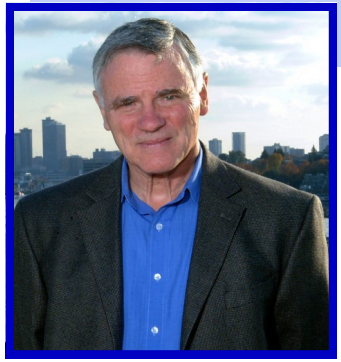
Brief Biography



Dr. Hood's research has focused on the study of molecular immunology, biotechnology, and genomics. His professional career began at Caltech where he and his colleagues pioneered four instruments - the DNA gene sequencer and synthesizer, and the protein synthesizer and sequencer - which comprise the technological foundation for contemporary molecular biology. In particular, the DNA sequencer has revolutionized genomics by allowing the rapid automated sequencing of DNA, which played a crucial role in contributing to the successful mapping of the human genome during the 1990s. In 1992, Dr. Hood moved to the University of Washington as founder and chairman of the cross-disciplinary Department of Molecular Biotechnology. In 2000, he co-founded the Institute for Systems Biology in Seattle, Washington to pioneer systems approaches to biology and medicine.

Most recently, Dr. Hood's lifelong contributions to biotechnology have earned him the prestigious 2004 Biotechnology Heritage Award, and for his pioneering efforts in molecular diagnostics the 2003 Association for Molecular Pathology (AMP) Award for Excellence in Molecular Diagnostics. In 2006 he received the Heinz Award in Technology, the Economy and Employment for his extraordinary breakthroughs in biomedical science at the genetic level. In 2007 he was elected to the Inventors Hall of Fame (for the automated DNA sequencer).

He has published more than 600 peer-reviewed papers, received 14 patents, and has co-authored textbooks in biochemistry, immunology, molecular biology, and genetics and is just finishing a text book on systems biology. In addition, he coauthored with Dan Keveles a popular book on the human genome project-The Code of Codes.

Dr. Hood is a member of the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts and Sciences, the Institute of Medicine and the National Academy of Engineering. Indeed, Dr. Hood is one of 7 (of more than 6,000) scientists elected to all three academies (NAS, NAE and IOM). Dr. Hood has also played a role in founding more than 14 biotechnology companies, including Amgen, Applied Biosystems, Systemix, Darwin and Rosetta. He is currently pioneering systems medicine and the systems approach to disease.

My Personal Experiences with Paradigm Changes in Biology that are Leading to a Transformation Healthcare

Monday, April 6
4:00 pm, Pfendler Auditorium

I have participated in four paradigm changes that have led to the transformation of how we practice biology—and how we will practice medicine. These include bringing engineering to biology, the human genome project, creating the first department of cross-disciplinary biology and the first Institute of Systems Biology. These paradigm changes are leading to a transformation in medicine and healthcare over the next 10-20 years that I have termed P4 medicine—predictive, personalized, preventive and participatory. I will discuss some of these experiences with paradigm changes and the lessons learned. I will also discuss the features of P4 medicine and the implications that it will have for society. For example, P4 medicine will lead to the digitalization of medicine with changes even more profound than the digitalization of information technologies and communications. It will also lead to a turn around in the inexorably increasing healthcare costs—with the possibility of bringing developed world medicine to the developing world.

Systems Biology, Emerging Technologies and the Emergence of P4 Medicine (Predictive, Personalized, Preventive and Participatory)

Tuesday, April 7
4:00 pm, Pfendler Auditorium

The challenge for biology in the 21st century is the need to deal with its incredible complexity. One powerful way to think of biology is to view it as an informational science. This view leads to the conclusion that biological information is captured, mined, integrated and finally executed by biological networks. Hence the challenge in understanding biological complexity is that of deciphering the operation of dynamic biological networks across the three time scales of life—evolution, development and physiological responses. Systems approaches to biology are focused on delineating and deciphering dynamic biological networks. I will outline the contemporary state of systems biology and then focus on its application to disease. In particular I will discuss in detail a model system we have studied—prion disease in mice. This systems approach provides a powerful new approach to understanding disease mechanisms—and suggests new strategies for diagnosis and therapy. I will then focus on a series of emerging technologies that will transform the landscape of medicine—next generation DNA sequencing, new approaches to protein analysis, single cell analyses and the powerful new applications of molecular imaging techniques. It appears that a systems approach to disease, together with these emerging technologies, as well as the development of powerful new computational and mathematical tools will transform medicine over the next 5-20 years from its currently reactive state to a mode that is predictive, personalized, preventive and participatory (P4 medicine).