Professor Robert Jay Pulliam, W.M. Keck Foundation Professor of Geophysics at Baylor University in the United States, and visiting IIT(ISM) as Fulbright-Nehru Distinguish Chair Professor, began developing the theory and numerical modeling software for seismic tomography during his PhD research at UC Berkeley in 1986. After obtaining his PhD in 1991, Prof. Pulliam worked as a postdoc in Berkeley's Statistics Department to develop approaches to assess uncertainties in seismic inversion. Then, he moved to the Department of Theoretical Geophysics, Utrecht University (Netherlands) to develop a practical approach to nonlinear tomography, and then as a research scientist at the Institute for Geophysics, The University of Texas at Austin on a broad array of data acquisition and modeling projects, including the joint inversion of multiple types of geophysical data via local and global optimization. Since 2008 he has been a member of the Geoscience Faculty at Baylor University, where his externally funded projects include large-scale broadband deployments in New Mexico, Texas, the Dominican Republic, and the state of Nevada. Then he used these data in developing various innovative techniques in tomographic inversions as well as joint inversion.

Since 1991 he has submitted, as Principal Investigator or Co-Investigator, 87 research proposals for a total funding request of 49 million dollars. Of these proposals, 42 were funded for a total of 20 million dollars. Awards were made by the U.S. federal government (National Science Foundation plus the U.S. Departments of Energy (National Nuclear Security Agency and National Energy Technology Laboratory), Defense (Air Force Research Laboratory, Defense Threat Reduction Agency, and Defense Special Weapons Agency) and numerous State, private and professional societies.

He has been awarded with several awards which includes US-Dept of state Fulbright-Nehru Distinguish Chair Fellowship in 2019, Baylor's Centennial Professor Award for years 2009-10 and 2015-16 etc. He has given more than 70 invited talks at major national as well as international platforms.

Comparing and Contrasting the Gulf of Mexico & the Bay of Bengal, with Potential Topics for US-India Research Collaborations

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The Gulf of Mexico (GoM) and Bay of Bengal (BoB) passive margins are the sites of our planet's largest accumulations of sediments. These sediments form deep blankets that, among other things, harbor vast reserves of hydrocarbons, create fertile soils, and produce flat terrains that millions of people call home. They also obscure the structure and composition of the crust and mantle beneath the sediments, so that, even now, their geological histories, compositions, and tectonic processes are poorly understood.

There are several reasons to study lithospheric structure and composition in efforts to infer the tectonic processes that created passive margins. First, they are the locales of continent-ocean transitions, so our understanding of plate tectonics requires that we understand the nature of and controls on this transition. Second, understanding details of the margin's structure is critical to accurate reconstructions, which is a major pursuit in both industry and academia. Third, "Wilson cycles" (the opening and closing of ocean basins and formation of supercontinents) require that continents rupture repeatedly and these ruptures (rifts) tend to occur on pre-existing zones of weakness. Understanding previous rifted margins throughout the cycle is crucial to understanding the entire cycle. Lastly, passive margins are likely to be the locales where future subduction is initiated.

The GoM and BoB share the attractive quality that more of the continent-ocean transition occurs on dry land than for most passive margins, so geophysical studies can be more extensive, complex, and of longer duration. The USA just completed a 15-year seismic reconnaissance of the North American continent in which research-quality seismographic stations were deployed across the country with a nominal spacing of 70 km. This project, called EarthScope/USArray, was a particular boon for studies of the GoM's passive margin, where such data had never been acquired on this scale.

I will describe results by students from my research group and other studies in an effort to summarize important discoveries about the GoM passive margin, distill lessons learned during the USArray project that could inform more targeted studies of the Bay of Bengal margin, and highlight opportunities for collaborations between Indian and US scientists.