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PATRICK D WOLF, ASSOCIATE PROFESSOR

My research is primarily in the area of advanced instrumentation for diagnosis and treatment of electrophysiological problems. This research covers two primary organ systems: the heart and the brain.

One thrust of the cardiac-based work is centered on atrial fibrillation and in particular on very low energy atrial defibrillation strategies. The goal is to produce a device that can defibrillate the atria with a painless series of electrical impulses. A second area of interest is the study of the biophysics of radio frequency ablation of the heart. A third avenue of research in the cardiac area is the development of new instruments and techniques for tracking interventional devices within the body without the use of ionizing radiation. These devices primarily rely on ultrasound technology. There is a strong collaborative effort in this area with the Duke Ultrasound group in the Department of Biomedical Engineering. The long term goal of this work is to develop technology to deliver image-guided therapy to target tissues in the heart and other organs.

In neuroengineering, we are currently developing a "brainchip" that would telemeter information recorded directly from neurons in the brain to a remote device. This IC based technology is being developed for application in neuro-prosthetic or brain controlled devices. There is a close collaboration on this project between our lab and the laboratory of Dr. Miguel Nicolelis the Department of Neurobiology. We are also developing advanced neural recoding systems to use on unrestrained, untethered animals as they learn to perform certain tasks.

Contact Info:

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Teaching (Spring 2010): (typical courses)

BME 204.01, *CARDIAC ELEC EVENTS* Synopsis

Education:

PhD, Duke University, 1992
MS, Pennsylvania State University, 1986
BS, Pennsylvania State University, 1978

Specialties:

Medical Instrumentation
Heart, Electrophysiology
Neural Prosthesis
Neuroengineering

Research Interests:

Current projects: Image Guided Ablation Therapy, Fully Implanted Brain-Machine Interface

Wolf's research is primarily in the area of advanced instrumentation for diagnosis and treatment of electrophysiological problems. This research covers two primary organ systems: the heart and the brain. In the heart, Dr. Wolf is developing an image guided ablation system for treatment of arrhythmias. In the brain, he is developing a fully implantable Brain-Machine

interface.

Areas of Interest:

Cardiac Arrhythmias
Pacing
Defibrillation
Brian-Machine Interface
Neural Coding

Duties:

Director of Undergraduate Studies

Recent Publications (More Publications)

C. D. Herickhoff and E. D. Light and K. F. Bing and S. Mukundan and G. A. Grant and P. D. Wolf and S. W. Smith, *Dual-Mode Intracranial Catheter Integrating 3D Ultrasound Imaging and Hyperthermia for Neuro-oncology: Feasibility Study*, Ultrasonic Imaging, vol. 31 no. 2 (April, 2009), pp. 81 -- 100 [abs].

M. Rizk and C. A. Bossetti and T. A. Jochum and S. H. Callender and M. A. L. Nicolelis and D. A. Turner and P. D. Wolf, *A fully implantable 96-channel neural data acquisition system*, Journal Of Neural Engineering, vol. 6 no. 2 (April, 2009) [abs].

M. P. Fronheiser and S. F. Idriss and P. D. Wolf and S. W. Smith, *Vibrating interventional device detection using real-time 3-D color Doppler*, Ieee Transactions On Ultrasonics Ferroelectrics And Frequency Control, vol. 55 no. 6 (June, 2008), pp. 1355 -- 1362 [abs].

S. J. Hsu and R. R. Bouchard and D. M. Dumont and P. D. Wolf and G. E. Trahey, *In Vivo assessment of myocardial stiffness with acoustic radiation force impulse imaging*, Ultrasound In Medicine And Biology, vol. 33 no. 11 (November, 2007), pp. 1706 -- 1719 [abs].

M. Rizk and I. Obeid and S. H. Callender and P. D. Wolf, *A single-chip signal processing and telemetry engine for an implantable 96-channel neural data acquisition system*, Journal Of Neural Engineering, vol. 4 no. 3 (September, 2007), pp. 309 -- 321 [abs].

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