Anyone who has been or will be fortunate to discover and understand the contributions made by Sergei Khristianovich to science and engineering should recognize that they will have worldwide significance long into the future. He conducted groundbreaking research in mechanics, mathematics, hydrology, energy science, metrology, and environmental science. Yet, he regarded himself as an engineer first. Indeed, he achieved seminal results in all practical fields of his work. They relate to aerospace technology; nuclear arms design and testing; application of the theories of plasticity and filtration to mining and coal, oil, and gas extraction and transportation; water management; inundation protection; efficient power generation; physical or mathematical modeling of natural, geophysical, and atmospheric phenomena; refinement of metrological practices in science and engineering; and production quality assurance.

More than once he voluntarily shouldered responsibility for implementing projects, producing recommendations, or making decisions at the level of the nation. He generously supplied his students and followers with revolutionary conceptions and insights while supporting other people’s promising brainchildren. At the same time, he was extremely punctilious in matters of authorship and considered it inappropriate for his name to be included in the list of authors of a paper whenever he regarded his contribution as not being of major importance.

Furthermore, he was a notable constructor in the literal sense of the word. In addition to mathematical models, he constructed laboratories, research institutes, and science centers of the highest order. He was influential in developing the Fiztekh model of teaching at the Moscow Institute of Physics and Technology, a world-famous educational institution. A brilliant educator and mentor, he was adept at identifying talented students, offering them upon graduation leading positions in organizations dealing with mechanics science or its applications.

Sergei Alekseevich Khristianovich was born on November 9 (October 27 OS), 1908, into a landed-aristocrat family who resided on their estate near the railroad station of Naryshkino in Orel province. His father, Aleksei Nikolaevich Khristianovich, and his grandfather were lawyers. His mother, Aleksandra Nikolaevna, devoted almost all her time to raising her daughter Kseniya and son Sergei. The children received private instruction in Russian grammar, arithmetic, and foreign languages—French and German—on their estate and later in Orel, where the family moved in 1918.

During the Russian Civil War, the Khristianovich family fled south alongside Denkin’s White Volunteer Army to arrive in Rostov-on-Don, the southern center of the White movement. In 1920, the Red Army captured the city, and the same year Sergei’s parents and elder sister died of typhus. Malnourished and poorly clad, the boy had had to rely on himself for two years, earning his living from casual jobs such as selling watermelons or tobacco. Fortunately, he met David Ivanovich Ilovaisky, who had been acquainted with his parents and who gave him refuge and unstinting support. Ilovaisky was a prominent painter from a wealthy background, who taught at Rostov University. It is likely he was the one who advised Sergei to enter the water-transportation college in 1922. Soon afterward,
Sergei was found by his maternal aunt, Mariya Nikolaevna Bek, who lived in Petrograd. While he was staying at her home on vacation, he contracted malaria, and she decided it was better for him to remain with her family. He started school from the 5th grade when he was 15 but managed to finish the curriculum in the spring of 1925.

Sergei decided to enroll at Leningrad University. As a person of noble birth, he had to obtain special permission for entering higher education, a normal practice of those days. Sergei overcame this hurdle with the assistance of Ilovaiskii (who was a professor of the Moscow Mining Academy at the time) and passed the entrance examinations to become a student in the Department of Mathematics at the Faculty of Physics and Mathematics of the university. In this way, he joined a dazzling array of mathematical talent, including both the professors (V.I. Smirnov, N.M. Gyunter, N.E. Kochin, and G.M. Fikhtengol’ts) and the students (S.L. Sobolev, V.A. Ambartsumyan, L.V. Kantorovich, and S.G. Mikhlin).

He won many lifelong friends during his time at the university. Among them were I.N. Vekua, a future full member of the USSR Academy of Sciences, and Boris Davison, who became a noted British physicist and a fellow of the Royal Society after he was forced to leave the Soviet Union in 1937 because of his British background. On graduation, Khristianovich and Davison were placed with the State Hydrological Institute. The newly assembled team of very capable mathematicians and engineers was charged with the vital tasks of compiling a water cadastre and conducting research into river discharge, groundwater conditions, and inundation hazard. Khristianovich remained interested in this field throughout his wide-ranging career as a scientist.

The main results of his work at the State Hydrological Institute were an advanced version of the method of characteristics that enabled him to develop a technique to calculate nonstationary flows in canals and rivers. The former tool, together with his theorems in the general theory of quasi-linear hyperbolic differential equations, proved very useful in his subsequent theoretical studies of supersonic flows and plasticity, which were continued by his students and followers. In 1936, he wrote the article “A Plane Problem in the Mathematical Theory of Plasticity with External Forces Specified on a Closed Contour,” which was appreciated by leading mathematicians including Jacques Salomon Hadamard. Khristianovich knew him personally and placed a high value on his judgment and advice. Khristianovich’s investigations at the institute were reported in the 1938 monograph *New Topics in Continuum Mechanics*, which he coauthored with S.G. Mikhlin and Davison.

Significantly, Khristianovich was awarded a doctoral degree in Physics and Mathematics and a doctoral degree in Engineering on finishing his postgraduate studies in 1937. He was elected a corresponding member of the USSR Academy of Sciences in January 1939, when he was with the Steklov Mathematical Institute. From May 1939 to October 1940, he carried out a series of studies in filtration theory at the Academy’s Institute of Mechanics headed by Academician B.G. Galerkin. They were summarized in the 1940 work “The Movement of Groundwaters That Violate Darcy’s Law.” His method of solving filtration equations was way ahead of its time; it earned him recognition by specialists worldwide many years later when a pressing need arose for more efficient technologies of viscoplastic or gasified petroleum extraction.

Unfortunately, the Institute of Mechanics lacked material resources for in-depth experimental research, and Khristianovich’s efforts to change things for the better were to no avail. Consequently, he accepted the full-time position of head of an aerodynamics laboratory at the Central Aerohydrodynamics Institute, or the TsAGI, which was offered to him by its newly appointed head, General I.F. Petrov. Khristianovich saw the newly erected premises of the TsAGI near Moscow, in what later became the town of Zhukovskii, and its impressive experimental facilities as a signal that both the staff and the national leadership attached special importance to aviation. He was also motivated by his sense of imminent war.