than 50 undergraduate and graduate courses in geophysics, geology and computer science. He has also advised 68 graduate students.

Bob directed the University of Utah Seismograph network bringing the initial use of digital recording and data processing and then densifying and expanding the seismic network throughout the Wasatch Front and Yellowstone. He first recognized and named the Intermountain Seismic Belt as the coherent zone of earthquakes bounding the active Basin-Range to the west and the relatively stable Rocky Mountains and Colorado Plateau on the east. Moreover he produced the first earthquake catalogs of the Intermountain Region and conducted one of the earliest studies of focal mechanisms in the Basin-Range that demonstrated the dominant E-W extensional in this intraplate tectonic regime. He led the first effort to employ GPS to evaluate the contemporary deformation regime of the Wasatch fault and Yellowstone. These efforts demonstrate his philosophy of the integration of seismic and GPS data with geologic information to more fully and quantitatively understand the contemporary nature of active tectonism in intraplate settings.

Bob was a leader in the formation of the Incorporated Research Institutions in Seismology (IRIS), UNAVCO, and EarthScope further demonstrating his broad integrative interests in employing modern seismic and GPS methods for understanding lithospheric structure and evolution as well as active earthquake and volcano systems. This further demonstrates his commitment to collaborative collegial research between various earth science international disciplines.

In addition, Bob has served on multiple national science panels such as at the founding of the Southern California Earthquake Advisory Committee, and served on such national advisory functions as the Yucca Mountain seismic safety panel, seismic safety panels on the Idaho National Laboratory, the USGS Seismic Earthquake Studies Panel, and multiple NSF earth science advisory committees. He frequently is invited to provide his views on the development of earth science and general science before Congress for the coalition on National Science Funding.

Importantly Bob has developed strong collaborative ties with international institutions such as serving as a Visiting Professor in multiple terms at the Swiss Federal Institute of Technology and at Cambridge University and as the President of the Seismology Section of the American Geophysical Union where he promoted international cooperation in geoscience.

Several universities and societies have honored Bob, most recently in 2011 by receiving U.S. Department of Interior's and USGS highest award, the prestigious John Wesley Powell Award and Medal.

He publishes regularly in our leading international journals, including highly cited papers in *GEOLOGY*, *GSA Today*, the *GSA Bulletin*, and a *GSA Memoir*. His publications include important contributions in several areas that have been the focus of his research for a number of years. Specifically, I see most of his contributions as falling into four main areas: 1) seismic studies of the structure of the lithosphere using the integration of a broad range of geological and geophysical data; 2) developing new applications and techniques for the processing, analysis and applications of a broad range of seismic and GPS data; 3) integrated studies of earthquake and volcanic hazards, and 4) studies of earthquake phenomena and contemporary deformation with GPS data. Based on this foundation, he has been consistently innovative technically, thorough, and opportunistic in his research activities.

Bob was a consultant and was featured as the geophysicist in the BBC production "Supervolcano", and has been a participant in many other Yellowstone documentaries. The most recent was the 2012 Nova documentary, "World's Deadliest Volcanoes."

In summary, I have been active in GSA's Geophysics Division for many years, and I honestly cannot think of anyone who is more deserving of this award. During his time in the Air Force, he even worked personally

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with Professor Woollard calibrating gravity meters, establishing the North American gravity base station network, and interpreting gravity data for this region. Thus, what could be more fitting than Prof. Robert B. Smith receiving this prestigious award named for Professor Woollard.

### *Response by Robert B. Smith*

Thank you Randy and to Larry Braile for the thoughtful remarks in my citation. They are sincerely appreciated.

First, I am grateful to the GSA Geophysics Division for the George P. Woollard Award. It means a great deal to me to be honored for my career in geophysics and geology especially for my productive association with many colleagues of the Society. The award is also special as I have been a GSA member for 50 years, a period in which I was able to investigate timely geologic problems with geophysics such as understanding the role of earthquakes and volcanoes in Yellowstone, hotspots and plumes, lithospheric tectonic processes, especially in the Interior West. Also I am fortunate to be amongst the previous honored recipients of the Woollard Award as I have known and worked with most of them, including Randy Keller, and the first Woollard Award recipient, George Thompson have been close colleagues throughout my career.

The George P. Woollard Award is also special to me because I had the opportunity to work personally with Dr. Woollard at the University of Wisconsin in the early 60s where I was working in the Air Force in developing global gravity surveys.

It was with Dr. Woollard's encouragement that I became involved in Antarctic research and exploration where I later served as the U.S. Exchange Scientist to the British Antarctic Survey in 1962-63 under Secretary Dean Rusk. This expedition was an extraordinary adventure for me, first to survive and secondly to conduct geophysical surveys in very remote places never before explored.

As Randy mentioned, my early career was shaped by experiencing first-hand the deadly M7.3 1959 Hebgen Lake Montana earthquake. Honestly it was this geologic event that turned me toward a career in earth science for which I have been richly rewarded.

Throughout my career I have endeavored to integrate geophysics and geology in basic earth science problems. This was accomplished through collaborative efforts of my many students, Post Docs and colleagues

to whom I owe a great debt of gratitude. There are too many to name them all, but some include: Ralph Archuleta, Harley Benz, Larry Braile, Ron Bruhn, Bob Christiansen, Wu-Lung Chang, Diane Dozer, Jamie Farrell, Thomas Hanks, David Hill, Gene Humphreys, Stephan Husen, James Jackson, Michael Jordan, Tom Jordan, Randy Keller, Geoff King, Edi Kissling, Emile Klingele, Tony Lowry, Fred Massin, Chuck Meertens, Rick O'Connell, Tom Owens, Christine Puskas, Lee Siegel, Taka'aki Taira, Greg Waite and Colin Zelt.

With these colleagues my academic career spanned the globe. I appreciate the support I received at the Swiss Federal Institute of Technology where Stephan Muller encouraged me in our common interests of lithospheric seismic investigations. This led to the joint 1978-80 U.S., European Yellowstone-Snake River Plain crustal seismic experiments, a project that brought students and scientists from U.S. and European universities together forming lasting scientific collaborations.

Another important milestone of my career was when Larry Braile and I proposed to NSF to acquire portable seismographs for seismic sounding. However, NSF said it would be better for us to form a community group to develop a pool of shared instruments. This led to the formation of the PASSCAL IRIS facility that paralleled the formation of the Global Seismic Network for which we naturally joined together to form the very successful IRIS organization including now the USARRAY.

Then in the 80s came the development of space-based earth science by making contemporary crustal deformation measurements using GPS and InSAR. These tools have been applied very productively to understand active tectonics and volcanic processes of the U.S. Again as a science community of GPS users we went to NSF for support of a facility that established UNAVCO and the Plate Boundary Observatory where I served as an original member of the UNAVCO executive committee.

A memorable aspect in my career was a discussion with an NSF program director on forming an integrated earth science group working on active tectonics and continental evolution. In a presentation by Tom Jordan and I, we noted the unique property of North American geology, namely that it contained all of the elements of plate tectonics: subduction, transform faulting, extension and a hotspot. Moreover it was "accessible by land" and was a "natural geology laboratory". What we outlined was incorporated into the

EarthScope program, an integrative geology and geophysics organization that provides a better understanding of the evolution and composition of the North America continent. I was honored to be the first chairperson of the EarthScope Science and Education Committee.

But we still wanted to know much more about earthquakes. Again I was privileged to work with scientists like K. Aki in participating with he and others to form the Southern California Earthquake Center and where I have worked closely for many years with Tom Jordan and Ralph Archuleta.

Throughout my endeavors, I particularly want to note that the career-long support by the University of Utah including my colleagues Frank Brown, Kip Solomon, Keith Koper, Relu Burlacu and Dave Drobeck has been greatly appreciative. I am very grateful to the university for encouragement of my academic efforts and providing resources for seeding my research ideas.

Finally, I sincerely thank my wife Jan and my family for their remarkable support and patience in accompanying me tirelessly working around the globe. They have endured my lectures and learned quite a bit of earth science on the way.

And most importantly my career has been and continues to be FUN and exhilarating. I anticipate another 56 years of science and collaboration with you, my colleagues.

Thank you