



DEPARTMENT OF BIOMEDICAL ENGINEERING

24th Annual Senior Project Conference

— Friday, May 1, 2009 —

7:15 – 8:00 AM Continental Breakfast

8:00 AM Welcome and Opening Remarks: Prof. Irving Bigio

8:10 – 10:15 AM SESSION I

PHO 206 Fooling Mother Nature: Tissue Engineering and Tissue Manipulation

Session Chair: Prof. Joyce Wong

Design of Experimental and Statistical Tools for Analyzing Mechanical Regulation of Tissue Fate
Daniel Bellin, Karen Chien

Articular Cartilage Deformation in an Osteochondral Plug Model
Mohit Butaney, Mathew Stephen

Cavitation-Enhanced Fragmentation of Tissue Using Ultrasonic Surgical Aspirating Horns
Derek Yue Cao, Brian Roach

Tissue Stretcher System for Engineered Small Diameter Blood Vessels
Warren Ferris, Timothy Lyford, Sean Taylor

A Bottom-Up Approach for Engineering 3D Vascularized Tissue Constructs
Majid Ghodousi, Nikhil Haas

Engineering a 3D Lung Extracellular Matrix
Avinash Oza, Kelsey Derricks

Monitoring Glucose Levels with Fluorescent Sensors in Tissue-Engineered Constructs
Mary Balaconis, Jaclyn Lautz

3D Freeform Fabrication of a Hybrid Hydrogel Scaffold
Francis Doyle, Jr., Samuel Polio

10:15 – 10:30 AM BREAK

10:30 – 12:30 PM SESSION IIa
PHO 206 A Picture of Life: Imaging

Session Chair: Prof. Tom Szabo

A New Concept in High Definition Digital X-Ray Imaging
Madeline Abrams, Justin Martin

Sensor Locator for Surface EMG Array
Megan Fessenden, Allie Paquette

Quantifying Multi-Spectral Parameters in Tissue-
Mimicking Gel Phantoms that Exhibit Magnetization
Transfer Phenomena: A Multi Field Study
**Natalya Kotlyar, Katherine Schwendinger-Roy,
Jaime Shaw**

Design of an Anatomical Ultrasound Simulator
Kevan Desai, Michael Habib, David Scaduto

Driving System for a Portable Ultrasound Brain Imaging
Device for Use in Forward Battlefield Areas
Julie Duran, Karla Mercado

Optical Imaging of Coral Regeneration at the Cellular
Level
Ryan Burke, Lauren Tuthill

HiLo Fluorescence Endomicroscope
Visar Ajeti, Brett Allaire

10:30 – 12:30 PM SESSION IIb
PHO 205 NUMB3RS:
Computation/Simulation
/Analysis

Session Chair: Prof. Ed Damiano

Analysis Methods for Neurovisual Rehabilitation
David Ahern, Muftah Ahmed

Simulating Echolocation Systems Using Computational
Models of Auditory Physiology
Andrew Dumas, Andrew Rothman

The Role of Temporal Fine Structure Cues in Enhancing
Speech Intelligibility for Simulated Cochlear Implant
Listening
Sruthi Ramakrishnan, Swathi Ramakrishnan

Asymmetries in Experimentally-Measured Inter-Aural
Time and Level Sensitivity: Dependence on Spatial
Origin and Type of Stimulus
Raymond Keffer, Akshay Navaladi

Implications of a Meta-Analysis of the Control Properties
of Motor Units
Joshua Kline

Determination of Viscoelastic Properties of a Blood Clot
via Acoustic Levitation
Kai Pong, Hiroo Shimoda, Hsiaoching Teng

The Effects of a Soy Protein Diet on the Bone Material
and Structural Properties of Estrogen-Depleted
Cynomolgus Monkeys
James Schmitz, Sonia Shah

DNA Sequence Analysis of Genes Linked to
Schizophrenia
Mary Harrison, Amy Nehring

12:30 – 1:15 PM LUNCH

1:15 – 3:00 PM
PHO 206

SESSION IIIa
What's up, Doc?:
Diagnostic Technologies
and Microfluidic Systems

Session Chair: Prof. Chris Passaglia

Development of an Automated Microfluidics Platform for Chemical Methodology

Meredith Blakely, Anna Yanko

Pressure Control of Optical Fiber Probes Used for Detecting Cancer

John D'Agostino, Gregory Ekchian

A Thermoplastic Micro-Electro-Mechanical System (MEMS) for Microfluidic Diagnostic Platforms

Theodorus de Groot, Megan Rexus

Development of Microfluidic Device Technology for HIV Diagnostics

Peter Lombardozi, Anoli Shah

Developing an Automated Microfluidic Device to Purify and Concentrate Bacteria from Whole Blood for SERS Bacterial Diagnosis

Michael Koan, Kenny Lin, Shauna Zane

Compact Label-Free Immunoassay Diagnostic Platform for Global Health

George Daaboul, David Rozenberg, Rahul Vedula

A Microfluidic Chip for Analysis of Mechanical Forces Generated During Cell Migration

Sean Collignon, Else Frohlich

1:15 – 3:00 PM
PHO 205

SESSION IIIb
Wired: Instrumenting
Living Systems and
Measurement of *in vivo*
Conditions

Session Chair: Prof. Kamal Sen

Transmitter Board Enclosure Design for EM Tracking System

Michael Augelli, Yue Ma

Design and Integration of a Temperature Sensor into the BIS Monitoring System

Bruce Miller, Lauren Ouellette

Ambulatory Vestibular Monitoring Device

Guilherme Goretkin, Kevin Lada

Design of Real-Time System for Partitioning Volume versus Flow Dependence of Respiratory System Resistance in Asthmatics

Nathaniel Steiger, Brian Trautman

The Effects of Mechanical Forces on the Progression of Emphysema

Gopesh Sharma, Venkat Subramaniam

Understanding Contrast Adaptation in Vision

Wilson Kwan, Wan Seo

Design of an Apparatus to Assess the Visual Abilities of Rats

John Greifenberger, Nathan Lavallee

3:00 – 3:15 PM

BREAK

3:15 – 5:00 PM

SESSION IV

PHO 206

Small Things: Nanotechnology, Molecules, Cellular Control

Session Chair: Prof. Steve Colburn

Nanotechnology in Biomedical Engineering: Nanoelectrical Biosensors
Kyum Lee, Willie Feng

Nanotechnology in Biomedical Engineering: Nanomechanical Biosensors
Nirav Bhavsar, Anand Patel

Threshold-Based Detection in *Escherichia coli*: Interfacing Synthetic Gene Networks
Ioana Lupascu, David Shi

Acoustically-Driven Microbubbles Mediate Cellular Uptake of Impermeable Biomolecules
Ruby Gill, Brittany Simone

Triggering Genetic Toggle Switch through Ultrasound-Induced Heating
Willis Hong, Jason Maley

Design and Characterization of a Polymer-Based Implant for Treatment of Age-Related Macular Degeneration
Rahul Ahuja, Balaji Nithianadam

Optimizing Drug Delivery Systems Using Single Molecule Imaging in Live Cells
Aaron Colby, Ankita Shah

**5:00 PM Final Conference Comments: Prof. Irving Bigio, Prof. Thomas Szabo,
Dean Kenneth Lutchen, BMES President Akshay Navaladi
RECEPTION IN THE ATRIUM, 2nd FLOOR, PHOTONICS CENTER**
