Professor Mario Wiesendanger (MW) was an internationally known and esteemed researcher on motor control. His passing over is a big loss for all. For several established neuroscientists working in this field MW as a person and his publications had a considerable and stimulating influence.

After his medical studies at the University of Zürich (1950-1957), MW worked in the same institution with Professor M. Mummenthaler, where he specialized in Clinical Neurology and Neurophysiology (1958-1962). Using mainly electromyography (EMG), MW studied various neuromuscular diseases: diabetic neuropathy, ocular neuropathy, peripheral nerve injury and myasthenia gravis. Meanwhile (1959) he obtained his MD degree.

His clinical training was complemented by a 2-years stay in Copenhagen (1962-1964) at the Institute of Neurophysiology where MW had the opportunity to work with Professor F. Buchtal, an expert in muscle physiology and electromyography (EMG). MW conducted studies based on quantitative EMG in human subjects and animals. The model of anesthetized cats was used to investigate the action of pyramidal tract on alpha and gamma motoneurons, as reflected in muscles, and the pathophysiology after deafferentation and transection of the bulbar pyramids (pyramidotomy).

In 1964 MW came back to Zurich as first assistant and head of the neurophysiological section of the Brain Research Institute newly created by Professor Konrad Akert. MW set up a laboratory of experimental neurophysiology and with several collaborators he explored many up to now unknown fields, focusing on the effects of the motor cortex on various subcortical regions and the spinal cord. MW obtained the Venia legendi in 1968 and was promoted Assistant Professor in 1970. Mario’s research was first focused on cortical, then on pyramidal influence on the trigeminal pain pathway at spinal and brain stem levels, on the brain stem relay of the sensory pathway, on alpha and gamma motoneurons, and on presynaptic inhibition. At that time, MW and his collaborators performed acute experiments lasting sometimes 24 hours in row. Most important is still Mario’s publication of his “Habilitationschrift”, published in 1969 in the Ergebnisse der Physiologie: “The Pyramidal Tract. Recent Investigations on its Morphology and Function”, an outstanding review with 286 references, providing actual and historical knowledge and discussion of future research directions. MW was indeed a visionary scientist, very creative and original, generating rapidly new projects that sometimes his collaborators did not understand immediately, as they did not share his already large scientific knowledge. The interests of Mario were expanding and two important new aspects of the role of motor cortex in motor control are orienting his research. The first concerned sensory inputs to motor cortex: the visual input, topic he investigated as visiting scientist in the laboratory of Professor Pierre Buser in Paris and the cortical representation of proprioception studied in Oxford with Professor Charles Phillips. The second interest of Mario was focused on the on-going discussion of the “pyramidal syndrome”, i.e. the question of spasticity after motor cortical lesions in patients. This was tested and rejected in monkeys subjected to pyramidotomy after training in a precision grip task. The quantitative assessment of the deficits and of the recovery was one of the most important and new finding of this period.
In 1972 MW was called as associate professor (tenured) at the University of Western Ontario in London Canada where he moved with the whole family (his wife Rita and their 4 daughters), taught and continued his research. Very eclectic, as he was during his whole career, MW contributed to studies on the physiology of the cerebellum and of the trigeminal input to the inferior olive. He also collaborated to neuronal recording in the motor cortex of monkeys trained to perform arm flexion and extension.

In 1975 the family re-crossed the ocean as MW took the position of associate and, two years later, of full professor of Neurophysiology (a newly created chair) at the Institute of Physiology of the University of Fribourg (Switzerland). With his characteristic enthusiasm, MW introduced an outstanding teaching program on the brain function for medical students, centred on the students’ needs and optimal to stimulate their interest and curiosity for basic neural and physiological mechanisms, as well as related clinical aspects. A major achievement in the domain of research was to successfully install in Fribourg the infrastructure allowing the use of non-human primates for the investigation of the motor control of voluntary movements, with emphasis on manual dexterity, a prerogative of primates. MW quickly demonstrated his great expertise and, with the crucial contribution of his wife Rita and precious collaborators, became a predominant figure in the field of motor control in general and of the supplementary motor area (SMA) in particular. MW, before several other laboratories, reported the functional and anatomical (connections) of SMA, with a rostral part (pre-SMA) distinct from its caudal part (SMA-proper). While most scientists studying motor control considered one single arm or hand, MW was a pionner in studying the neural control of bimanual movements, the perfect coordination of the two hands in both spatial and temporal domains, e.g. when playing an instrument like violin, another passion of Mario. To study bimanual control, MW created the “reach and grasp drawer” task that was applied first to monkeys, then to healthy human subjects, and later to neurological patients. The hypothesis of Mario was that SMA is a key player in bimanual coordination. It turned out that SMA is indeed involved, but not alone, only in cooperation with other cortical areas (primary, premotor and cingulate motor areas). In 1994, MW retired from his professor position in Fribourg but remained as active as before by returning to the neurological clinic that motivated his whole carrier. He was appointed as Guest Professor at the Department of Neurology, University of Bern (Inselspital), Switzerland. Here he pursued his investigations of bimanual coordination in various patients (Parkinson, Huntington, cerebellar, Tourette syndrome, etc.). At the end of his career (first decade of 21st century), MW nicely combined his two major passions, bimanual control and playing the violin, by studying the sophisticated coordination of fingering (with the left) and bowing (with the right hand).

Overall, until 2011 MW published nearly 200 publications, both original experimental studies and very rich and comprehensive reviews, highly estimated in the motor control community. MW was also a gifted writer of textbook chapters, representing a solid basis for students.

His colleagues, students and friends remember Mario as a real multilingual and multicultural scholar. They admired his talent as musician and as creative scientist and his extremely vast knowledge of neurology both from the historical and contemporary points of view. MW was fascinated by many different cultures, with a focus on eastern European countries (Poland, Russia, Bulgaria, Armenia, etc), where he collaborated with many laboratories, providing a great help to scientists in these countries where the resources for research were limited. His carrier is a journey following the evolution of motor
control from the traditions of neurology, anatomy, physiology and psychology to the present integration of all these fields in Neuroscience. In some way Mario was a scientific adventurer and explorer! MW exerted the whole time a critical attitude, in the good sense of it and in a constructive spirit and he was not frightened of controversies and defended with conviction his points of view. MW was not only a highly recognized expert in his field of research but also in others domains, such as paleontology and rock drawings. However, he remained a modest person and was always pleasant and spiritual. For many scientists the time they spent together will remain as one of the best of their scientific career.

Mario Wiesendanger was born on May 10th 1931 as the son of Paul and Betty in Erlenbach, Switzerland. He married Rita Gisi, also a medical doctor and a researcher, and they had four daughters. He passed away on December 21st 2017 in Bern. He is survived by his daughters, Cornelia, Katrin, Barbara and Eva, seven grandchildren and two grand-grandchildren.

Professor Marie-Claude Hepp-Reymond (University of Zürich)

Professor Eric M. Rouiller (University of Fribourg)

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