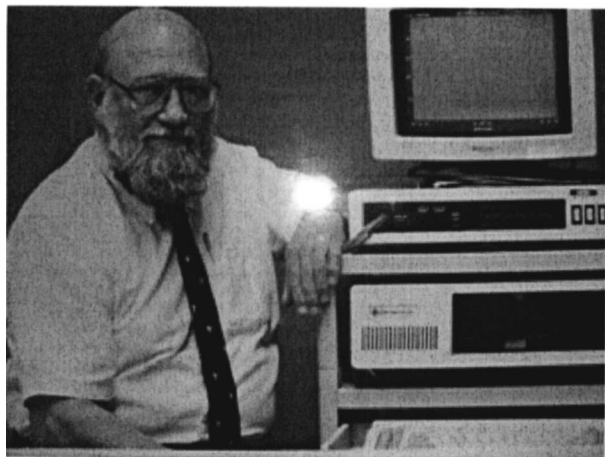


# SPECIAL SECTION GUEST EDITORIAL

## Pioneers in Biomedical Optics: Special Section Honoring Professor Frans F. Jöbsis of Duke University

This fourth in the series of “Pioneers in Biomedical Optics”—special sections of the *Journal of Biomedical Optics* dedicated to giants of the field—honors Professor Frans F. Jöbsis of Duke University and his pioneering work in near-infrared spectroscopy (NIRS). Indeed, Frans Jöbsis is the founding father of NIRS, or as he coined it in the early years, nirosopy. Sadly, as we set about preparing this honorary section, Dr. Jöbsis lost a long battle with cancer and passed away on August 29, 2006, at the age of 77. But he was well aware of the advent of this special section and the desire of his colleagues to honor his life’s work, and he was most appreciative.



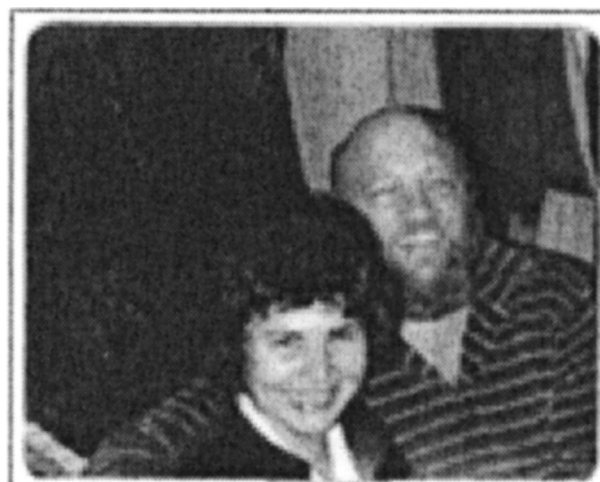
Frans Jöbsis and the niroscope.

Frans F. Jöbsis was born in Batavia (Jakarta) on the first of April 1929, a child of Dutch parents living in Indonesia. His mother was a practicing internist and his father a banker, as well as a closet poet. His parents got him interested in field biology and he dreamed of becoming an explorer of rain forests; however, the family returned to Holland when he was nine—just before the German occupation of World War II. Despite the Dutch famine, young Frans grew formidably tall, but by his own admission always remained “gentle as a lamb.” And as a result of the war he developed an interest in agriculture. He came to America for a visit after his freshman year at the University of Leiden (his father had been appointed to the post-war Far Eastern Economic Committee in Washington), and enrolled at the University of Maryland, from which he graduated. He then earned a PhD in zoology at the University of Michigan under Professor Dugald Brown—who reproved him to always explore away from the beaten track.



Three generations of the Jöbsis family in Philadelphia.

After graduate school, Frans joined the Johnson Foundation at the University of Pennsylvania as a postdoctoral fellow under Professor Britton Chance, from whom he learned the principles of optical monitoring. He did postdoctoral studies in biochemistry in the Slater laboratory in Amsterdam and in neurophysiology at the Nobel Institute in Stockholm. In 1964, he was offered a faculty position in the Department of Physiology at Duke University, which he accepted, and he spent the next 35 years in that department working on noninvasive optical monitoring and training students and fellows in the wonders of physiology.



Frans and his wife Joan.

In Durham, the Jöbsises settled into the comfortable but unassuming life of a family at a 1960s American university, raising a family of five children, Terry, Gerrit, William, Mieke, and Paul. Later, in 1975, Frans married Dr. Joan Murray-Jöbsis and became an important surrogate father in raising her two children, Alaina and Marc.



Frans at the Lazy J Ranch.

Insatiably curious, Frans was an explorer and a pioneer, not only in his professional endeavors but in all aspects of his life. He set up a vibrant laboratory at Duke, bringing in countrymen, Henk Vreman and Hans Kaiser, to help manage his research program. Research funding was plentiful—even exploratory research could sometimes be funded or slipped in—until the climate began its shift in the 1970s.



Frans and Marco Ferrari in Garmisch Partenkirchen, Germany, October 1991.

While still at the Johnson Foundation, Frans had become interested in the optical behavior of all four redox centers of *cytochrome c oxidase*, the terminal member of the respiratory chain, including the copper atoms that absorb in the NIR region. He thought that a comprehensive approach might provide better insight into the unexpectedly high reduction state of the enzyme *in situ*. But he had no funding to develop the means to explore the NIR region of the spectrum. It so happened in December 1976, coincidentally with his early realization of the potential of NIR light as a noninvasive moni-

toring technique, that a special request for applications (RFA) from the National Institutes of Health (NIH) was issued for exploratory research applications in physiology or medicine focused on novel techniques. This fit Frans perfectly—he always considered himself more explorer than scientist anyway. Although “fishing expeditions” were frowned upon by funding authorities, here was a true opportunity. His proposal received the highest score among all, but alas NIRS did not receive funding because the NIH withdrew the funds for another purpose.



Tokyo, September 1998 (from left: Britton Chance, David Delpy, Marco Ferrari, David Benaron, and Frans Jöbsis).

Thus, the seminal discovery of the near-infrared window into the body and the early development of NIRS in the U.S. were done without direct federal support—mostly between 1977, when his first paper appeared in *Science*, and 1985, when he actually received his first grant from the NIH on NIRS. The first prototype instrument was built on a shoestring budget in the Department of Physiology Instrument Shop; meanwhile the first spectral deconvolution algorithms were being developed from animal data generated by Frans’ laboratory group, which included his fellow Claude Piantadosi. During this period, Dr. Jöbsis often said that the fledgling NIRS emerged perhaps most conspicuously at the 1984 meeting of the International Society for Oxygen Transport to Tissues (ISOTT) in Nijmegen, the Netherlands. This location was especially meaningful for him since Nijmegen was the birthplace of his father. He was pleased to find the cause had been taken up by Marco Ferrari in Rome and several other early champions of the new technique, including David Delpy in London and Mamoru Tamura in Japan. And today, one can find more than 1,000 citations of his 1977 *Science* paper in Medline. Frans continued to work until 1999, when he retired to his ranch, the Lazy J, in Efland, North Carolina, with his loving wife Joan to live the agrarian life he had dreamed of as a boy. However, even in retirement, Frans’ active mind continued to generate research ideas and patents until his health failed in the last year of his life.

This special section of the *Journal of Biomedical Optics* consists of 12 papers on a range of topics, largely representative of Dr. Jöbsis’ impact on the field of NIRS. Many notable scientists who worked with him over his long and distin-

guished career have contributed to this special section. We trust you will enjoy this special section as much as we have enjoyed assembling it. We are certain that all who knew Frans share the same delight and astonishment at their marvelous associations with this wonderful man—gentle giant and great scientist.

**David T. Delpy, Ph.D.**  
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**Claude A. Piantadosi, M.D.**  
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**Special Section Guest Editors**