

Obituary



Professor George Mrevlishvili (1938–2008)

George Mrevlishvili, one of the Republic of Georgia's most distinguished biophysicists, died of a stroke in its capital Tbilisi on February 7 2008, at the comparatively young age of 69.

George was born in Tbilisi in what was then the Georgian Soviet Socialist Republic on the 30th November 1938 into the family of the well-known Georgian novelist and playwright, Michael Mrevlishvili and Faina Kiladze. He first went to school in 1945 and he finished there in 1956 with a gold medal denoting his academic excellence. In the same year he successfully passed the entrance examinations for Tbilisi State University (TSU) and became a student in the Department of Physics. As was the Soviet practice in those days, fourth-year students began to study a specialization. At that time, the Department was headed by the outstanding Georgian physicist, Academician Elephter Andronikashvili and it was at his initiative that George started his focused activity as a member of Calorimetry Laboratory at the (now Andronikashvili) Institute of Physics of the Academy of Sciences of Georgia. At that time, the Head of the Laboratory was Peter Privalov who is now a world-famous biophysicist, expert on the folding of proteins and other macromolecules, appointed to Professorships in the Departments of Biology and Biophysics at Johns Hopkins University, Baltimore, USA. For two years from 1959 as a scientific researcher under Privalov's guidance, George took part in investigations on the low temperature calorimetric characteristics of biological macromolecules which resulted in the creation of a new method of determining the physical state of water in such molecules, known as the Privalov–Mrevlishvili method, which is now a standard procedure included in almost all the literature on the physical chemistry of biopolymers. In 1961 he graduated as a specialist in 'the Physics of Low Temperatures'.

In 1968 at the age of 30 George gained his first scientific degree as Candidate (equivalent to PhD) of the Physico-Mathematical Sciences in Tbilisi; later, in 1981 he defended his doctoral thesis (DSc) in Biophysics at Moscow Lomonosov University. Before gaining these distinctions, in 1967 George had become the Head of the Department of the Physics of Biopolymers at TSU and, with his co-workers, designed and constructed a unique device in differential scanning calorimetry (DSC) which gave an increased access to studying macromolecules at low temperature and, for the first time, provided an exact estimation of the heat capacity of biologically important biopolymers such as DNA and proteins. All this research led to the establishment of a new regularity, namely that these biopolymers appeared to have fundamental properties similar to those of glass and plastics. In other words, they underwent a second order phase transition at a characteristic temperature, the glass transition, T_g . This served as a basis for creating a new view on the dynamic properties of biopolymers considering their structure aperiodicity and conformal diversity including the existence within them of so called 'double-level systems'.

George's scientific discoveries made him much in demand among his worldwide colleagues as a lecturer and discussant; he was invited as a participant in many conferences and symposia across Europe (Russia, France, UK, Germany, Sweden, Italy, Romania, Poland, Czech Republic, Hungary, etc.), including ISBC Conferences, as well as to Universities and scientific centres in Europe, Japan and USA.

In 1984, George's monograph entitled 'The Low Temperature Calorimetry of Biological Macromolecules' was published in the Russian language. It was distinguished by being the first attempt in the world to describe the behaviour of biopolymers at low temperatures and further, near the absolute zero. The book was translated into Japanese and published by the Hokkaido University Press in 1994. In the next year, the author paid his second visit to Japan when he was specially invited to attend the presentation of the book at the Japanese National Conference on Calorimetry. For this book George Mrevlishvili was awarded the highest prize given by TSU – The Petre Melikishvili Premium in the Natural Sciences (1998). George had been Head of the Department of Macromolecule Physics in TSU since 1982 and Professor in the University since 1986. He was a member of the Scientific Board and of its Board of Professors.

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For 6 years from 1992, he was the bearer of the title – The George Soros Honorary Professor. In addition, George was the Head of the Special Council to Grant the Doctor of Science Degree. As an indication of his importance, he was one of the founders of the Georgian Academy of Natural Sciences, one of its Academicians and, as well, an Academician of the Georgian Academy of Ecological Sciences.

In more recent years, George focused his attention on the thermodynamic studies of DNA and the thermal properties of proteins in dilute solutions, and on bacterial viruses (bacteriophages). Under his leadership, his group carried out several important studies in this area which are considered by his peers to be seminal to the field even now. In particular, during 1990-1996, the group was the first to determine that the helix-spool transformation for double-helix (ds) DNA was accompanied by a relatively large change in heat capacity. The existence of this phenomenon was the subject of serious arguments among George's contemporaries but, in 1999, it was completely recognized by them. This led to a series of fundamental results that created the thermodynamic basis for bacterial virus infection in terms of an entropy-driven process (1991–2000). For this work, George's Department was involved in a number of INTAS European grants. Under his guidance in 1990-2000 Tbilisi University gained other European and also American awards which of course facilitated not only the maintenance of the Department but also its development.

For three years from 1999, George was the recipient of a special EU grant supervised by the Portugal Ministry of Science and Technology. He worked with Professor Manuel A. V. Ribeiro da Silva and his group at the Department of Chemistry, Porto University, on several aspects the application of DSC to the thermodynamic properties of macromolecule, including the hydration of ds- and single-strand DNA.

Throughout his career, George was in demand as a rigorous but fair reviewer of the scientific primary literature. From 1987 onwards, he was a member of the Editorial Board of the US journal, *Physiological Physics and Chemistry in NMR in Medicine*.

George was the author of over 100 scientific papers in peer-reviewed journals and wrote three monographs on the Low Temperature Calorimetry of Biological Macromolecules (Publisher Metsniereba, 1984, Tbilisi, Georgia), the Low Temperature Calorimetry of Biological Macromolecules (Hokkaido University Press, 1994, Hokkaido, Japan) and the Physics of Polymers (TSU Press, 1999). In addition, he was the author of a student textbook, the Physics of Biopolymers (TSU Press, 1999), the first on this topic written in the Georgian language and thus very helpful for Georgians studying Biophysics.

George was a Georgian patriot, a Kartvelobi in his land, Sakarkvelo! Besides his science, he was a painter and an advocate of all things Georgian which he articulated in a humorous but meaningful way. He was a contemporary and friend of the first post-Soviet Georgian President, Zviad Gamsakhurdia whose father, Konstantine, was the most famous 20th century writer in Georgia. Zviad was a writer as well but also a scientific colleague and friend who was with George on the staff of TSU for two periods of time. George had his first stroke on the 9th April 1989, the day when a peaceful independence demonstration turned to many deaths. The early post-Soviet days were also terrible, with much internal strife and, although Gamsakhurdia was elected President by over 80% in April 1991, he was deposed in a coup d'état within 8 months and died in strange circumstances of a bullet wound on December 31st 1993. All this affected his friend, George, very much and the latter had his second stroke soon afterwards. Then, he began to be affected by glaucoma which progressed to such an extent that in the last few years he was virtually blind.

George Mrevlishvili is survived by his wife, Maya Dvali who is a Master of Chemistry at the Institute of Biochemistry of Georgian Academy of Sciences, and his two sons, George who is a Journalist and Alexander (Sandro), a student in the Department of Archeology at TSU.

We will treasure his memory for a long time.

Richard Kemp
Aberystwyth

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