



CEE Seminar Speaker **RICHARD WILSON**

Professor
Department of Chemical and Biomolecular Engineering
University of Houston

APRIL 4TH, 2025 11:00 A.M. - 12:00 P.M. IN WCH 205/206

NEW PURIFICATION AND PROCESS MONITORING TOOLS FOR MONOCLONAL ANTIBODIES: A BIOMANUFACTURING INDUSTRY COMPARABLE IN SIZE TO EXXONMOBIL

Antibodies are proteins in the blood that bind to invaders such as viruses and bacteria; most top-selling drugs are now antibodies or derivatives. The “antibody revolution” in hybridoma and recombinant DNA technology now allows the development of antibodies with fully-human sequences (human monoclonal antibodies, “mAbs”). These can be therapeutics by binding to cancer cells, or to the proteins mediating Alzheimer’s disease, psoriasis, rheumatoid arthritis, SARS-CoV-2, Crohn’s, a major form of blindness, etc. Over 100 antibody drugs are now approved by the US FDA, and they are ubiquitous in television advertising (look for a long strange name ending in “mab”). This talk will discuss our efforts to reduce the manufacturing costs of these medicines to make them more widely available, including for malaria prophylaxis in sub-Saharan Africa. Specific approaches include the development of cyclic affinity versions of the Staph. aureus antibody-binding “Protein A” ubiquitous in antibody purification, a continuous antibody biosensor for process control, and revisiting the foundational cloning of Protein A to discover hundreds of alternatives, some of which may have biophysical/bioprocess characteristics superior to those of the canonical Protein A.

BIOGRAPHY

Richard Willson is Huffington-Woestemeyer Professor of Chemical & Biomolecular Engineering, Biology & Biochemistry, and Biomedical Engineering at the University of Houston, and a Senior Affiliate of The Houston Methodist Hospital Research Institute. He holds B.S. (honors) and M.S. degrees in Chemical Engineering from Caltech, and completed his Ph.D. in Biochemical Engineering and postdoctoral studies in Biochemistry at MIT. Dr. Willson is the recipient of the Presidential Young Investigator Award under the first Bush administration, and an elected Fellow of the American Institute of Medical and Biological Engineering, the American Chemical Society, and the American Association for the Advancement of Science. He is a member of the National Academy of Inventors, and served for a time as interim Associate VP for Technology Transfer of the University of Houston, then the non-medical public university with the largest patent royalty income in the US. His research interests are in medical diagnostics and the purification of biological molecules, including nucleic acids such as mRNA vaccines.