Interface between Engineering and Biology and its Impact on the Human Condition

Regional National Academy of Engineering Meeting, March 13, 2003
University of Washington

Bruce A. Finlayson and Edward D. Lazowska, Co-chairs

The National Academy of Engineering holds several Regional Conferences each year, on topics of interest to the host institution. Because of the biological focus at the University of Washington, we have decided to concentrate on engineering and scientific developments in the medical field. The program begins with a talk by Dr. Richard Klausner, Director of Global Health at the Bill & Melinda Gates Foundation. He will give an overview of the need for appropriate medical care in developing countries. Dr. Chris Elias, President of PATH, Seattle, will then describe the efforts of PATH to create medical technology for that same use. Professor Paul Yager will describe his laboratory's efforts to combine medical testing on a small scale with information technology to improve (and make cheaper) medical care in advanced countries. Dr. Robert Bea, University of California, Berkeley, will discuss unintended consequences, since engineering projects have the potential to do more than their creators envisaged. Finally, several scientific endeavors will illustrate the future possibilities for improvement in health: Astronaut Bonnie Dunbar, on biological research in space, Buddy Ratner, UW, on how to grow heart muscle, and UW's Mary Lidstrom and Deirdre Meldrum on how to obtain and use genetic information by examining single cells. Thus, this NAE Regional Meeting will provide a broad perspective of the needs, some examples of current engineering application, and a preview of prospects for the future.

Introduction to the National Academy of Engineering
Dr. William A. Wulf, President

Dr. Richard D. Klausner, M.D.
Executive Director, Global Health, Bill & Melinda Gates Foundation

Program for Appropriate Technology in Health (PATH)
Dr. Christopher J. Elias, M.D., M.P.H., President of PATH

Microfluidics and Engineering a New Doctor-Patient Interface
Professor Paul Yager, (UW, Bioengineering)

Unintended consequences
Professor Robert Bea, Department of Civil & Environmental Engineering, University of California, Berkeley

Biomedical Research in Space
Dr. Bonnie J. Dunbar, PhD
NASA Johnson Space Center, Assistant Director (University Research and Affairs)

To Tissue Engineer Heart Muscle

Professor Buddy D. Ratner[1], Margaret Allen[2], John Angello[1], Paul Bornstein[1], Kip Hauch[1], Stephen D Hauschka[1], Allan S. Hoffman[1], Charles Murry[1], Joan Sanders[1], Patrick Stayton[1], Robert Vernon[2], Kim Woodhouse[3],
[1]University of Washington, Seattle, WA 98195, [2]Hope Heart Institute, Seattle, WA 98112,
[3]University of Toronto, Toronto, CA

Flying with Animals: Interfacing Computer Electronics and Biology

Professors Thomas L. Daniel (UW, Biology) and Chris Diorio (UW, CSE)

LIFE-ON-A-CHIP

Professors Mary Lidstrom and Deirdre Meldrum, Co-Directors, Microscale Life Sciences Center, University of Washington