2005 Summer Bioengineering Conference Student Award

Competition Chair
Dr. Amy L. Lerner

We gratefully acknowledge partial support from the Whitaker Foundation!

Bachelors Level Competition:

Competition Chair: X. Sheldon Wang

Solids, Design and Rehabilitation:

1st place: Mindy I Ezra, Tulane University

Three-Dimensional Reconstruction of Trabecular Bone Tissue

2nd place: Nicholas Stepenosky, Rowan University

Comparison of Pz, Fz and Cz Event Related Potentials for the Early Diagnosis of Alzheimer's Disease

3rd place: Mariana Kersh, University of Wisconsin – Madison

How Does Normal Flexion Patellofemoral Contact Area Change Before and After Deep Knee Flexion?

Honorable Mentions:

Meghan McGee, Michigan Technical University
Cross-Sectional and Whole Bone Structural Properties of Bear Femurs are not Compromised by Annual Periods of Disuse
Robert Held, University of Washington
Annular Phased-Array High Intensity Focused Ultrasound Device for Image-Guided Therapy

Cell and Tissue, Biofluids and Heat Transfer:

1st place: Vishal Patel, Georgia Institute of Technology

Wavelet-Based Characterization of Small-Scale Turbulent Structures in a Mechanical Heart Valve Flow

2nd place: Andrea Les, Stanford University

Comparison of Hemodynamic Parameters across species in Normal and Aneurysmal Abdominal Aortas using Magnetic Resonance Imaging and Computational Fluid Dynamics

3rd place (tie):

Hiroki Kamada, Tohoku University
Computer Simulation of Formation of Primary Thrombus due to Platelet Aggregation using Particle Method
Alex Pang, Stanford University
Computer Simulation of Venous Occlusion Induced by Pacing Leads

Honorable Mention:

Patrick Harrington, Michigan State University
Sensitivity Analysis of Arrhenius Parameters for Denaturation of Collagen

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MS Level Competition:

Competition Chairs: Matthew Gounis and James Iatridis

Solids, Design and Rehabilitation I:

1st place: Casey L Korecki, University of Vermont

"Determination of Baseline Loading Levels and Dependent Variables for Use in an Intervertebral Disc Organ Culture System"

2nd place: Lu Li, University of Kansas

"Effect of Whole Body Vibration on Reposition Sense and Dynamic Low Back Stability"

3rd place (TIE):

Bradley S Davidson, Virginia Tech

"Lumbar Extensor Fatigue Affects Postural Control by Increasing Ankle Stiffness"

Silvia Wongum, Eindhoven University of Technology

"Why Does an Intervertebral Disc Herniate in a Period of Life in which Tissue Stresses Are Decreasing?"

Honorable Mention: Yifei Dai, University of Notre Dame

"Sensitivity of B-Spline Surface Fitting of a Verterbral Endplate Using Least Squares"

Solids, Design and Rehabilitation II:

1st place: Kristen L. Moffat, Columbia University

"Characterization of the Mechanical Properties of the ACL-Bone Insertion Site"

2nd place: Saikat Pal, University of Denver

"Probabilistic Finite Element Modeling of TKR Wear"

3rd place: Timothy D. Schwab, University of British Columbia

"Ligaments Subjected to Cyclic Fatigue Fail Sooner and Strain More than Those Subjected to Static Creep at High Stress"

Honorable Mentions:

Evan J Goldberg, University of Texas at Austin

"Compensatory Strategies in Response to Decreased Muscle Strength During Normal Walking"

Bhaskar Thoomukuntla, University of Kansas

"Validation of an MRI-Based Method for In Vivo Joint Contact Mechanics Analyses"

Cell and Tissue:

1st place (TIE):

Kristy T Salisbury, Boston University

"Mechanobiological Regulation of Molecular Expression and Tissue Differentiation During Bone Healing"

Taras Juzkiw, University of Toronto

"Direct Measurements of Human Trabecular Meshwork Cell Stiffness"

3rd place: Melissa A Deitzer, University of Miami

"Effects of Fibrinolytic Inhibitors on the Chondrogenesis of Bone Marrow Mesenchymal Stem Cells in Fibrin Gels"

Honorable Mentions:

Karin A Wartella, Virginia Commonwealth University

"Bioreactor for Application of Biaxial Mechanical Stimulation to Tissue Engineering Constructs"

Kevin K Toosi, University of Pittsburgh

"Changes in the Mechanical Properties of the Rat Urinary Bladder Following Long-Term Spinal Cord Injury"

Biofluids and Heat Transfer:

1st place: Ralph D. Nyilas, Imperial College of Science, Technology and Medicine

"Towards a New Geometric Approach to Assess the Risk of Rupture of Abdominal Aortic Aneurysms Using Patient Specific Modeling"

2nd place: Hyun Jin Kim, Stanford University

"One-Dimensional and Three-Dimensional Finite Element Simulations of Blood Flow for Spinal Cord Injury Patients"

3rd place: Raghav Goel, University of Minnesota

"Enhancement of Cryoinjury to Prostate Tumors by Targeted Delivery of TNF-a Bound Gold Nanoparticles"

Honorable Mentions

Tomohiro Fukui, Tohoku University
"Differentiation of Vascular Diseases by Pulse Wave Propagation Analysis; Fluid-Solid Interaction Study"
Amit Ogata, Keio University
"Shear Dependence of Adhesive Force of Artificial Platelet Measured by Atomic Force Microscopy"

PhD Level Poster Competition:
Competition Chair: Michele Grimm

Solids, Design and Rehabilitation:

1st place: Andrew E. Anderson, University of Utah

Validation of Bone Strains and Cartilage Contact Stress in a 3-D Finite Element Model of the Human Hip

2nd place: Eric C. Huang, University of Minnesota

Active Iris Mechanics and Pupillary Block: Analysis of Anatomical Risk Factors of Primary Angle-Closure Glaucoma

3rd place: Seungbum Koo, Stanford University

Patterns of Cartilage Degeneration for ACL Deficient Patients Are Influenced by Gait Mechanics

Honorable Mentions:

Amy E. Kerdok, Harvard University
Identification of Nonlinear Constitutive Law Parameters of Breast Tissue
Brian P. Kelly, University of Tennessee Health Science Center
Tension-Compression Nonlinearity in Chondrocyte-Seeded Agarose Hydrogels

Cell and Tissue:

1st place: Kelly B. Emerton, The City College of the City University of New York

Biconjugate Nano-Labeling of Intracellular Proteins within Fixed and Living Cells

2nd place: Helene Karcher, Massachusetts Institute of Technology

A Coarse-Grained Model for Force-Induced Protein Deformation

3rd place: Belinda Yap, Massachusetts Institute of Technology

Mechanical Deformation of Neutrophils into Narrow Channels Induces Pseudopod Projection and Changes in Biomechanical Properties

Honorable Mentions:

Caren E. Petrie, University of Virginia
Novel Osteogenic Progenitor Cells
George C. Engelmayr, University of Pittsburgh
A Structural Model for Predicting the Effective Stiffness of Engineered Heart Valve Tissues Based on Nonwoven Scaffolds

Biofluids and Heat Transfer:

1st place:

Veronica Gambillara, …cole Polytechnique FÈdÈrale de Lausanne
Effect of Cyclic Reversal Flow on Endothelium and SMC Cell Metabolism on Pig Carotid Arteries

2nd place:

T. Alexander Quinn, Columbia University
Design of Experiments Methodology for Biventricular Pacing Optimization

3rd place:

Beverly T Tang, Stanford University
Comparison of Wall Shear Stress in the Human Abdominal Aorta During Resting and Simulated Exercise Conditions: Application to in vitro Endothelial Cell Gene Expression

Honorable Mentions:

Anne-Virginie LB Salsac, University of California San Diego
Physiological Relevance of the Changes in Hemodynamic Stresses for Circulating Blood Cells in Abdominal Aortic Aneuryxms
Jonathan Barletta, Georgia Institute of Technology
Transient Temperature Distributions During Electrical Pulsing of Filaments Used for Microporation of Skin

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PhD Level Podium Competition:
Competition Chair: Michele Grimm

Solids, Design and Rehabilitation:

1st place: Blaine Christiansen, Washington University in St. Louis
The Effect of Varying Magnitudes of Whole-Body Vibration on Various Skeletal Sites in Mice

2nd place: Tamim Diab, Rensselaer Polytechnic Institute
Dimorphic Damage Development and Toughness Loss Optimize Bone Fatigue Resistance

3rd place: James Chris Fritton, Cornell University
Adaptation of Cancellous Bone Mass and Architecture following Orchidectomy and Loading

Honorable Mentions:

Zuoping Li, University of Alabama, Birmingham
Finite Element Modeling of the Human Pelvis
Jason T Maikos, Rutgers University
In Vivo Tissue-Level Thresholds for Spinal Cord Injury
Costin D Untaroiu, University of Virginia
Validation of Finite Element Model of the Human Lower Limb in Dynamic Lateral Bending

Cell and Tissue:

1st place: Craig L Duvall, Georgia Institute of Technology

Osteopontin Deficient Mice Display Reduced Vascular Response and Altered Bone Properties During Fracture Healing

2nd place: Krishna Sarangapani, Georgia Institute of Technology

Dead Zone Distributions in Selectin-Mediated Interactions

3rd place: Bahar Bilgen, Northeastern University

The Use of Particle Image Velocimetry to Validate Computational Fluid Dynamics Modeling of a Wavy-Walled Bioreactor for Cartilage Tissue Engineering

Honorable Mentions:

Ericka Bueno, Northeastern University
Effect of Bioreactor Geometry on the Efficiency of Chondrocyte Attachment to Polymer Scaffolds
Xiefan Lin, University of Virginia
Leukocyte Rolling on Nanopatterned Surfaces of P-Selectin
Kristin Michael, Georgia Institute of Technology
Focal Adhesion Kinase Regulates Cell Adhesion Strenghtening

Biofluids and Heat Transfer:

1st place: Joan M Greve, Stanford University

Development of Methods to Non-Invasively, Longitudinally Quantify Hemodynamics in a Rat Model of Abdominal Aortic Aneurysm using Magnetic Resonance Imaging and Computational Fluid Dynamics

2nd place: Christopher M Yakacki, University of Colorado at Boulder

Optimized Thermomechanics of a Shape-Memory Polymer Stent to Recover at Body Temperature

3rd place: Steve R Lammers, University of Colorado

Conjugation Efficiency of Functionalized Microbubbles for Targeted Ultrasound-Based Molecular Imaging

Honorable Mentions:

Anna M Fallon, Georgia Institute of Technology
Characterization of Thrombosis causes by Flow through Various Channels Approximating the Hinge Region of Mechanical Heart Valves
Zhonghua Li, North Carolina State University
Computation Fluid-Structure Interaction Analyses Applied to a Stented Abdominal Aortic Aneurysm
Binjian Sun, Georgia Institute of Technology
Ex Vivo Multi-Contrast MRI of Atherosclerotic Plaque under Simulated In Vivo Conditions