

**Saturday April 17, 2004**

**Oral Presentations**

**BIOMATERIALS TISSUE AND CELLULAR ENGINEERING**

**Law School A, 10:30 – 11:50 a.m.**

**6.1.1 Differentiation of CD34+ Cord Blood Cells in Glycosaminoglycan Microcapsules**

G. K. Buruzula, H. W. T. Matthew, J.F. Eliason

*Wayne State University, Department of Chemical Engineering and Material Science  
Karmanos Cancer Institute*

**6.1.2 Surface Properties of the Substratum Affect Human Mesenchymal Stem Cell Differentiation**

M.S. Godbole, A. Seyda, J. Kohn, T. Livingston Arinzeh

*Department of Biomedical Engineering, New Jersey Institute of Technology  
Department of Chemistry, Rutgers University and New Jersey Center for Biomaterials*

**6.1.3 Osteopontin Secretion and ERK Phosphorylation of Smooth Muscle Cells Cultured in Two-Dimensional and Three-Dimensional Collagen and Fibrin Matrices**

H. Hong, C.M. McCullough, and J.P. Stegemann

*Rensselaer Polytechnic Institute*

**6.1.4 Mechanisms Controlling Increased Vascular Cell Adhesion to Nano-Structured Polymer Films**

Derick C. Miller, Karen M. Haberstroh, Thomas J. Webster

*Department of Biomedical Engineering and School of Materials Engineering  
Purdue University*

**BIOMECHANICS**

**Law School B, 10:30 – 11:50 a.m.**

**7.1.1 Fatigue of Human Cortical Bone Under Axial-Torsional Loading**

W.T. George and D. Vashishth

*Department of Biomedical Engineering  
Rensselaer Polytechnic Institute*

**7.1.2 The Effect of Microstructure on the Mechanical Properties of Equine Bone**

M. D. Clark, N. P. Davis, A. F. Walsh, B. Savioloni, C. Kirker-head, C. Les

*Worcester Polytechnic Institute*

*Tufts University*

*U.C. Davis*

**7.1.3 Skeletal Strain Induced by Planar Orbital Shaking**

D.K. Sung and D.J. Adams

*Department of Orthopaedic Surgery, University of Connecticut Health Center  
Biomedical Engineering, University of Connecticut*

**7.1.4 A Biomechanical Study of a Rigid Plating System for Sternal Fixation**

Najmuddin Gunja, Shruti Pai, Nicole McMahon, Erin Dupak, Janice Lalikos, Ray Dunn, Nicola Francalancia, George Pins, and Kristen Billiar

*Department of Biomedical Engineering, Worcester Polytechnic Institute*

*Department of Mechanical Engineering, Worcester Polytechnic Institute*

*University of Massachusetts Medical Center*

## **BIOMEDICAL INSTRUMENTATION**

**Law School C, 10:30 – 11:50 a.m.**

### **2.1.1 A Reduced Skin-Irritation Defibrillation Electrode**

P.F. Meyer<sup>1</sup>, P.D. Gadsby, D. Van Sickle, W.E. Schoenlein, K.S. Foster, and G.P. Graber  
*Tyco Healthcare Ludlow*  
*Dept. of Basic Medical Sciences and Dept. of Biomedical Engineering, Purdue University*

### **2.1.2 Switching Modulation for Wireless Transmission of Biological Waveforms Using a Cellphone**

Mingui Sun, Paul A. Roche, Jun Zhao, and Robert J. Scwabassi  
*Laboratory for Computational Neuroscience Departments of Neurosurgery, Bioengineering, and Electrical Engineering, University of Pittsburgh*

### **2.1.3 Automation of Ventilator Control for Hyperbaric Oxygen Therapy**

Ryan Felber  
*University of Connecticut*  
*Baystate Health System*

### **2.1.4 Human Factor Issues Pertaining to a Conductance Telemetry System that Relies on Skin Electrodes**

R. J. Degon, K.L. Hines, J. Iudice, R.A. Peura, and C. Sherman  
*Worcester Polytechnic Institute and Whalen Biomedical Inc.*

## **MEDICAL IMAGING**

**Law School D, 10:30 – 11:50 a.m.**

### **3.1.1 Development of a Field-deployable Voice-activated Ultrasound Scanner System**

Dalys Sebastian and Peder C. Pedersen  
*Dept. of Electrical and Computer Engineering*  
*Worcester Polytechnic Institute*

### **3.1.2 Measurement of Acoustic Properties of Breast Tissue Phantoms Using Ultrasound**

Lisa McLeod, Peggy Griffin, Diane M. Muratore  
*Department of Biomedical Engineering*  
*Western New England College*

### **3.1.3 Revisiting Wavelet & Fuzzy-Based Denoising of Medical Images from Ultrasound-Mammography**

A. D. Sarmento  
*University of Connecticut School of Engineering*

### **3.1.4 Ultrasound Image Enhancement Based on an Annular Array Pulse-echo System**

Aditya Nadkarni and Peder C. Pedersen  
*Dept. of Electrical and Computer Engineering, Worcester Polytechnic Institute*

## **Poster Session I**

**Rivers Memorial, 12:00 – 2:00 p.m.**

## **BIOMATERIALS, TISSUE AND CELLULAR ENGINEERING**

### **6.P1.1 Rat Odontoblast-Like Cell Differentiation in Collagen Scaffolds**

Mary Huelsman, Kristina Gonzalez, Ian Bonzani, Kerry Malone, Sarah Walsh, George Pins, Maura Pavao,  
*Department of Biology, Worcester State College*  
*Department of Biomedical Engineering, Worcester Polytechnic Institute*

**6.P1.2 A Novel Chamber Designed to Quantify Real-Time Renal Cell Response to Hypoxia and/or Pressure**

Alissa L. Russ, Julie S. Martin, Ann E. Rundell, and Karen M. Haberstroh

*Purdue University*

*Department of Biomedical Engineering*

**6.P1.3 The Effect of Copper Ion on Blood Coagulation**

Elias Jelis, David Kristol, Rohit R. Arora, Charles R. Spillert

*New Jersey Institute of Technology*

*UMDNJ-New Jersey Medical School*

**6.P1.4 Thermal Analysis of Poly(desamino arylates)**

Ali Recber, Michael Jaffe, George Collins

*Medical Device Concept Laboratory, Department of Biomedical Engineering*

*New Jersey Institute of Technology*

**6.P1.5 Scaffold Informatics: Multi-Material Strategies for Tissue Scaffolds**

A.L. Darling, S. Khalil, J. Nam, and W. Sun

*Department of Mechanical Engineering and Mechanics*

*Drexel University*

**6.P1.6 Tissue Engineered Constructs: Connectivity Study for Three Dimensional Two-Phase Structures**

C. Gomez, M. F. Demirci, A. Shokoufandeh, W. Sun, W. Regli

*Department of Mechanical Engineering and Mechanics*

*Department of Computer Science*

*Drexel University*

**BIOMECHANICS**

**7.P1.1 Application of Lubrication Theory to Ovum Transport through the Human Fallopian Tube**

Frank Kellogg, Richard Cairncross, and Michele Marcolonogo

*Drexel University, Materials Science and Engineering, Chemical Engineering*

**BIOMEDICAL ENGINEERING EDUCATION**

**12.P1.1 Biomedical Industry Skills Education Program at IEEE EMBS Student Club of Beijing University of Posts and Telecommunications**

Yunfeng Wu and Jingjing He

*School of Information, Beijing University of Posts and Telecommunications*

*School of Computer Science and Technology, Beijing University of Posts and Telecommunications*

**BIOMEDICAL INSTRUMENTATION**

**2.P1.1 Transmission of Light in a Synthetic Fog Medium**

B. R. Babaria, T. L. Alvarez, M.T. Bergen, R.J. Servatius

*Department of Biomedical Engineering, New Jersey Institute of Technology*

*Neurobehavioral Research Laboratory, VA New Jersey Health Care System*

*Department of Neurology & Neuroscience New Jersey Medical School*

**2.P1.2 Velocity and Position Approximations from Left Ventricular 3D Accelerometer Data**

Morten Grimnes, Lars Hoff, Steinar Halvorsen, Ole Jakob Elle, Hans Jørgen Alker, Erik Fosse

*Vestfold University College, Norway, Rikshospitalet University Hospital*

### **2.P1.3 A Device for Quantifying the Severity of Lower Extremity Edema**

Chelsey Fontaine, Brain Weindling, Raymond Dunn, and Kristen L. Billiar  
*Department of Biomedical Engineering, Worcester Polytechnic Institute*  
*Department of Surgery, University of Massachusetts, Medical Center*

### **2.P1.4 Analytical and Numerical Optimization of an Implantable Volume Conduction Antenna**

Brian L. Wessel, Robert J. Scwabassi, Paul Roche, and Mingui Sun  
*Laboratory for Computational Neuroscience*  
*Departments of Neurological Surgery, Electrical Engineering, Bioengineering, and Psychiatry*  
*University of Pittsburgh*

## **BIO-OPTICS**

### **14.P1.1 Q-dots as Probes for Dynamic Observation of Intracellular Pathways**

Elisabeth Papazoglou, Bahar Edrissi, Amir Rezvan, Kambiz Pourrezaei  
*School of Biomedical Engineering*  
*Drexel University*

### **14.P1.2 Spectroscopic Distinguishability of Glucose from Tissues in the Porcine Eye**

A. Ergin, R. Greene, G. A. Thomas  
*Department of Biomedical Engineering, New Jersey Institute of Technology*  
*Departments of Physics, New Jersey Institute of Technology*

## **BIOSENSORS AND BIOMEMS**

### **5.P1.1 Investigating Pathogen-Specific TLR Signaling of Innate Immune Cells for Biosensor Applications**

A. Lottes, H. Oh, H. HogenEsch, M. Ladisch, J. Hutchcroft, A Rundell  
*Purdue University*

### **5.P1.2 Neuroblastoma Biosensor System**

R. Silva, R. Gaumont, E.W. Barrett, M.V. Phelps, H.R. Allcock, N. Vasudevan  
*Bioengineering Department; Chemistry Department; Biology Department*  
*The Pennsylvania State University*

### **5.P1.3 Uniform Acquisition for High-Throughput DNA Sequencing**

Sameh El-Difrawy, Roger Lam, Daniel J. Ehrlich  
*Whitehead Institute for Biomedical Research*

## **CARDIOVASCULAR BIOMECHANICS**

### **9.P1.1 Use of a Genetic Algorithm for Determining Material Parameters in Ventricular Myocardium**

Arun U Nair, David G. Taggart, and Frederick J. Vetter  
*Department of Mechanical Engineering & Applied Mechanics*  
*Department of Electrical & Computer Engineering*  
*University of Rhode Island*

### **9.P1.2 Time-Varying Left Ventricular Elastance Determined by a Finite Element Model**

Rumei Dong, Ying Sun, Frederick J. Vetter, and Salvatore A. Chiaramida  
*University of Rhode Island, Kingston, RI; Medical University of South Carolina*

### **9.P1.3 Velocity Changes in a Model Study of Propagation in a Ring of Stretched Ventricular Myocytes**

Frederick J. Vetter, Haiyan Sui, Hong Liu, and Li Wu  
*University of Rhode Island*

#### **9.P1.4 Quantifying Impedance Defined Flow**

Michelle S. Bovard, Wesley R. Connell, Sarah E. Moore, Joseph L. Palladino  
*Trinity College Department of Engineering*

### **MEDICAL APPLICATIONS OF NANOSYSTEMS AND NANOTECHNOLOGY**

#### **17.P1.1 Carbon Nanofibers: Polycarbonate Urethane Composites as a Neural Biomaterial**

Dongwoo Khang, Janice L. McKenzie, and Thomas J. Webster  
*Departments of Biomedical Engineering, Physics and School of Materials Engineering  
Purdue University*

#### **17.P1.2 Gum Arabic Surface-modified Magnetic Nanoparticles for Cancer Therapy**

Uduak Effiong, Darryl Williams, Wilson Otto, Winston Anderson  
*Department of Biomedical Engineering, Catholic University of America*

### **Oral Presentations**

#### **BME EDUCATION**

#### **Law School A, 2:00 – 3:20 p.m.**

#### **12.1.1 A Cumulative Report on the Biomedical Engineering Research Experiences for Undergraduates Program at Purdue University**

Karen M. Haberstroh and Thomas J. Webster  
*Department of Biomedical Engineering, Purdue University*

#### **12.1.2 Studio Classes Modeled On Complex System Theory In Order To Increase Creativity And Critical Thinking**

Bruno Mantilla, Richard Foulds, Michael Bergen  
*New Jersey Institute of Technology*

#### **12.1.3 Experiential Learning in Neurophysiology for Undergraduate Biomedical Engineering Students**

John DiCecco, Shelly Silva, John Coughlin, Timothy Swaby, Jiang Wu, Ying Sun, Kiyooki Kuwasawa, and Robert Hill  
*Department of Electrical and Computer Engineering, Department of Biological Sciences, University of Rhode Island  
Okayama University of Science*

#### **12.1.4 Virtual Clinical Engineering: From Biomedical Basics to Practical Applications**

J.P. Giuffrida  
*Cleveland Medical Devices, Inc*

#### **NEURAL ENGINEERING**

#### **Law School B, 2:00 – 3:20 p.m.**

#### **1.1.1 Muscarinic Modulation of Firing Mode of Layer II/III Pyramidal Neurons in the Cat Motor Cortex**

Y.D. Zhou, C.P. Wu  
*Department of Biomedical Engineering, Boston University  
Shanghai Brain Research Institute, Chinese Academy of Sciences*

#### **1.1.2 Effects of Amygdala Prestimulation on Neuroplasticity in the Hippocampus**

J. Harry Blaise and Joseph D. Bronzino  
*Department of Engineering, Trinity College*

### **1.1.3 Responses of CA1 Pyramidal Neurons: Comparing the Effects of Dendritic and Somatic Inputs**

Tara Keck, Theoden I. Netoff, and John A. White  
*Boston University Department of Biomedical Engineering,  
Center for Biodynamics, Center for Memory and Brain*

### **1.1.4 Vestibular Stimulation and its Effects on Muscle Tone**

Donald G. Helt III and Richard Foulds  
*New Jersey Institute of Technology*

## **SYSTEMS AND SIGNALS**

### **Law School C, 2:00 – 3:20 p.m.**

#### **4.1.1 Parameter Estimation for Biochemical Pathways by Resolving Inconsistent Experimental Data**

Jiang Wu, Ying Sun, Li Wu, Robert L. Rodgers  
*Department of Electrical and Computer Engineering, Mathematics, and Biomedical Sciences  
University of Rhode Island*

#### **4.1.2 Observations and Analysis of Long-Duration, Constant-Posture, Force-Varying, Fatiguing EMG**

M.V. Bertolina, E.A. Clancy, D. Farina, and R. Merletti  
*Worcester Polytechnic Institute  
Centro di Bioingegneria, Dip. Di Elettronica, Politecnico di Torino*

#### **4.1.3 A Polynomial Approximation to the Neuronal Action Potential as Governed by the Hodgkin-Huxley Equations**

Stathis Leonopoulos and Evangelia Micheli-Tzanakou  
*Conceptual Intelligence Laboratories  
Biomedical Engineering, Rutgers University*

#### **4.1.4 Optimal Estimation of Blood Glucose**

B. Wayne Bequette  
*Department of Chemical and Biological Engineering, Rensselaer Polytechnic Institute*

## **REHABILITATION ENGINEERING**

### **Law School D, 2:00 – 3:20 p.m.**

#### **10.1.1 Motor Unit Control in Human Vastus Lateralis Muscle During Fatigue**

A. Adam and C.J. De Luca  
*NeuroMuscular Research Center  
Boston University*

#### **10.1.2 Developing a Quantitative Measure of Muscle Spasticity**

Darnell Simon, Richard Foulds  
*Department of Biomedical Engineering  
New Jersey Institute of Technology*

#### **10.1.3 Alterations in EMG Patterns During Robotic Assisted Walking**

A.E. Wall and J.M. Hidler  
*Department of Biomedical Engineering, Catholic University  
Applied Neuromuscular Biomechanics Laboratory, National Rehabilitation Hospital*

#### **10.1.4 Design of a Myoelectric Prosthetic Training and Assessment System**

Jason A. Scoufield and Steven Schreiner  
*Department of Biomedical Engineering*  
*Western New England College*

### **Oral Presentations**

#### **BIOMATERIALS TISSUE AND CELLULAR ENGINEERING**

**Law School A, 3:40 – 5:00 p.m.**

##### **6.2.1 Spinning of Collagen Fibers and Characterizing Thermal, Mechanical, Tensile and Structural Properties**

Grace Evanelin Tatagiri, George Collins, Michael Jaffe  
*Department of Biomedical Engineering, New Jersey Institute of Technology*

##### **6.2.2 Biopolymer Deposition for Freeform Fabrication of Tissue Engineered Scaffolds**

S. Khalil, J. Nam, W. Sun  
*Laboratory for Computer-Aided Tissue Engineering, Department of Mechanical Engineering*  
*Drexel University*

##### **6.2.3 Effect of Coating Techniques on the Creation of a Calcified Zone for Implant-Tendon Enteses**

P. Venu, J. L. McKenzie and T.J. Webster  
*Department of Biomedical Engineering, Purdue University*

##### **6.2.4 Applications of Electrospinning: Tissue Engineering Scaffolds and Drug Delivery System**

Shobana Shanmugasundaram, Kimberly Griswold, Charles Prestigiacomo, Treena Arinze, Michael Jaffe  
*Department of Biomedical Engineering, New Jersey Institute of Technology*  
*Department of Neurosurgery and Radiology, University of Medicine and Dentistry of New Jersey*

#### **BIOMECHANICS**

**Law School B, 3:40 – 5:00 p.m.**

##### **7.2.1 Renal Cells Respond Differently on Various Substrates in Response to Hydrostatic Pressure**

Julie S. Martin, Lauren S. Brown, Hiroki Yokota, and Karen M. Haberstroh  
*Department of Biomedical Engineering, Purdue University*  
*Interdisciplinary Engineering, Purdue University*  
*Department of Biomedical Engineering, Indiana University Purdue University at Indianapolis*

##### **7.2.2 Relationship Between Tissue Composition and Biomechanics of the Urinary Bladder: Effects of Spinal Cord Injury on Bladder Tissue**

J. Nagatomi, R. H. Getzenberg, K. Torimoto, M. B. Chancellor, and M. S. Sacks  
*University of Pittsburgh*

##### **7.2.3 Validation of an Inflation Method for Measuring the Strength of Engineered Tissues**

Margo Tilley Frey, Katie Ann Bush, Kristen L. Billiar  
*Department of Biomedical Engineering, Worcester Polytechnic Institute*  
*Department of Biomedical Science, University of Massachusetts Medical School*

##### **7.2.4 Design and Validation of a Test Fixture to Model Hand Arm Vibration Syndrome Using Cultured Mammalian Cells**

Heather Hasulak and Judy L. Cezeaux  
*Department of Biomedical Engineering*  
*Western New England College*

## **BIOMEDICAL INSTRUMENTATION**

**Law School C, 3:40 – 5:00 p.m.**

### **2.2.1 Non-Contact Biopotential Measurement from the Human Body Using a Low-Impedance Charge Amplifier**

Wayne J. Smith, John R. LaCourse

*University of New Hampshire*

*Department of Electrical and Computer Engineering, Biomedical Laboratory*

### **2.2.2 Electrode Chemistry of Prolonged External Pacing**

P.F. Meyer and P.D. Gadsby

*Tyco Healthcare Ludlow*

### **2.2.3 Designing a Cell Phone Adaptor for Biological Waveform Transmission**

Paul A. Roche, Jun Zhao, Mingui Sun, Robert J. Sclabassi

*Laboratory for Computational Neuroscience*

*Departments of Neurosurgery, Bioengineering, and Electrical Engineering,*

*University of Pittsburgh*

### **2.2.4 Light-Guided Environmental Control Device**

Brent David Marsden, Frank Breau, R. John Ellwood, Toby Johnson, Jenna Lewis, Jebediah McCluskey, Ying Sun, Musa Jouaneh, Robert Comerford

*University of Rhode Island*

## **MEDICAL IMAGING**

**Law School D, 3:40 – 5:00 p.m.**

### **3.2.1 A Neural Network Based Method for the Inverse Problem of Electrical Impedance Tomography**

Soumyadipta Acharya, Bruce C. Taylor.

*Department of Biomedical Engineering, The University of Akron*

### **3.2.2 Analysis of Maximum Phase Projection Data for Improvement of Microwave Imaging Background Media**

Sarah Pendergrass, Margaret Fanning, Qianqian Fang, Colleen J. Fox, Timothy Raynolds,

Paul Meaney, Keith Paulsen

*Thayer School of Engineering, Dartmouth College*

### **3.2.3 A New Change Detection Method and its Application to Epilepsy Monitoring Video**

Qiang Liu, Robert J. Sclabassi, and Mingui Sun

*Laboratory for Computational Neuroscience Departments of Electrical Engineering, Neurological Surgery and Biomedical Engineering, University of Pittsburgh*

### **3.2.4 Exploring the Limits of Contactless Electrical Conductivity Imaging**

Mehmet Nejat Tek, Bahram Shafai

*Electrical and Computer Engineering Department*

*Northeastern University*

**Sunday April 18, 2004**

**Oral Presentations**

**PHYSIOLOGICAL MONITORING**

**Law School A, 8:30 – 9:50 a.m.**

**8.1.1 Investigating the Heart Rate Variability Patterns of Posttraumatic Stress Patients using Principal Components Analysis**

Bethany Knorr, Metin Akay, Thomas A. Mellman  
*Thayer School of Engineering,  
Dartmouth Medical School, Department of Psychiatry*

**8.1.2 In vitro Investigation of the Procoagulant Properties of Silver Ion**

Biren A. Bhatt, David Kristol, Charles R. Spillert  
*New Jersey Institute of Technology  
UMDNJ-New Jersey Medical School*

**8.1.3 The Feasibility of Using A Forehead Reflectance Pulse Oximeter for Automated Remote Triage**

Suzanne Wendelken, Susan McGrath, George Blike, Metin Akay  
*Dartmouth College/Thayer School of Engineering  
Dartmouth Hitchcock Medical Center/Anesthesiology*

**8.1.4 Design, Implementation and Validation of a Graphical User Interface for Analysis of Patient Monitor Event Logs**

Megan Friel, John Enderle, Vinnie DeFrancesco, Eric Rosow, Ian Greenshields  
*Biomedical Engineering Department, University of Connecticut  
Biomedical Engineering Department, Hartford Hospital  
Premise Development Corporation*

**REHABILITATION ENGINEERING**

**Law School B, 8:30 – 9:50 a.m.**

**10.2.1 Personal Alerting Technology for People with Hearing Difficulty: Pilot Study**

Stephen Dubin and Stanley Zietz  
*Department of Mathematics, Physics and Computer Science  
University of the Sciences in Philadelphia*

**10.2.2 Light Activated Position Sensing Array for Persons with Disabilities**

Frank Breau, Brent Marsden, Jebediah McCluskey, R. John Ellwood, Jenna Lewis, Toby Johnson, Ying Sun, Musa Jouaneh, Robert Comerford  
*Biomedical Engineering, Mechanical Engineering, and Business Administration  
University of Rhode Island*

**10.2.3 Autonomic Nervous System Response to Locomotor Training with Body Weight Supported Treadmill Walking in Individuals with Incomplete SCI**

S. Bentson, S. Reisman, J. Wecht, G. Forrest, S. Sisto, et al.  
*Kessler Medical Rehabilitation Research and Education Corporation*

**10.2.4 Implementation of a Re-usable Adhesive in a Novel Automated Page-Turner**

Ellaine Abueg, John Coughlin, Nevan Hanumara, Oliver Koenig, Adam Tillinghast and Terry Malaghan  
*University of Rhode Island*

## SYSTEMS AND SIGNALS

**Law School C, 8:30 – 9:50 a.m.**

### **4.2.1 Total Wavelet Entropy Analysis of Cyclic Exercise Protocol on Heart Rate Variability**

A. M. Petrock, S. Reisman, I. Dardik

*Department of Biomedical Engineering, New Jersey Institute of Technology  
Lifewaves International*

### **4.2.2 Evaluation of Pulse Features for Oscillometry**

S. Colak, C. Isik

*Electrical Engineering & Computer Science Department  
College of Engineering and Computer Science  
Syracuse University*

### **4.2.3 Sensitivity Analysis of Cardiac Function Detection for Patients with Ventricular Assist Device Support**

P.A.B Weerakoon and Yih-Choung Yu

*Department of Electrical and Computer Engineering  
Lafayette College*

### **4.2.4 Automated Diagnosis of Ischemic Heart Disease using Dilated Discrete Hermite Functions**

Raghavan Gopalakrishnan, Soumyadipta Acharya, Dale H. Mugler

*Department of Biomedical Engineering, Department of Applied Mathematics  
The University of Akron*

## MEDICAL IMAGING

**Law School D, 8:30 – 9:50 a.m.**

### **3.3.1 Multi-Channel Video for Patient Monitoring based on DCT Compositing**

Jian Xu, Hakki Ilgin, Qiang Liu, Mingui Sun, Robert J. Sclabassi, and Luis. F. Chaparro

*Laboratory for Computational Neuroscience*

*Departments of Electrical Engineering, Neurological Surgery and Biomedical Engineering  
University of Pittsburgh*

### **3.3.2 Differentiating Responses to Odorant Stimuli using the Kalman Filter in an fMRI Experiment**

Jason Steffener, Matthias H. Tabert, Haiying Tang, Truman R. Brown, Davangere P. Devanand, Stanley Reisman

*Department of Biomedical Engineering, New Jersey Institute of Technology*

*Department of Biological Psychiatry, New York State Psychiatric Institute*

*Department of Psychiatry, Columbia University, College of Physicians and Surgeons*

*Department of Radiology, Columbia University, College of Physicians and Surgeons*

### **3.3.3 A Technology for Retrieval of Volume Images from Biomedical Databases**

Deniz Sarioz, Gabor T. Herman, T. Yung Kong

*Department of Computer Science Graduate School and University Center*

*City University of New York*

*Department of Computer Science Queens College*

*City University of New York*

### **3.3.4 Process for Reducing False Negative Mammography Bilateral Registration**

K August, B Biswal, S Reisman

*New Jersey Institute of Technology*

*University of Medicine and Dentistry New Jersey*

## **Oral Presentations**

### **BIOMATERIALS TISSUE AND CELLULAR ENGINEERING**

**Law School A, 10:10 – 11:30 a.m.**

#### **6.3.1 Friction and Wear Characteristics of PVA/PVP Hydrogels as Synthetic Articular Cartilage**

Jayanth K. Katta, Michele S. Marcolongo, Anthony M. Lowman, Kevin A. Mansmann

*Drexel University*

*Arthroscopy Research Institute*

#### **6.3.2 The *in vitro* Interfacial Mechanics of a Bioactive Composite for Mandibular Construction**

E. Ho and M. Marcolongo

*Drexel University*

#### **6.3.3 Designing a Bioreactor to Enhance Cell-Mediated Mineralization of Scaffolds for Bone Tissue Engineering**

Ian Bonzani, Kerry Malone, Sarah Walsh, Maura Pavao, George Pins

*Department of Biomedical Engineering, Worcester Polytechnic Institute*

*Department of Biology, Worcester State College*

#### **6.3.4 NaOH-Treated PLGA Scaffolds Allow for Greater Articular Chondrocyte Functions**

G. E. Park, K. Park, T. J. Webster

*Departments of Biomedical Engineering and Pharmaceutics, School of Materials Engineering*

*Purdue University*

### **BIOMECHANICS**

**Law School B, 10:10 – 11:30 a.m.**

#### **7.3.1 Effects of Stride Length on the Mechanics of the Tibiofemoral Joint**

Jessica Kinnevan and John R. LaCourse

*Biological Engineering Laboratory*

*University of New Hampshire*

#### **7.3.2 A New Method to Develop the Finite Element Model of the Bones in the Hand from CT Scans**

Suneel Battula, Glen O. Njus

*The University of Akron*

#### **7.3.3 The Role of Stiffness in Lumbar Fusion**

Tiefu Shao

*Department of Mechanical & Industrial Engineering*

*University of Massachusetts*

#### **7.3.4 A Method for Using an Ultrasonic Thickness Gauge to Assess Outsole Wear in Running Shoes**

J. Ocif, J. Cappaert, B. Rich

*Reebok International Ltd.*

*Human Performance Engineering Lab*

## **BIOMEDICAL INSTRUMENTATION**

**Law School C, 10:10 – 11:30 a.m.**

### **2.3.1 Design of an Image-Guided Robot System for Measurement, Biopsy and Injection in Rodents**

J.C. Li, P. Kazanzides, R. Taylor, C. Ling, and G. Fichtinger

*Johns Hopkins University*

*Memorial Sloan-Kettering Cancer Center*

### **2.3.2 A LabVIEW Program for the Stimulation of a Vergence Open-Loop Response**

Anuj P. Daftari, Tara L. Alvarez, Florence B. Chua, John L. Semmlow, Claude Pedrono

*Department of Biomedical Engineering, New Jersey Institute of Technology*

*Department of Biomedical Engineering, Rutgers University*

*Department of Surgery, Bioengineering, Robert Wood Johnson Medical School*

*Essilor International S. A. Saint Maur*

### **2.3.3 An Approach to Animating Sign Language: A Spoken English to Sign English Translator System**

Jerome M. Allen, Richard A. Foulds

*Neuromuscular Engineering Laboratory, Department of Biomedical Engineering*

*New Jersey Institute of Technology*

### **2.3.4 Biofuel Cells as a Possible Power Source for Implantable Electronic Devices**

Gusphyl A. Justin, Yingze Zhang, Robert Sclabassi, Mingui Sun

*Laboratory for Computational Neuroscience*

*Departments of Bioengineering, Medicine, Electrical Engineering, and Neurological Surgery*

*University of Pittsburgh*

## **SYSTEMS AND SIGNALS**

**Law School D, 10:10 – 11:30 a.m.**

### **4.3.1 PR and PP ECG Interval Variation during Obstructive Apnea and Hypopnea**

R. Shouldice, S. Ward, L.M. O'Brien, C. O'Brien, S. Redmond, D. Gozal, C. Heneghan

*Department of Electronic & Electrical Engineering, University College Dublin*

*Kosair Children's Hospital Research Institute, University of Louisville*

### **4.3.2 Cross Spectral and Cross-Bispectral Analysis of Hippocampal EEG with ICA Processing**

Taikang Ning and Nhon Trinh

*Department of Engineering, Trinity College*

### **4.3.3 System Theoretic Analysis of Electroencephalogram Data for the Early Identification of Epileptic Seizures**

Amit K. Sinha, William J. Richoux and Kenneth A. Loparo

*Case Western Reserve University*

### **4.3.4 A Fast Adaptive Filter for Electrocardiography**

Soumyadipta Acharya, Dale H. Mugler, Bruce C. Taylor

*Department of Biomedical Engineering, Department of Applied Mathematics*

*The University of Akron*

## Poster Session II

Rivers Memorial, 11:30 a.m. – 1:30 p.m.

### BIOINFORMATICS

#### 15.P2.1 A Component for Remote Viewing and Monitoring of Mechanical Ventilator Data

J.R. Zaleski

*Siemens Medical Solutions Health Services*

### NEURAL ENGINEERING

#### 1.P2.1 Effects of a Single Green Flash Versus a White Flash of Light on Saccadic Oculomotor Metrics

F.B. Chua, A.P. Daftari, T.L. Alvarez, R.M. DeMarco, M.T. Bergen, K.D. Beck, R.J. Servatius

*Department of Biomedical Engineering, New Jersey Institute of Technology*

*Neurobehavioral Research Laboratory, VA New Jersey Health Care System*

*Department of Neuroscience New Jersey Medical School*

#### 1.P2.2 Brainstem Mechanisms Underlying Control of Large Amplitude Saccades

Vaibhav Juneja, Jason Cromer and David M. Waitzman.

*University of Connecticut Health Center*

#### 1.P2.3 Improved Methodology to Facilitate the Recording of Bioelectric Events in the Neonatal Rat Brain

J.W. Griffis, J.H. Blaise, J.D. Bronzino

*Department of Engineering, Trinity College*

### REHABILITATION ENGINEERING

#### 10.P2.1 Lever Propulsion Design for Manual Wheelchairs

Thomas Harrington and Gabby Murphy

*University of Rhode Island*

### SYSTEMS AND SIGNALS

#### 4.P2.1 Detecting Drowsiness While Driving Using Wavelet Transform

Prachi Parikh and Evangelia Micheli-Tzanakou

*Computational Intelligence Laboratories*

*Department of Biomedical Engineering Rutgers University*

#### 4.P2.2 Issues on Hypoglycemia Prediction and Detection

Cesar C. Palerm, B. Wayne Bequette

*Chemical & Biological Engineering, Rensselaer Polytechnic Institute*

#### 4.P2.3 Biomedical signal visualization and analysis system development utilizing Open Source software and a Computer Cluster

Jason C. Tillett, Daniel B. Phillips

*Rochester Institute of Technology*

#### 4.P2.4 Baroreflex Sensitivity Index in Chronic Fatigue Syndrome

D. L. Donnelly, R.H. Rockland, S. S. Reisman, K.S. Quigley

*New Jersey Institute of Technology (NJIT)*

*Engineering Technology and Biomedical Engineering, NJIT*

*Biomedical Engineering, NJIT*

*University of Medicine and Dentistry New Jersey (UMDNJ)*

#### **4.P2.5 Voice-Coil Actuator Control Design for Use in an Elastance-Based Mock Circulatory System**

Matthew Loh and Yih-Choung Yu

*Department of Electrical and Computer Engineering, Lafayette College*

#### **PHARMACEUTICAL ENGINEERING AND DRUG DELIVERY**

##### **13.P2.1 The Effects of Drugs on Pluronic F127 Structure**

P. K. Sharma and S. R. Bhatia

*Dept. of Chemical Engineering*

*University of Massachusetts*

#### **PHYSIOLOGICAL MONITORING**

##### **8.P2.1 Soluble Clotting Factors and the Coagulation Response: an *In Vitro* Study**

Biren A. Bhatt, David Kristol, Charles R. Spillert

*New Jersey Institute of Technology*

*UMDNJ-New Jersey Medical School*

#### **SURGICAL DEVICES**

##### **16.P2.1 Accelerometer-based Measurement of Exercise and Mobility for Pulmonary Rehabilitation**

Delsey M. Sherrill, Paolo Bonato, Marilyn L. Moy, and John J. Reilly

*Spaulding Rehabilitation Hospital*

*Brigham & Women's Hospital*

*Harvard Medical School*

##### **16.P2.2 Development of a Tethered Epicardial Crawler for Minimally Invasive Cardiac Therapies**

Nicholas A. Patronik, Marco A. Zenati, and Cameron N. Riviere

*The Robotics Institute, Carnegie Mellon University*

*Division of Cardiothoracic Surgery, University of Pittsburgh*

#### **TELEMEDICINE AND VIRTUAL REALITY IN MEDICINE**

##### **11.P2.1 A Portable Setup for Comparing Transmittance and Reflectance Pulse Oximeters for Field Testing Applications**

Daniel Traviglia and Yitzhak Mendelson

*Department of Biomedical Engineering and Bioengineering Institute*

*Worcester Polytechnic Institute*

##### **11.P2.2 Effects of Motion Artifacts on Helmet-Mounted Pulse Oximeter Sensors**

William S. Johnston, Paul C. Branche, Chirag J. Pujary, Yitzhak Mendelson

*Department of Biomedical Engineering and Bioengineering Institute*

*Worcester Polytechnic Institute*

##### **11.P2.3 Measurement Reproducibility and Sensor Placement Considerations in Designing a Wearable Pulse Oximeter for Military Applications**

Paul C. Branche, William S. Johnston, Chirag J. Pujary, Yitzhak Mendelson

*Department of Biomedical Engineering and Bioengineering Institute*

*Worcester Polytechnic Institute*

#### **TOPICS IN BIOENGINEERING**

##### **18.P2.1 Provisional Patents Solve Inventors' Problems**

Richard R. Michaud

*McCormick, Paulding & Huber LLP*

**18.P2.2 FMEA Software Program for Managing Preventive Maintenance of Medical Equipment**

Zacarias De Lemos

*Department of Biomedical Engineering*

*University of Connecticut*

**18.P2.3 Characterizing Neuropathy in the Sciatic Nerve of a Poly I:C - Induced Rat Model of Type 1 Diabetes**

Walker F. League-Pike, David L. Mason and Ross D. Shonat

*Department of Biomedical Engineering*

*Worcester Polytechnic Institute*

**18.P2.4 Effect of Tissue Factor on Plasma and Packed RBC Clotting Parameters**

Darshana R Patel, John Davidson, David Kristol, Charles R. Spillert

*New Jersey Institute of Technology*

*UMDNJ-New Jersey Medical School*

**18.P2.5 Web Browser Software with Single Switch Interface for PDAs or Computers**

Sareh Rajaei

*University of Rhode Island*

**18.P2.6 Universal Remote Alarm System by Using Virtual Instrumentation and Labview Graphical Programming**

Umair H. Siddiqui

*University of Connecticut*

*Biomedical Engineering Department*

**18.P2.7 Computational Studies of Cell Migration**

E. Jabbarzadeh, C. F. Abrams

*Department of Chemical Engineering, Drexel University*

---