



Ferenc Andras Jolesz



Photograph courtesy of Michael W. Halle, PhD

Dr. Ferenc A. Jolesz MD was born on May 21st, 1946 in Budapest, Hungary where he grew up and attended the Semmelweis Medical School graduating summa cum laude and earning his MD degree in 1971. He then did a research fellowship in biomedical engineering at K. Kando College of Electrical Engineering, followed by a residency in neurosurgery at the Institute of Neurosurgery (Budapest, Hungary). Facing religious discrimination in his home country, Dr Jolesz and his wife Anna (also a physician), bravely emigrated to the United States in 1979. He arrived in Boston where he began a fellowship in neurology at Massachusetts General Hospital and the Boston Biomedical Research Institute followed by a research fellowship in physiology at Harvard Medical School. Fortunately for the field of Radiology, he decided to pursue a residency in Diagnostic Radiology to complete his training and certification to practice in the USA. In 1982, he began a residency in the Radiology Department of Brigham and Women's Hospital (BWH), and then finished his training in neuroimaging as a clinical fellow in neuroradiology. In 1985, he joined the faculty at both the Brigham and Harvard Medical School.

Ferenc became a master clinician scientist in the exploding field of magnetic resonance imaging (MRI). As medical director of the division of MR in the Radiology Department, he planned and catalyzed tremendous growth in the clinical applications of brain magnetic resonance imaging (MRI) and oversaw a dramatic expansion in the number and capabilities of MRI units at BWH.

In parallel, he distinguished himself through cutting edge research in basic and clinical neuroscience, magnetic resonance imaging and image-guided therapy always supported by a large portfolio of NIH funded grants. He established one of the leading MR research groups in the world, spearheaded the development and implementation of highly novel approaches to image processing and analysis, visualization, and navigation techniques. Uniquely armed with a brilliant mind, training in neurosurgery and neuroimaging, it was clear that he was primed to make enormous contributions to the converging fields of surgery and imaging and developing an entirely new field. He went on to achieve world-wide recognition as one of the great innovators in advanced imaging technology; and as one of the foremost leaders in Radiology in this country and across the globe. Today, he is widely recognized as the "father of

modern-day image-guided therapy,”

Ferenc pioneered the use of diagnostic imaging, specifically MRI, to provide surgeons with the ability to “see” under the surface of tissues. His development of intra-operative MRI or MRT, was motivated by the difficulty of operating within the brain due to a lack of visible landmarks to differentiate tumor from critical brain structures. In parallel he wanted to be able to deliver treatments in a minimally invasive way. The implementation of his vision required basic and applied research in a variety of technological domains: MRI image acquisition sequences, tissue ablation techniques including laser, radiofrequency heating, cryogenic methods, and high energy focused ultrasound. As the locations of the interventions were not visible to the unaided eyes, it was necessary to acquire images during the procedure and process those images in such a way that they could be used to replace direct visualization of the treatment volume. Ferenc attracted research scientists from all over world who wanted to learn from and work with, him. Under his visionary leadership, many minimally invasive and non-invasive image-guided therapies were successfully translated into clinical application.

He was always a neurosurgeon first and remained deeply committed to neurosurgery throughout his career, despite applying his creativity and energy widely. Many of the areas where he was most influential and impactful derived from his understanding of neurosurgical needs. He strongly supported the development of novel imaging approaches for the brain including the development of functional brain imaging and white matter mapping--developments which allowed unprecedented visualization of individual brain organization--and which impacted neurosurgical planning and have led to great insights into numerous neuropsychiatric illnesses. His delight in the positive impact of these developments for neurosurgeons and their patients was evident as he attended clinical procedures and presented the translational work.

Ferenc marshalled all his passion, his powers of persuasion and successfully convinced General Electric’s Global Research Center in Niskayuna, NY, to collaborate with him on the design and eventual construction of an intraoperative *MRI device the Signa SP/2* this was a 0.5Tesla magnet with a 60 cm gap, located in an operating room, allowing a physician to stand in the MR field to perform procedures. It was colloquially named MRT for magnetic resonance therapy. In order to perform surgeries in this custom scanner -also known as the “double donut” it was necessary to merge an MR with an operating room. It took several years until all the elements were tested, developed and functional. This *first in the world system* was installed in an operating room at the Brigham in the early 1990’s. First procedures were performed on patients in the mid 1990. Dr. Jolesz’s crowning glory was the establishment of the NIH supported- *National Center for Image Guided Therapy* (NCIGT) and the building of 2 unique image-guided therapy operating/procedure room facilities at the Brigham. These being, the aforementioned original MRT and the now highly successful Advanced Multi-modal Image-Guided Operating suite or *AMIGO*. This unique suite opened in 2011 (supported by Brigham Health and multiple NIH grants) and quickly became internationally renowned, with scientists and healthcare professionals flocking to visit and learn, from all over the world. This suite continues to care for patients today, with now over 2500 patients treated within its rooms. Multiple similar installations are now seen in most major academic medical centers.

Ferenc, along with an expert team, also led early pioneering research in perhaps the most elegant of all image guided therapies - *MR guided Focused Ultrasound (MRgFUS)*:- a unique non-invasive use of therapeutic ultrasound and MR imaging for pre-treatment planning and real-time MR thermometry, all allowing for a complete intra-procedural closed-loop system. Again-with GEHC, he oversaw its

therapeutic translation addressing a diverse array of clinical needs from uterine fibroids to blood brain barrier disruption. In this work Ferenc saw an opportunity to address neurologic illness with the immediacy and efficacy of surgery, but non-invasively. Today MRgFUS is used to treat Essential tremor, Parkinson's disease, is in over 90 clinical trials most recently for Brain tumor drug delivery and has received global acceptance curing many patients. In recognition of his innovations and breakthrough leadership, Dr Jolesz was appointed to be the first incumbent of the *B. Leonard Holman Professorship in Radiology* at Harvard Medical School in 1998, along with many other awards and honors such as the Szent-Gyorgyi Award of the Hungarian National Academy of Sciences, the Outstanding Scientist award from Radiological Society of North America (RSNA), membership in the Institutes of Medicine, Gold medal recipient of the International Society of Magnetic Resonance in Medicine (ISMRM), the A. Clifford Barger Excellence in Mentoring Award HMS. He was also honored in 2007, with the establishment of the *Ferenc A. Jolesz MD Chair in Diagnostic Radiology, Brigham and Women's Hospital, Harvard Medical School*.

All of Ferenc's amazing innovations were driven by his vision, enabled by his keen intelligence and his amazing people skills. He had a warm and caring personality and cared deeply about the people working with him-it was also mutual on their part. Everybody who interacted with him knew he thought of them as special. It was an honor for so many of us to be included as *Friends of Ferenc's* and share in his wonderful *joie de vivre*.

Most of all he was devoted to his wife Anna and his daughters Marta and Klara. He continues to be sorely missed by all.

Discovery is seeing what everybody else has seen, and thinking what nobody else has thought.
(A.Szent-Gyorgyi)

Respectfully submitted,

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