Samuel Achilefu, Ph.D.

Harnessing the Power of Light to Image and Treat Cancer

Thursday, November 2, 2023
4 p.m. Lecture, Reception to Follow
Tom and Lula Gooch Auditorium
utsouthwestern.edu/pls
The President’s Lecture Series was established to recognize the importance of UT Southwestern staff in enabling the Medical Center to achieve its mission and goals. The faculty excels in education, research, and patient care only with the contributions of staff, whose work, directly and indirectly, supports faculty endeavors.

The lectures selected for this series provide an opportunity for the employees of UT Southwestern to learn more about the research discoveries, clinical advances, and other contributions of the Medical Center’s most accomplished scientists, physicians, and senior leaders. Three times each academic year, leading experts present a President’s Lecture, discussing in nontechnical terms the basics of their research and clinical programs and their implications for good health and medical care.

The President’s Lecture Series is offered in appreciation and respect for the work and dedication of UT Southwestern staff.

Daniel K. Podolsky, M.D.
President
UT Southwestern Medical Center
Biomedical innovator Samuel Achilefu, Ph.D., aims to use the power of light to expose and defend against one of the darkest forces of disease affecting humankind for millions of years — cancer.

For many forms of cancer, surgery remains the gold standard of treatment. These procedures rely heavily on visual inspection and physical examination by surgeons as well as intraoperative examination of tumor margins. Common preoperative imaging techniques — including MRI, computerized tomography, and positron emission tomography — are effective but can lead to incomplete tumor removal, which facilitates tumor relapse and can lead to repeat surgery.

Dr. Achilefu says that fluorescence image-guided surgery (FGS) often provides useful information about tumor locations and the extent of the disease in real time during surgery.

In today’s President’s Lecture, Dr. Achilefu will highlight the history of promising fluorescence imaging technology, discuss its current state, and provide a glimpse of what future applications and opportunities may look like.

FGS consists of materials that highlight tumors selectively and devices that capture these signals, allowing the detection and removal of cancer cells with high precision. Dr. Achilefu and his team developed a small fluorescent molecule that can find different types of cancer and amplify its signal in tumor tissue.

He uses multimodal imaging methods to address technology challenges, focusing on optical platforms. His research interests also include developing portable imaging devices, new imaging methods, and nanotechnology.

Dr. Achilefu conceived and led the development of Cancer Viewing Glasses (CVGs) that can provide real-time guidance to surgeons in the operating room to ensure the complete removal of cancerous tissue. The combination of light, cancer-illuminating molecules, and CVGs enhances surgery with improved accuracy.
Samuel Achilefu, Ph.D., an expert in molecular imaging and its application in treating human diseases, joined UT Southwestern in February 2022 as the inaugural Chair of the Department of Biomedical Engineering. He holds the Lyda Hill Distinguished University Chair in Biomedical Engineering.

Dr. Achilefu pioneered the design and use of innovative fluorescent materials and systems for cancer imaging. His seminal work resulted in the clinical translation of a method to identify and treat most cancer types, especially breast tumors and multiple myeloma.

His work has earned national and international recognition, including Distinguished Investigator Awards from the Department of Defense Breast Cancer Research Program and the Academy for Radiology and Biomedical Imaging Research, as well as the SPIE Britton Chance Biomedical Optics Award from the international society for optics and photonics. A fellow of eight professional societies, he was elected to the National Academy of Inventors in 2017 and the National Academy of Medicine in 2021.

Dr. Achilefu earned a doctorate in chemistry and materials science from the University of Nancy in France and completed postdoctoral training in oxygen transport in biological systems and hematological science at Oxford University in the United Kingdom.

Before coming to UT Southwestern, Dr. Achilefu was at the Mallinckrodt Institute of Radiology at Washington University School of Medicine in St. Louis, where he was the Michel M. Ter-Pogossian Professor of Radiology and Professor of Medicine, Biomedical Engineering, and Biochemistry and Molecular Biophysics. He served as Director of the Center for Multiple Myeloma Nanotherapy, the Molecular Imaging Center, and the Optical Radiology Laboratory.
Steven Kliewer, Ph.D., is a Professor of Molecular Biology and Pharmacology recognized for his work on regulatory proteins called nuclear hormone receptors and their effects on metabolism. He runs a joint laboratory with David Mangelsdorf, Ph.D., Chair and Professor of Pharmacology and Professor of Biochemistry.

The longtime collaborators, along with Pharmacology Instructor Mihwa Choi, Ph.D., found a hormone produced in the liver that helps to reverse the effects of acute alcohol poisoning in mice and could lead to effective treatment in humans. Their study was published earlier this year in *Cell Metabolism*.

In 2015, the same year Dr. Kliewer was elected to the National Academy of Sciences, he also was awarded the prestigious Adolf Windaus Prize for Bile Acid Research. He received the prize for the discovery of a hormone secreted by the gut – FGF19 – to regulate bile acid metabolism in the liver. Dr. Mangelsdorf called the finding “the missing link in the feedback loop by which bile acids regulate their own synthesis.”

Dr. Kliewer, who joined the UT Southwestern faculty in 2002, holds the Diana K. and Richard C. Strauss Distinguished Chair in Developmental Biology.

He majored in biochemistry at Brown University before earning his Ph.D. in molecular biology from the University of California, Los Angeles. He was a postdoctoral fellow in the laboratory of Dr. Ronald Evans at the Salk Institute for Biological Studies in La Jolla, California, and in 1993 joined GlaxoSmithKline Inc. in Research Triangle Park, North Carolina, where he founded a scientific group devoted to targeting nuclear receptors for drug discovery.