

Obituary of Prof. Boris Kashtan



Boris Kashtan (1941-2020)

On July 26th, 2020, our valued colleague, supervisor, mentor, teacher, and friend, Prof. Boris Markovich Kashtan, passed away. He was the head of the laboratory of elastic media dynamics of St. Petersburg University, Russia. The laboratory was founded in 1955 by Boris' teacher, the legendary Soviet and Russian mathematician G. I. Petrashen. He was fundamental in forming the scientific attitude and approach of Prof. Kashtan. Boris kept a portrait of Petrashen on a shelf over his desk at home with great respect and gratitude. After receiving a diploma in theoretical physics from Leningrad University, Boris performed studies under the supervision of Petrashen and received his PhD in 1981 followed by

his habilitation in 1987. From 1988 Prof. Kashtan led the laboratory of elastic media dynamics.

Boris continued traditions laid down by his teacher and created a scientific school of seismic wave propagation in anisotropic and complex media. He supervised a large number of bachelor, master and doctoral theses and, together with his co-workers and students, he published monographs as well as many articles in top rank scientific journals. Prof. Kashtan repeatedly presented at Russian and international conferences. He lectured with great success at the UC Berkeley, the University of Hamburg, Technical University Berlin, University of Munich, and the University of Helsinki.

Boris' scientific interest span a broad fan of topics, like ray tracing in piecewise constant anisotropic media, inhomogeneous plane waves in the vicinity of an interface in anisotropic media, dynamic ray tracing in anisotropic media using wavefront orthonormal coordinates, reflection phenomena in anisotropic media, true amplitude migration in anisotropic media, tube waves interaction between wells connected by fractures, among many other topics related to elastic wave phenomena often solved by high frequency asymptotics. Obviously, anisotropic medium and its wave phenomena were of particular interest to him.

For all his life Prof. Kashtan had a strong link to Germany even prior to the fall of the iron curtain in 1989. He liked to tell the story, that he owned the first Audi in the

whole Leningrad, which he bought on one of his trips to Germany importing it with some struggles to the USSR at that time. He kept long standing cooperation first with Technical University Berlin and for almost 3 decades with the University of Hamburg, sharing his passion for high frequency asymptotics to investigate seismic wave modeling, wave propagation in anisotropic media, and for other wave phenomena, like diffractions or tube waves.

G. I. Petrashen used to claim "solve all the possible problems by yourself from scratch, and it will turn out at some day that you will have solved a new one". If Boris entered a research topic, he always started from first principles, like 1-D media, and derived everything by himself on paper. This led to a fundamental understanding in wave propagation phenomena and it was always a pleasure to discuss with Boris and to take profit from his deep knowledge in wave propagation. This approach was also exposed to his students and co-workers and led to a large number of very talented graduates with excellent skills in using mathematical methods to solve fundamental problems in applied seismics and seismology.

Boris' ego never prevented him from offering solutions that may work or may fail. He was open to mistakes but never afraid to try things out and his advice was often most far-sighted. Boris often displayed less than he knows, so when he might say let us try maybe this - you could be assured it was not a random thought that first came to his mind, but something already seeing ahead of its time.

Prof. Kashtan was an outstanding theoretician but well aware of the complexity of field data processing. Despite the fact that he developed techniques for seismic data processing, imaging and inversion, he never was a "data person". The field data work he liked to expose to his students and made fun of them by ironically claiming "to have a successful academic career one should never touch real data". This is also an account of Boris' very much appreciated sense of humor which he liked to inflict not only on his students.

Nevertheless, he was appreciative and attentive of real-world problems most deeply understanding the complexity and our limited knowledge of the real world. Prof. Kashtan was not a "hedgehog" type academic that teaches birds to fly. He was the true "fox" appreciating that practical geophysicists need to deal with myriad details that may be beyond any of the theories. He liked to listen and asked unexpected questions even about experimental things far away from his official expertise. Such freedom of thought combined with a deep knowledge of the theoretical background allowed Boris to fruitfully supervise diverse industry-driven collaborations including St. Petersburg Shell Cluster and later with Saudi Aramco.

Prof. Kashtan was passionate working with students, being their supervisor, mentor and teacher. He was an amazingly unassuming person especially for an academic,

always approachable and willing to help. He generously devoted his time and one could call him or come to his office anytime to discuss a scientific or a personal question. If a problem turned out to be particularly complex, he did not stop until complete resolution was achieved. In his lectures, he followed his approach to science starting from simple examples and first principles providing analytical inside to lay out the foundation for the solution of more complex problems. He tried to get to the core of the problem and, in an attempt to sensitize his students to achieve valuable conclusions of their work, he posed questions like “what is the takeaway message” or what is the physics “in the dry residual”.

Boris' legacy will be continued by his graduates, who are spread all over the world in leading research institutes and geophysical companies. His numerous friends will retain a shining memory of him as a scientist and person. Till his end, Boris kept interest in research and teaching making lots of plans, writing proposals and planning trips. Two days prior to his death, Boris enthusiastically participated in a seminar with his students spreading his love for wave phenomena.

Dirk Gajewski, Pavel Znak, Vladimir Troyan, Andrey Bakulin, Evgeny Landa for a large group of colleagues, graduates and students