The IEEE Pittsburgh Section Signal Processing and Engineering in Medicine & Biology Society Chapters Present:

Model-Based Analysis of Human Postural Control

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11:30 to 12:00 – Refreshments
12:00 to 1:00 - Presentation

For most of us, standing upright is a skill we acquire very early in life, and don't think much about unless we develop a balance disorder or are injured by a fall, the likelihood of which increases in elderly adults. For example, disorders of the vestibular system and dizziness are one of the most common complaints of elderly persons. Falls can be a very serious consequence of balance disorders, particularly in the elderly where hip fractures due to falls are common and debilitating, with significant associated costs that are projected to increase if effective interventions are not found. Thus, an understanding of human balance function (or postural control) and identification of the causes of and treatments for various balance disorders could have a great impact on public health. This talk will discuss an engineering systems analysis approach to the study of human balance, through experiments and model development, and the insights that such an approach has provided over the years. Differences in balance function in young versus older adults will be discussed, as will the development and analysis of a vibrotactile balance prosthesis.

Patrick Loughlin is a professor of Bioengineering, and Electrical & Computer Engineering, at the University of Pittsburgh, which he joined in 1993. He has made contributions to signal processing and bioengineering, including the development and application of nonstationary signal processing methods (especially time-frequency distributions); analysis and modeling of human postural control; control of inhalation anesthetic delivery; and development of a physical model of anesthetic uptake, for which he holds two US patents. Prof. Loughlin is Associate Editor and member of the editorial board for the IEEE Transactions on Biomedical Engineering; past chair of the signal processing chapter of the IEEE (Pittsburgh Section); and member of the technical committee on acoustic signal processing of the Acoustical Society of America. He is a Fellow of the American Institute for Medical and Biological Engineering (AIMBE), the Acoustical Society of America (ASA), and the Institute of Electrical and Electronics Engineers (IEEE)