Event:

## 12th Annual Kruse Lecture

7:00 PM, Thursday, April 21, 2016
Nierman Building, Room 251

Lecture Title:

## The Origin of the North American Cordillera and Other Mountain Belts

Lecture Abstract:

The origin of mountain belts has been a puzzle for a long time. Some of the first geological study started with the observation of marine fossils high in the Alps of Europe. How did they get there? A big step in our understanding came with the theories of continental drift and plate tectonics. Most mountains were understood to be formed by continental collision. The type example was the collision of India with Asia that has produced the high Himalayas and Tibet. The collision-thickened crust floats higher like an iceberg with a deep root or keel. Ancient eroded mountain belts in the geological record are usually interpreted this way. However, we may have been too quick to assume that this model applies globally. It fits neither the North nor the South America Cordillera mountain belts. The North America Cordillera has had no recent collision and new data show clearly that the crust is not thickened, it is actually uniformly thin compared to the rest of the continent. We now have an answer to this new puzzle. The Cordillera is high because of thermal expansion. The crust and upper mantle are especially hot compared to the rest of the continent. The recognition of high temperatures allows us to understand a number of other geological observations, including why the Cordillera is continually deforming, is tectonically active, compared to the stable rest of the continent and why most earthquakes occur in the Cordillera. Because it is hot, the Cordillera crust is weak and can be deformed by continually changing plate boundary forces along the Pacific coast margin. Also, we can understand why most volcanic activity is restricted to the Cordillera. The Cordillera deep crust and upper mantle are at high temperatures close to the rock melting.

Lecturer Bio:

**Dr. Roy Hyndman** is an Emeritus Research Scientist at the Pacific Geoscience Centre, Geological Survey of Canada, and Adjunct Professor at the School of Earth and Ocean Sciences, University of Victoria. He came to the Pacific Geoscience Centre at its inception, after 10 years on the faculty of Dalhousie University. He is a former Director of the Centre. He has published over 250 scientific journal and volume articles on a wide range of marine and land geoscience research. He has been involved in numerous international collaborative programs, and has participated and organized research cruises in the Atlantic, Pacific, Indian and Arctic oceans, including four legs of ODP/DSDP, one as co-chief scientist. Advisory committees include: chairman of the Advisory Board of SAFOD (San Andreas Fault Drilling, U.S. EarthScope program); chairman Canadian LITHOPROBE Scientific Committee, member of several ODP Committees. including: chairman Downhole Meas. Committee; chairman ODP/OD21 Seismogenic Zone Drilling (SEIZE) committee for riser drilling; NSF review committee of ODP; Canadian National

Committee for IODP), member Academy of Sciences committee, Royal Society of Canada, member of several NSERC Grant Selection Committees, incl. Collaborative Research Initiatives (large NSERC grants); Canadian Council of Academies, Committee Review on Canadian Ocean Science Research Priorities. He has been a member of review committees for several university departments. He has been an Associate Editor of J. Geophys. Res. and several other scientific journals. He has supervised some 20 PhD and MSc graduate students and 5 postdoctorate research fellows. He is a Fellow of the Royal Society of Canada, a Fellow of the American Geophysical Union, an Honorary member of the Canadian Society of Exploration Geophysicists, and a recipient of the J. Tuzo Wilson medal for contributions to geophysics in Canada. He is former President of the Canadian Geophysical Union.

Kruse Bio:

**Olan Kruse** was born in Coupland Texas on September 6, 1921. He received his Bachelor of Science degree in Physics in 1942 from Texas A&I University. He served in the Navy during World War II, teaching sailors how to use the newly developed technology, radar. Dr. Kruse returned to South Texas after the war, teaching math while carrying out his graduate work in Physics at the University of Texas at Austin. He received his Ph.D. from UT in 1951.

After a short stay at Stephen F. Austin University, he again returned to Texas A&I University, this time as chair of the Physics Department. One of his first tasks was to design a new building for the department, the Lon C. Hill Physics Building, where the department is still located. Under his leadership, the physics program offered both undergraduate and graduate degrees, hosted an annual Physics Exhibits display, and offered a series of Summer Physics Institutes.

Dr. Kruse helped shape the University that exists today as Texas A&M University-Kingsville. He chaired the committee that created the Faculty Senate, was its first president and served in that assembly for every term that he was eligible. He chaired the Physics Department until 1987, and continued to teach at the university until 2000. He was awarded Professor Emeritus rank in 1994. Along with his wife, Lucy, he established the Olan Kruse Science Faculty Award, which recognizes outstanding accomplishments in the sciences within the College of Arts and Sciences.

**The Olan Kruse Lecture Series Endowment Fund** was established in 2003 for the purpose of bringing distinguished physicists to Texas A&M University-Kingsville to make presentations to the students and faculty on current events in physics and astronomy. It is supported by private contributions. For more information on the endowment, please contact the Physics Program at 593-3310.

**Previous Distinguished Speakers**

Dr. Wolfgang Rindler
Dr. Richard Tesarek
Dr. Edward L. (Ned) Wright
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Dr. Mario C. Diaz
Dr. Lev Titarchuk
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