

## **Karl Fuchs (1932–2021)**

Prof. Dr Karl Fuchs was a world-leading geophysicist and geophysicist. During his extensive career he contributed to the present understanding of the lithosphere using seismology and tectonic stress field analysis. He initiated many international and interdisciplinary research programmes, served on international boards and published some 100 peer-reviewed papers.

Fuchs was born on 21 January 1932 in Stettin, now Szczecin, Poland. After the Second World War his family fled to Germany where he went to school near Hamburg. He studied geophysics in Hamburg, London and Clausthal, where in 1957 he finished his studies and married his wife Cornelia (known to many as Corry). Fuchs accepted a position in the oil exploration industry and worked for Prakla Seismos GmbH (Hannover) as leader of geophysical field crews in the Amazon Basin in Brazil and the Sahara Desert in Algeria. Two years later he returned to Clausthal to pursue a PhD. Fuchs planned and organized long-range seismic refraction campaigns in Central Europe to explore the crust and uppermost mantle. He carefully analyzed the seismic records and also started theoretical work on wave propagation. In 1963 he completed his dissertation on “Investigations on the wave propagation in wedged media” – a starting point for the famous reflectivity method to calculate synthetic seismograms. Afterwards he held postdoc positions in Clausthal, Saint Louis and Dallas.

In 1965 Prof. Stephan Mueller offered him a position in the newly founded Geophysical Institute at the University of Karlsruhe. Fuchs accepted and started in October 1965. He would stay in Karlsruhe for the rest of his life. Initially, Fuchs was responsible for applied geophysics and worked on deep seismic sounding and numerical wave propagation. He submitted his habilitation thesis on “The reflexion of spherical waves at inhomogeneous transition zones with arbitrary depth distribution of the elastic moduli and the density” in 1968 and became a member of the faculty. After Mueller moved to ETH Zürich, Karl Fuchs accepted the chair of General Geophysics in Karlsruhe in 1971, while he also had another offer from Berlin. After his retirement he played an active role in advising the newly established Collaborative Research Centre 416 on Strong Earthquakes and worked on historical events such as the 1755 Lisbon earthquake. He continued to visit US institutions such as Stanford University and the US Geological Survey and attended most institute seminars until the Covid-19 pandemic stopped the physical presence of participants last year.

His main achievement in theoretical geophysics was the establishment of the reflectivity method to compute synthetic seismograms partly in collaboration with Gerhard Müller. He implemented a computer code on the first mainframes and was able to compute full seismograms in layered media representing the lithosphere. In this way he consistently combined his theoretical and computational work with the application to deep seismic sounding. From the 1960s–80s he thereby became a leader in studying lithospheric structures and the upper mantle. He also went a step further and started petrophysical

interpretations of seismic models. He initiated numerous field measurements for long-range seismic profiles in international collaboration and fostered interdisciplinary cross-national partnerships.

One focus was on continental rift systems: Karlsruhe is situated in the Upper Rhine Graben, where the first studies started in the late 1960. Later the Dead Sea region and the Kenya Rift were investigated with international partners. In the 1980s and 1990s his focus shifted to understanding the stress field of the lithosphere (World Stress Map) and earthquake hazard projects. He started and led the successful Collaborative Research Centre “Stress and Stress Release in the Lithosphere” in Karlsruhe and became president of the International Lithosphere Program (ILP). After the cold war Karl Fuchs initiated joint research projects for eastern and western countries under the umbrella of the EUROPROBE programme of the European Science Foundation.

Fuchs was co-editor of the *Journal of Geophysics*, president and honorary member of the German Geophysical Society, president of ILP, vice president of the European Union of Geosciences, fellow of the American Geophysical Union, American Association for the Advancement of Science, and the Geological Society of London, honorary fellow of the Royal Astronomical Society, member of Academia Europaea, professor honoris causa of the University of Bucharest, member of the Heidelberg Academy of Science and vice-chairman of EUROPROBE. In 2002 he received the prestigious Karl-Heinrich-Heitfeld Prize of the German GeoUnion Alfred-Wegener-Stiftung.

In Karlsruhe Fuchs was a very committed mentor for his employees and PhD students; many of them are now also professors or in leading industry positions. Karl Fuchs passed away on 22 March 2021 after a short illness.

Joachim Ritter & Friedemann Wenzel, KIT-GPI, summer 2021



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