

## **Francis X. Hart**

**Tom Costen Professor of Physics**  
**The University of the South**  
**Sewanee, TN USA**

### **Degrees:**

B.S. in Physics 1963 Manhattan College (New York City)  
M.S. in Physics 1965 Syracuse University  
Ph. D. in Physics 1967 Syracuse University

### **Academic Position: The University of the South**

Instructor in Physics 1967  
Assistant Professor of Physics 1969  
Associate Professor of Physics 1973  
Professor of Physics 1981

Department Chairman 1977-87; 1992-7

### **Visiting Positions:**

The University of Salford (England); Visiting Research Fellow 1980-81.

Faculty Research Participation Program; Oak Ridge National Laboratories; 1994-5;  
Summers 1995-7.

### **Professional Activities:**

Sigma Xi Club; Secretary-Treasurer 1968-70; Vice-President 1972-74;  
President 1978-80, 1990-92.

Tennessee Section: American Association of Physics Teachers; Vice-Chairman 1976-77, 1984-85,  
1995-96; Chairman 1977-78, 1985-86, 1996- 97.

Tennessee Academy of Science.

American Association of Physics Teachers.

Southeastern Section: American Physical Society.

Bioelectromagnetics Society; Technical Program Committee 1992; Board of Directors 2005-8.

International Society of Bioelectricity; Board of Directors 1983-87.

IEEE Electrical Insulation Society (Associate).

Society for Physical Regulation in Biology and Medicine; Executive Council 1987-89; Chairman of  
the Bylaws Committee 1986-96; Program Committee 1989-94, Chairman 1994; President-Elect  
1998-9; President 2000-1.

The Bioelectrochemical Society

## Research Interests:

- \* Mathematical Modeling of the Interaction of Electric and Magnetic Fields with Biological Systems
- \* Impedance Spectroscopy of Biomaterials
- \* Teaching of Physics

## Publications in the last five years:

1. An Analytical Model for the Calculation of the Change in Transmembrane Potential Produced by an Ultrawideband Electromagnetic Pulse. F. X. Hart and C. E. Easterly. *Bioelectromagnetics*, 25, 251-9 (2004).
2. "Solving" the Physical Pendulum. F. X. Hart. *The Physics Teacher*, 42, 150-3 (2004).
3. Effect of Cell Electroporation on the Conductivity of a Cell Suspension. M. Pavlin, M. Kanduser, M. Rebersek, G. Pucihar, F. X. Hart, R. Magjarevic and D. Miklavcic. *Biophysical Journal*, 88, 4378-4390 (2005).
4. Thermal Hysteresis of Bioelectrical Impedance in Frog Gastrocnemius Muscle, Measured In-Vivo. F. X. Hart, E. E. Davila-Moriel, N. J. Berner and R. L. McMillen. *Journal of Non-Crystalline Solids*, 351, 2929-2934 (2005).
5. Electric Properties of Tissues. D. Miklavcic, N. Pavselj and F. X. Hart. in "Wiley Encyclopedia of Biomedical Engineering", M. Akay, ed., Wiley, New York, Vol. 6, 3578-3589 (2006).
6. Integrins May Serve as Mechanical Transducers for Low-Frequency Electric Fields. F. X. Hart. *Bioelectromagnetics*, 27, 505-8 (2006).
7. Some Factors That May Determine the Frequency Response of Cells and Tissue to Applied Electrical and Mechanical Forces. F. X. Hart. *Molecular and Cellular Biomechanics*, 3, 235 (2006).
8. Impedance Spectroscopy of Newt Tails. F. X. Hart, J. H. Johnson and N. J. Berner; *IFMBE Proceedings*, 16 190-3 (2007).
9. Glycoproteins Bound to Ion Channels Mediate Detection of Electric Fields: A Proposed Mechanism and Supporting Evidence. O. V. Kolomytkin, S. Dunn, F. X. Hart, C. Frillot II, D. Kolomytkin, and A. A. Marino. *Bioelectromagnetics*, 28, 379-85, (2007).
10. The Mechanical Transduction of Physiological Strength Electric Fields. F. X. Hart. *Bioelectromagnetics*, 29, 447-56 (2008).
11. The Electric Field is a Sufficient Physical Determinant of the Human Magnetic Sense. S. Carrubba, C. Frillot II, F. X. Hart, A. L. Chesson, A. A. Marino. *International Journal of Radiation Biology* (In Press).
12. Cytoskeletal Forces Produced by Extremely Low-Frequency Electric Fields Acting on Extracellular Glycoproteins. F. X. Hart. *Bioelectromagnetics* (In Press).