

SATURDAY, OCTOBER 9, 2010

PLATFORM SESSION - 9-1 - 10:30AM - 12:00PM

Track: Tissue Engineering * - 9-1-1

Novel Biomaterials and Scaffolds - III

Chairs: Stephanie Bryant, Sang Jin Lee

Room 12A

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 10:30AM **OP-9-1-1A - Photopolymerizable Laminin-PEG Hydrogels for Intervertebral Disc Regeneration**
A. T. Francisco¹, J. W. Ogle¹, C. L. Gilchrist¹, J. Chen¹, S. L. Craig¹, and L. A. Setton¹
¹Duke University, Durham, NC
- 10:45AM **OP-9-1-1B - *In Situ* Forming Transient-Network Hydrogels for Tissue Morphogenesis**
B. Liu¹, Y. Liu¹, and W. Shen¹
¹University of Minnesota, Minneapolis, MN
- 11:00AM **OP-9-1-1C - Hydrogels with Time-Dependent Mechanical Properties Enhance Cardiomyocyte Differentiation *In Vitro***
J. L. Young¹, and A. J. Engler¹
¹UC San Diego, La Jolla, CA
- 11:15AM **OP-9-1-1D - Click Chemistry for Synthesis of Modular Poly(ethylene glycol) (PEG) Scaffolds**
P. K. Nguyen¹, and D. L. Elbert¹
¹Washington University in St. Louis, Saint Louis, MO
- 11:30AM **OP-9-1-1E - Tuning Mechanical Properties of Multiphoton-Fabricated, Biological Macromolecular Scaffolds**
E. Spivey¹, C. E. Schmidt¹, and J. B. Shear¹
¹The University of Texas at Austin, Austin, TX
- 11:45AM **OP-9-1-1F - Fabrication of Chemoselectively Crosslinked Hydrogels via Staudinger Ligation**
K. M. Gattas-Asfura¹, and C. L. Stabler¹
¹University of Miami, Miami, FL

Track: Systems Biology, Bioinformatics and Computational Biology - 9-1-2

Modeling of Biomolecules and Their Interactions

Chairs: Rohit Pappu, David Sept

Room 12B

- 10:30AM **OP-9-1-2A -SH1 Provides Additional Flexibility for the Rotation of Myosin VI's Converter Domain**
Y. Zhang¹, and J-C. Liao¹
¹Columbia University, New York, NY
- 10:45AM **OP-9-1-2B -Development of Small Molecules Models for the AMOEBA Polarizable Force Field**
J. C. Wu¹, and P. Y. Ren¹
¹The University of Texas at Austin, Austin, TX
- 11:00AM **OP-9-1-2C -Editing and Aligning Complex Molecular Pathways Using 3D Models**
B. Yankama¹, R. Umeton^{1,2}, S. Ayyadurai¹, and C. F. Dewey¹
¹Massachusetts Institute of Technology, Cambridge, MA, ²University of Calabria, Rende, CS, Italy

- 11:15AM **OP-9-1-2D -Monte Carlo Analysis of Neck Linker Extension in Native and Mutant Kinesin Molecular Motors**
W. O. Hancock¹, M. L. Kutys¹, and J. Fricks¹
¹Penn State University, University Park, PA
- 11:30AM **OP-9-1-2E -Systems Analysis of the Mechanisms of *Clostridium difficile* Toxins A and B**
K. M. D'Auria¹, G. M. Donato¹, M. C. Gray¹, E. L. Hewlett¹, and J. A. Papin¹
¹University of Virginia, Charlottesville, VA
- 11:45AM **OP-9-1-2F -A Parallel Approach to Creating a Quantitative Pathway Model for NO Production in Endothelial Cells**
A. Koo¹, A. Surendran^{1,2}, J. M. Wentz¹, M. I. Legrand¹, J. E. Yazbek¹, and C. F. Dewey Jr¹
¹Massachusetts Institute of Technology, Cambridge, MA, ²National University of Singapore, Singapore, Singapore, Singapore

Track: Biomedical Imaging and Optics - 9-1-3

Biophotonics - II

Chairs: Aydogan Ozcan, Chris Rylander
Room 19A

- 10:30AM **OP-9-1-3A - Lensfree Differential Interference Contrast (DIC) Microscopy on a Chip**
C. Oh¹, S. O. Isikman¹, M. Lee¹, and A. Ozcan^{1,2}
¹Electrical Engineering Department, University of California, Los Angeles, CA, ²California NanoSystems Institute (CNSI), University of California, Los Angeles, CA
- 10:45AM **OP-9-1-3B - Ultra High-throughput Lensfree Fluorescent Imaging Using Compressive Sampling**
A. F. Coskun¹, I. Sencan¹, T-W. Su¹, and A. Ozcan¹
¹UCLA Electrical Engineering Dept., Los Angeles, CA
- 11:00AM **OP-9-1-3C - Lensfree Color and Monochrome On-chip Imaging of *Caenorhabditis Elegans* Over a Wide Field-of-View**
S. O. Isikman¹, I. Sencan¹, O. Mudanyali¹, W. Bishara¹, C. Oztoprak¹, and A. Ozcan^{1,2}
¹UCLA Electrical Engineering Dept., Los Angeles, CA, ²California NanoSystems Institute (CNSI), University of California, Los Angeles, CA
- 11:15AM **OP-9-1-3D - A General and Label-Free Method for Assessing Cellular Attachment Using Photonic Crystal Biosensors**
E. A. Lidstone¹, V. Chaudhery¹, A. Kohl¹, L. Trump¹, L. B. Schook¹, and B. T. Cunningham¹
¹University of Illinois at Urbana-Champaign, Urbana, IL
- 11:30AM **OP-9-1-3E - Multiplexed and Reiterative Fluorescence Labeling via DNA-Circuit Technologies**
D. Y. Duose¹, R. M. Schweller¹, W. N. Hittelman², and M. R. Diehl¹
¹Rice University, Houston, TX, ²M.D Anderson Cancer Center, Houston, TX
- 11:45AM **OP-9-1-3F - Lensfree Incoherent Microscopy on Nano-Structured Chips**
B. Khademhosseini¹, I. Sencan¹, G. Biener¹, T-W. Su¹, A. Coskun¹, D. Tseng¹, and A. Ozcan^{1,2}
¹UCLA, Los Angeles, CA, ²California NanoSystems Institute, Los Angeles, CA

Track: Neural Engineering - 9-1-4

Neural Control of Movement

Chairs: Robert Kirsch, Brian Schmitt
Room 19B

- 10:30AM **OP-9-1-4A - Enhancing the Performance of an Upper Extremity FES System via Feedback and a Mobile Arm Support**
S. Solanki¹, and R. F. Kirsch^{1,2}
¹Case Western Reserve University, Cleveland, OH, ²Cleveland Functional Electrical Simulation Center, Cleveland, OH
- 10:45AM **OP-9-1-4B - Trunk Dynamics in Response to Position Perturbations**
E. Miller¹, B. Bazrgari², B. Hendershot¹, M. Nussbaum², and M. Madigan²
¹Virginia Tech - Wake Forest, Blacksburg, VA, ²Virginia Tech, Blacksburg, VA
- 11:00AM **OP-9-1-4C - Decoding of Arm End Point Trajectory Using Local Field Potentials from Primate Primary Motor Cortex**
M. Mollazadeh¹, V. Aggarwal¹, A. Law², A. Davidson², M. Schieber², and N. Thakor¹
¹Johns Hopkins University, Baltimore, MD, ²University of Rochester, Rochester, NY

- 11:15AM **OP-9-1-4D - Spike Distribution Analysis of Surface EMG from Stroke Survivors**
X. Li¹, N. Suresh¹, F. J. Nezhad¹, W. Z. Rymer^{1,2}, and P. Zhou^{1,2}
¹Rehabilitation Institute of Chicago, Chicago, IL, ²Northwestern University, Chicago, IL
- 11:30AM **OP-9-1-4E - Role of Tendon Vibration in Multijoint Reflex Coupling of the Hemiparetic Arm Post Stroke**
B. Gadhoke¹, and B. D. Schmit¹
¹Marquette University, Milwaukee, WI
- 11:45AM **OP-9-1-4F - Recording Swallowing Patterns for Activating a Functional Electrical Stimulation System for Dysphagia**
A. J. Hadley^{1,2}, K. Krival³, and D. Tyler^{1,2}
¹Case Western Reserve University, Cleveland, OH, ²Functional Electrical Stimulation Center, Cleveland, OH, ³Kent State University, Kent, OH

Track: Cellular and Molecular Engineering - 9-1-5

Molecular Engineering - III

Chairs: Jennifer Maynard, Jonathan Silberg
Room 18A

- 10:30AM **OP-9-1-5A - Molecular Mechanisms of Radiation-Induced Brain Injury for Treatment of Brain Tumor Patients Injury for Treatment of Brain Tumor Patients**
W. H. Lee¹, W. E. Sonntag², and Y. W. Lee¹
¹Virginia Tech-Wake Forest University, Blacksburg, VA, ²University of Oklahoma Health Sciences Center, Oklahoma City, OK
- 10:45AM **OP-9-1-5A - Engineering a Human Methionine Lyase as a Cancer Therapeutic**
O. M. Paley¹, E. Stone¹, B. Ekerdt¹, S. Yang¹, and G. Georgiou¹
¹University of Texas, Austin, Austin, TX
- 11:00AM **OP-9-1-5A - Hydrogel Encapsulated Glucose Oxidase: Effect on Cell Growth and Proliferation**
R. M. Khan¹, A. Guiseppi-Elie², and P. Vadgama¹
¹Queen Mary University of London, London, United Kingdom, ²Clemson University, Clemson, SC
- 11:15AM **OP-9-1-5A - Light-induced Activation of Caged Morpholino Oligonucleotides in Embryonic Zebrafish**
C. M. Jarreau¹, E. Menelaou¹, K. Svoboda¹, and T. Monroe¹
¹Louisiana State University, Baton Rouge, LA
- 11:30AM **OP-9-1-5A - Parallel "One-Pot" Synthesis of Synthetic Genes that Encode Protein Polymers**
M. Amiram¹, F. Garcia Quiroz¹, and A. Chilkoti¹
¹Duke university, Durham, NC
- 11:45AM **OP-9-1-5A - Modulation of Binding Site Density on an Elastic Fiber by Cyclic Stretch**
S. Amin¹, A. Majumdar¹, and B. Suki¹
¹Boston University, Boston, MA

Track: Cellular and Molecular Engineering - 9-1-6

Cell Motility

Chairs: Amina Qutub, Maribel Vazquez
Room 18B

- 10:30AM **OP-9-1-6A - Stem Cells Migrate and then Differentiate on Matrices with Physiological Elasticity Gradients**
J. R. Tse¹, and A. J. Engler¹
¹University of California, San Diego, La Jolla, CA
- 10:45AM **OP-9-1-6B - Endothelial Progenitors Migrate More Efficiently Than Adult Endothelial Cells: Role of SM22/Transgelin**
L. Moldovan¹, and N. I. Moldovan¹
¹Davis Heart and Lung Research Institute, The Ohio State University, Columbus, OH
- 11:00AM **OP-9-1-6C - Cell-Cell Adhesion Between Invasive Cells Promotes Persistent Cell Migration in a Three-Dimensional Matrix**
W. Shih¹, and S. Yamada¹
¹University of California, Davis, CA

11:15AM **OP-9-1-6D - Epidermal Growth Factor Regulates Medulloblastoma *In Vitro* Migration**
V. Dudu¹, V. Rotari¹, Q. Kong², and M. Vazquez¹
¹City College of New York, New York, NY, ²University of Illinois at Urbana-Champaign, Urbana, IL

11:30AM **OP-9-1-6E - Dynamic Actin Densities in the Axon of Sensory Neurons**
J. Chetta¹ and S. Shah¹
¹University of Maryland, College Park, MD

11:45AM **OP-9-1-6F - Mechanics of Leukocyte Transmigration through Endothelial Cell Monolayers**
K. M. Stroka¹, and H. Aranda-Espinoza¹
¹University of Maryland, College Park, MD

Track: Cardiovascular Engineering - 9-1-7

Vascular Structure and Function II: Growth and Remodeling

Chairs: Jessica Wagenseil, David Vorp

Room 18C

10:30AM **OP-9-1-7A - Mechanics of Developing Arteries with Reduced Elastin Amounts**
V. Le¹, and J. Wagenseil¹
¹Saint Louis University, St. Louis, MO

10:45AM **OP-9-1-7B - Three-Dimensional Microscopy to Study Regional Microstructural Changes during Aneurysm Development**
S. Saatchi¹, J. Azuma¹, N. Wanchoo¹, P. S. Tsao¹, S. J. Smith¹, P. G. Yock¹, and C. A. Taylor¹
¹Stanford University, Stanford, CA

11:00AM **OP-9-1-7C - Association of Wall Strength of Ascending Thoracic Aneurysms with Different Aortic Valve Morphologies**
J. E. Pichamuthu^{1,2}, J. A. Phillippi^{1,3}, T. G. Gleason^{1,3}, and D. A. Vorp^{1,2}
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA, ³HLESI, Pittsburgh, PA

11:15AM **OP-9-1-7D - Comparison of the Postnatal Somatic Growth Patterns between the Pulmonary Trunk and Ascending Aorta**
B. Fata¹, D. Gottlieb², A. Cois³, G. Stetten¹, J. Mayer², and M. Sacks¹
¹University of Pittsburgh, Pittsburgh, PA, ²Children's Hospital of Boston, Harvard Medical School, Boston, MA, ³Carnegie Mellon University, Pittsburgh, PA

11:30AM **OP-9-1-7E - A New Constitutive Model of Arterial Wall Based on Finite-Strain Micromechanical Method**
H. Chen¹, Y. Liu¹, X. Zhao¹, and G. S. Kassab¹
¹Indiana University-Purdue University, Indianapolis, IN

11:45AM **OP-9-1-7F - The Mechanical Behavior of Arteries Under Torsion**
S. D. Lamm¹, J. R. Garcia¹, and H-C. Han¹
¹University of Texas at San Antonio, San Antonio, TX

Track: Cardiovascular Engineering - 9-1-8

Cardiovascular Computational Modeling and Measurement - II

Chairs: Todd Doehring, George Engelmayr

Room 18D

10:30AM **OP-9-1-8A - Simulations of Anisotropic Cardiac Tissue Formation Within Accordion-like Honeycomb Scaffolds**
A. Jean¹, A. Parkar¹, N. Masoumi¹, and G. C. Engelmayr¹
¹The Pennsylvania State University, University Park, PA

10:45AM **OP-9-1-8B - Effect of Smooth Muscle Contraction on Residual Stress in the Canine Aorta: an Experimental and Numerical Study**
C. Bellini¹, and E. S. Di Martino¹
¹University of Calgary, Calgary, Alberta, Canada

11:00AM **OP-9-1-8C - Mathematical Modeling of Transendothelial Water Transport and the Resulting Oncotic Paradox: Possible Link to Early Atherosclerosis?**
S. Joshi¹, K-M. Jan², and D. Rumschitzki¹
¹City College of New York, New York, NY, ²College of Physician and Surgeons, New York, NY

11:15AM **OP-9-1-8D - Modeling Blood Flow and Pressure Waves in Arteries incorporating a Viscoelastic Wall Model**
R. Raghu¹, and C. Taylor¹
¹Stanford University, Stanford, CA

11:30AM **OP-9-1-8E - Fully automated 3D mesh Generation from Multi-domain Voxel Images**
T. C. Doehring¹
¹Drexel University, Philadelphia, PA

11:45AM **OP-9-1-8F - Numerical Study of Blood Flow after Embolization of Cerebral Aneurysm with Yield Stress Fluids**
W. Wang¹, F. Graziano², V. M. Russo², and D. B. Khismatullin¹
¹Tulane University, New Orleans, LA, ²Louisiana State University Health Sciences Center, New Orleans, LA

Track: Respiratory Engineering - 9-1-9

Acute Lung Injury from Cell to System

Chairs: Konstatin G. Burukov, Susan Margulies

Room 17A

10:30AM **OP-9-1-9A - Role of MicroRNAs in Regulating Mechanically Induced Inflammation in Human Alveolar Epithelial Cells**
Y. Huang¹, M. Crawford², P. Nana-Sinkam², and S. Ghadiali³
¹Biomedical Engineering, columbus, OH, ²Department of Internal Medicine, Columbus, OH, ³Biomedical Engineering, Columbus, OH

10:45AM **OP-9-1-9B - Expanding on Lung Slices**
S. Uhlig¹, C. Martin¹, S. Rausch², R. Metzke², O. Pack¹, and W. Wall²
¹RTWH Aachen University, Aachen, NRW, Germany, ²Technische Universitaet Muenchen, Garching, Bavaria, Germany

11:00AM **OP-9-1-9C - Epac-Rap1 Mechanism in Modulation of Acute Lung Injury: From Cell to System**
K. Birukov¹
¹The University of Chicago, Chicago, IL

11:15AM **OP-9-1-9D - MRI-based Assessment of Aerosol Deposition in the Rat Lung in Health and Disease**
C. Darquenne¹, J. M. Oakes¹, and M. Scadeng¹
¹University of California, San Diego, La Jolla, CA

11:30AM **OP-9-1-9E - High Magnitude Stretch Decreases MLC Phosphorylation in Alveolar Epithelia**
B. C. DiPaolo¹, and S. S. Margulies¹
¹University of Pennsylvania, Philadelphia, PA

11:45AM **OP-9-1-9F - Changes in Cell Mechanics During Airway Reopening Alter Pulmonary Epithelial Barrier Function**
A-M. Jacob¹, and D. P. Gaver¹
¹Tulane University, New Orleans, LA

Track: Orthopedic and Rehabilitation Engineering - 9-1-10

Orthopedic Soft Tissue Biomechanics

Chairs: Stefan Duma, Johnna Temenoff

Room 17B

10:30AM **OP-9-1-10A - Three-dimensional Collagen Fiber Kinematics in Collagen Gels Subjected to Indentation**
S. P. Lake¹, and V. H. Barocas¹
¹University of Minnesota, Minneapolis, MN

10:45AM **OP-9-1-10B - Effect of Cyclic Compressive Loading on Muscle Mechanical Properties Following Eccentric Exercise**
C. M. Haas¹, F. Haq¹, Y. Zhao¹, T. A. Butterfield², and T. M. Best¹
¹The Ohio State University, Columbus, OH, ²University of Kentucky, Lexington, KY

11:00AM **OP-9-1-10C - Contributions of Neural Tone to Muscle-Tendon Unit Stress-Relaxation Biomechanical Properties**
S. Mannava^{1,2}, W. F. Wiggins^{1,2}, J. Stitzel², M. F. Callahan¹, L. A. Koman¹, T. L. Smith¹, and C. J. Tuohy¹
¹Wake Forest University School of Medicine, Winston Salem, NC, ²Wake Forest University Graduate School of Arts and Sciences, Winston Salem, NC

- 11:15AM **OP-9-1-10D - Analysis of Spatiotemporal Changes in Elasticity of Developing Tendon using Atomic Force Microscopy**
J. E. Marturano¹, J. D. Arena¹, and C. K. Kuo¹
¹Tufts University, Medford, MA
- 11:30AM **OP-9-1-10E - Damage Evolution Process in Ligaments**
Z. Guo¹, J. Barrett², and R. De Vita¹
¹Virginia Tech, Blacksburg, VA, ²Virginia-Maryland Regional College of Veterinary Medicine, Leesburg, VA
- 11:45AM **OP-9-1-10F - Passive Tension in Supraspinatus Following Rotator Cuff Repair: A Simulation Analysis**
K. Saul Holzbaur^{1,2}, S. Hayon³, T. Smith¹, C. Tuohy¹, and S. Mannava¹
¹Wake Forest University School of Medicine, Winston-Salem, NC, ²VT-WFU School of Biomedical Engineering and Sciences, Winston-Salem, NC, ³Wake Forest University, Winston-Salem, NC

Track: Devices: Nano to Micro - 9-1-11

Drug Delivery Technologies: Nano to Micro Devices - II

Chairs: Christine Trinkle, Jennifer West

Room 16A

- 10:30AM **OP-9-1-11A - A Mechanically Robust Nanofluidic Membrane with Tunable Zero-order Release for Implantable Dose Specific Drug Delivery**
D. Fine¹, A. Grattoni¹, S. Hosali², A. Ziemys¹, E. De Rosa¹, J. Gill¹, M. Kojic¹, R. Medema², M. Milosevic³, L. Brousseau, III¹, L. Hudson², R. Goodall², M. Ferrari^{1,4}, and X. Liu¹
¹The University of Texas Health Science Center at Houston, Houston, TX, ²NanoMedical Systems, Inc., Austin, TX, ³R & D Center for Bioengineering, Kragujevac, Šumadija, Serbia, ⁴The University of Texas M.D. Anderson Cancer Center, Houston, TX
- 10:45AM **OP-9-1-11B - Size and Shape effects in the vascular dynamics of nano-Particle Systems (nPSs)**
S. Lee¹, F. Gentile², A. Van de Ven³, M. Ferrari³, and P. Decuzzi³
¹University of Texas at Austin, Austin, TX, ²University of Magna Graecia at Catanzaro, Catanzaro, Italy, ³The University of Texas Medical School at Houston, Houston, TX
- 11:00AM **OP-9-1-11C - Mucus-penetrating particles achieve prolonged retention and improved distribution in the mouse vagina**
Y-Y. Wang¹, S. K. Lai¹, L. Ensign¹, R. Cone¹, and J. Hanes¹
¹The Johns Hopkins University, Baltimore, MD
- 11:15AM **OP-9-1-11D - Silicon nanowires improve adhesion *In Vitro* and *In Vivo* by triggering active cell remodeling**
K. E. Fischer¹, R. H. Daniels², E. Li², V. Cowles³, J. L. Miller³, and T. A. Desai¹
¹UCSF, San Francisco, CA, ²Nanosys, Inc, Palo Alto, CA, ³Depomed, Menlo Park, CA
- 11:30AM **OP-9-1-11E - Development of a Nano/Micro Particle Protein Delivery System**
J. Coleman¹, and A. Lowman¹
¹Drexel University, Philadelphia, PA
- 11:45AM **OP-9-1-11F - Thermoresponsive Nanocomposite Double Network Hydrogels with Cell-Releasing Behavior**
R. Fei¹, J. T. George¹, and M. A. Grunlan¹
¹Texas A&M University, College Station, TX

Track: Devices: Nano to Micro - 9-1-12

Micro and Nanostructured Biomaterials - II

Chairs: Sanjay Kumar, Christine Trinkle

Room 16B

- 10:30AM **OP-9-1-12A - Design of Biodegradable Gold Nanoclusters for NIR Optical Imaging**
A. K. Murthy¹, J. M. Tam¹, J. O. Tam¹, D. Ingram¹, M. Schulze¹, R. Nguyen¹, L. L. Ma¹, K. V. Sokolov¹, and K. P. Johnston¹
¹University of Texas at Austin, Austin, TX
- 10:45AM **OP-9-1-12B - Multifaceted Nano- and Micropatterned Surfaces Created with Laser Scanning Lithography**
J. H. Slater¹, J. S. Miller², S. S. Yu³, and J. L. West¹
¹Rice University, Houston, TX, ²University of Pennsylvania, Philadelphia, PA, ³Vanderbilt University, Nashville, TN

- 11:00AM **OP-9-1-12C - Single Walled Carbon Nanotube Peapods as Photothermal Agents for Laser Cancer Therapy**
J. Whitney¹, J. Zhang¹, S. Naha², S. Torti³, H. Dorn¹, and M. N. Rylander¹
¹Virginia Tech, Blacksburg, VA, ²ADA Technologies, Littleton, CO, ³Wake Forest University, Winston-Salem, NC
- 11:15AM **OP-9-1-12D - Multifunctional Virus-based Scaffold for Targeted *In Vivo* MR Imaging of Prostate Cancer**
D. Ghosh^{1,2}, Y. Lee¹, A. Kohli^{1,2}, K. A. Kelly³, and A. Belcher^{1,2}
¹Massachusetts Institute of Technology, Cambridge, MA, ²Koch Institute of Integrative Cancer Research, MA Institute of Technology, Cambridge, MA, ³University of Virginia, Charlottesville, VA
- 11:30AM **OP-9-1-12E - A New Model of Iron Oxide Nanoparticle Magnetic Properties to Guide Design of Novel Nanomaterials**
R. A. Ortega^{1,2}, S. S. Yu^{1,2}, and T. D. Giorgio^{1,3}
¹Vanderbilt University Department of Biomedical Engineering, Nashville, TN, ²Vanderbilt Institute of Nanoscale Science and Engineering, Nashville, TN, ³Vanderbilt University Department of Chemical and Biomolecular Engineering, Nashville, TN
- 11:45AM **OP-9-1-12F - Monodisperse, Stable Nanoparticles based on Amphiphilic Peptide-Polymer Conjugates**
T. Xu¹
¹University of California, Berkeley, Berkeley, ca

Track: Drug Delivery Systems * - 9-1-13

Novel Materials & Self-Assembling Systems: Peptide and Protein Delivery

Chairs: Jordan Green, Jung Suh

Room 14

** Drug Delivery Systems Track is sponsored by Acta Biomaterialia*

- 10:30AM **OP-9-1-13A - Antimicrobial Peptide Delivery and Surface Coatings**
A. Shukla¹, A. C. Engler¹, and P. T. Hammond¹
¹Massachusetts Institute of Technology, Cambridge, MA
- 10:45AM **OP-9-1-13B - Polymeric Nanoparticles for Anti-angiogenic Peptide Delivery**
R. B. Shmueli¹, J. E. Koskimaki¹, J. Sunshine¹, P. A. Campochiaro¹, A. S. Popel¹, and J. J. Green¹
¹Johns Hopkins University, Baltimore, MD
- 11:00AM **OP-9-1-13C - Exploring Multi-Domain Peptides and Gelatin Microparticles as an Osteogenic Factor Delivery System**
D. M. Yoon¹, B. Y. Lu¹, E. L. Bakota¹, F. Kasper¹, J. D. Hartgerink¹, and A. G. Mikos¹
¹Rice University, Houston, TX
- 11:15AM **OP-9-1-13D - Low Viscosity Highly Concentrated Dispersions of Stable IgG Particles Formed by SWIFT Freezing**
M. A. Miller¹, B. Wilson¹, J. Maynard¹, and K. P. Johnston¹
¹The University of Texas at Austin, Austin, TX
- 11:30AM **OP-9-1-13E - GLP-1 polymer Drug Depots for Treatment of Type-2 Diabetes**
M. Amiram¹, and A. Chilkoti¹
¹Duke University, Durham, NC
- 11:45AM **OP-9-1-13F - Swelling and Insulin Release of Glucose-Responsive Microparticles and Nanogels**
S. R. Marek¹, and N. A. Peppas¹
¹The University of Texas at Austin, Austin, TX

Track: Drug Delivery Systems * - 9-1-14

Targeted Drug Delivery - I

Chairs: Daniel Kamei, Justin Saul

Room 15

** Drug Delivery Systems Track is sponsored by Acta Biomaterialia*

- 10:30AM **OP-9-1-14A - Bone Marrow Targeted Multistage Drug Delivery System for the Treatment of Bone Marrow Associated Disorders**
A. Mann¹, T. Tanaka^{1,2}, R. Nieves-Alicea¹, X. Liu^{1,2}, G. Lopez-Berestein³, A. Sood³, and M. Ferrari^{1,2}
¹University of Texas Health Science Center at Houston, Houston, TX, ²University of Texas at Austin, Austin, TX, ³University of Texas M.D. Anderson Cancer Center, Houston, TX

- 10:45AM **OP-9-1-14B - Multi-ligand Nanoparticles for Targeted Drug Delivery to Endothelium after Cardio-Interventions**
S. KONA^{1,2}, H. Xu^{1,2}, Y-T. Tsai^{1,2}, L-C. Su^{1,2}, J-F. Dong³, L. Tang^{1,2}, and K. T. Nguyen^{1,2}
¹University of Texas at Arlington, Arlington, TX, ²The University of Texas Southwestern Medical Center, Dallas, TX, ³Baylor College of Medicine, Houston, TX
- 11:00AM **OP-9-1-14C - Improving Protein Pharmacokinetics by Engineering Erythrocyte Affinity**
S. Kontos¹, and J. A. Hubbell¹
¹Swiss Federal Institute of Technology, Lausanne, VD, Switzerland
- 11:15AM **OP-9-1-14D - Biomarker-Triggered Aptamer Regulation Strategy for Targeted Therapeutics**
N. Li¹, and C-M. Ho²
¹University of Miami, Coral Gables, FL, ²University of California, Los Angeles, Los Angeles, CA
- 11:30AM **OP-9-1-14E - Neointimal Reduction with Vascular-Matrix Targeted Nanoparticles for Systemic Paclitaxel Delivery.**
J. M. Chan¹, J-W. Rhee², G. Golomb³, R. Langer¹, and O. Farokhzad²
¹Massachusetts Institute of Technology, Cambridge, MA, ²Harvard Medical School, Boston, MA, ³Hebrew University of Jerusalem, Jerusalem, Jerusalem, Israel
- 11:45AM **OP-9-1-14F - Doxorubicin-loaded Nanoscale Liposomes Targeted to E-selectin Ligands on Circulating Tumor Cells**
V. Ponmudi¹, and M. R. King¹
¹Cornell University, Ithaca, NY

Track: Tissue Engineering * - 9-1-15

Stem Cells and Tissue Engineering - I

Chairs: Taby Ahsan, Brendan Harley

Ballroom E

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 10:30AM **OP-9-1-15A - Utilizing a Novel Microfluidic platform as an Ex Vivo Model to Recapitulate the Stem Cell Niche**
B. Carrion¹, C. Huang², and A. J. Putnam¹
¹University of Michigan, Ann Arbor, MI, ²University of California, Irvine, Irvine, CA
- 10:45AM **OP-9-1-15B - Human Mesenchymal Stem Cell Neural Differentiation by Synergistic Topographical & Sustained Biochemical Signaling**
X. Jiang¹, and S-Y. Chew¹
¹Nanyang Technological University, Singapore, Singapore, Singapore
- 11:00AM **OP-9-1-15C - Development of a Chondrogenic Pellet Preculture System for Cartilage Tissue Engineering Applications**
E. J. Levorson¹, F. K. Kasper¹, and A. G. Mikos¹
¹Rice University, Houston, TX
- 11:15AM **OP-9-1-15D - Combinatorial Development of Synthetic Polymeric Substrates for Clonal Growth of Human Pluripotent Stem Cells**
K. Saha¹, Y. Mei², R. Langer², R. Jaenisch¹, and D. Anderson²
¹Whitehead Institute/MIT, Cambridge, MA, ²MIT, Cambridge, MA
- 11:30AM **OP-9-1-15E - Hematopoietic stem cell culture on an adipogenic feeder layer**
D. L. Glettig¹, and D. L. Kaplan¹
¹Tufts University, Medford, MA
- 11:45AM **OP-9-1-15F - Neural Progenitor Cell Response to Flow-Stimulated Endothelial Cell Extracellular Matrix Production**
C. M. Zwolinski¹, K. S. Ellison¹, N. DePaola², and D. M. Thompson¹
¹Rensselaer Polytechnic Institute, Troy, NY, ²Illinois Institute of Technology, Chicago, IL

Track: Tissue Engineering * - 9-1-16

Host Response to Biomaterials

Chairs: Eric Brey, Kent Leach

Ballroom F

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 10:30AM **OP-9-1-16A - Modeling the Relative Impact of Fibrous Encapsulation and Tissue Perfusion on Implanted Glucose Sensor Performance**
M. T. Novak¹, F. Yuan¹, and W. M. Reichert¹
¹Duke University, Durham, NC
- 10:45AM **OP-9-1-16B - Novel Near-infrared Fluorescence (NIR) Nanoprobes for *In Vivo* Imaging of Inflammatory Diseases**
J. Zhou¹, Y-T. Tsai¹, H. Weng¹, and L. Tang¹
¹University of Texas at Arlington, Arlington, TX
- 11:00AM **OP-9-1-16C - Dynamic *In Vivo* Visualization of Anastomosis Between a Prevascularized Implantable Tissue Construct and Host Circulation**
S. M. White¹, C. Hughes¹, S. George¹, and B. Choi¹
¹University of California, Irvine, Irvine, CA
- 11:15AM **OP-9-1-16D - Parsing Inflammatory Cues in Angiogenesis Using Bioactive Hydrogels**
A. L. Zachman¹, S. W. Crowder¹, H. K. Kleinman², J. B. Kohn³, and H-J. Sung¹
¹Vanderbilt University, Nashville, TN, ²NIH, Bethesda, MD, ³Rutgers University, Piscataway, NJ
- 11:30AM **OP-9-1-16E - Dendritic Cell Response to a Library of Terpolymers with Graded Variations in Material Properties**
P. Kou¹, A. Joy^{2,3}, B. Cunningham^{2,3}, J. Kohn^{2,3}, and J. Babensee¹
¹Georgia Institute of Technology, Atlanta, GA, ²Rutgers University, Piscataway, NJ, ³New Jersey Center for Biomaterials, Piscataway, NJ
- 11:45AM **OP-9-1-16F - *In Vivo* imaging of biomaterial-induced reactive oxygen species**
W. F. Liu^{1,2}, M. Ma¹, D. G. Anderson¹, and R. Langer¹
¹MIT, Cambridge, MA, ²UC Irvine, Irvine, CA

Track: Tissue Engineering * - 9-1-17

Cell- and Gene-Based Therapeutics

Chairs: Eben Alsberg, WT Godbey

Ballroom G

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 10:30AM **OP-9-1-17A - Pure, Non-denatured Collagen Matrix: A Cell Delivery Model for Myocardial Repair**
N. A. Kouris¹, J. Squirrell¹, and B. Ogle^{1,2}
¹University of Wisconsin - Madison, Madison, WI, ²University of Wisconsin-Madison, Madison, WI
- 10:45AM **OP-9-1-17B - Injectable, Macroporous Hydrogels for Controlled Stem Cell Deployment**
N. Huebsch^{1,2}, C. Madl¹, M. Xu¹, and D. J. Mooney^{1,2}
¹Harvard University, Cambridge, MA, ²Wyss Institute for Biologically Inspired Engineering, Boston, MA
- 11:00AM **OP-9-1-17C - Engineering Cell Derived Materials**
J. C. Wolchok¹, and P. Tresco¹
¹University of Utah, Salt Lake City, UT
- 11:15AM **OP-9-1-17D - Microspotting of Adeno-Associated Virus for Combinatorial Genetic Testing**
K. I. McConnell¹, R. Schweller¹, M. Diehl¹, and J. Suh¹
¹Rice University, Houston, TX
- 11:30AM **OP-9-1-17E - Analysis of Promoters and Expression-targeted Gene Therapy, Optimization Based on Cell Behavior**
X. Zhang¹, and W. T. Godbey¹
¹Tulane University, New Orleans, LA
- 11:45AM **OP-9-1-17F - Matrix-mediated Non-viral Gene Delivery**
C. Chu¹, and H. Kong¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Track: Undergraduate - 9-1-18

Undergraduate Research I

Chairs: R. Christopher Geiger, Ann Saterbak

Room 13B

- 10:30AM **OP-9-1-18A - A Biomechanical Analysis of Implantation-Induced Cup Deformation in Acetabular Cup Designs**
M. E. Jones¹, S. R. Small², J. B. Meding², and K. S. Toohey¹
¹Rose-Hulman Institute of Technology, Terre Haute, IN, ²Joint Replacement Surgeons of Indiana Foundation, Mooresville, IN
- 10:45AM **OP-9-1-18B - Biomimetic Thymic Niche: Controlling Notch Signaling in 3D for Generation of T cells**
M. P. Mendoza¹, M. H. Kim¹, and K. Roy¹
¹University of Texas at Austin, Austin, TX
- 11:00AM **OP-9-1-18C - Retaining the Inert Environment of Macroporous Alginate Scaffolds via Sacrificial Progen Chemistry**
M. M. Xu¹, N. D. Huebsch^{1,2}, and D. J. Mooney^{1,3}
¹Harvard University, Cambridge, MA, ²Harvard-MIT Division of Health Sciences and Technology, Cambridge, MA, ³Wyss Institute for Biologically Inspired Engineering, Cambridge, MA
- 11:15AM **OP-9-1-18D - Structural Adaptations of Endothelial Progenitor Cells in Response to Fluid Flow Shear Stresses**
E. A. McNamara¹, M. Knothe Tate¹, and H. Chang¹
¹Case Western Reserve University, Cleveland, OH
- 11:30AM **OP-9-1-18E - Engineered Nanoparticles for Targeted Tumor Delivery**
S. Kadali¹, Á. Mercado¹, and E. Jabbari¹
¹University of South Carolina, Columbia, SC
- 11:45AM **OP-9-1-18F - Compression-induced Changes in Nuclear Rheology: Linking Force Response to Genome Organization**
T. A. Alcoser¹, E. A. Booth-Gauthier¹, and K. N. Dahl¹
¹Carnegie Mellon University, Pittsburgh, PA

PLATFORM SESSION - 9-2 - 1:30PM - 3:00PM

Track: Tissue Engineering * - 9-2-1

Novel Biomaterials and Scaffolds - IV

Chairs: Balaji Sitharaman, Lakeshia Taite

Room 12A

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 1:30PM **OP-9-2-1A - Engineered Bacterial Cellulose as a Scaffold for Chondrogenesis**
B. Panilaitis¹, L. Sun¹, V. Yadav¹, and D. Kaplan¹
¹Tufts University, Medford, MA
- 1:45PM **OP-9-2-1B - Engineered Aprotinin for Enhanced Stability of Fibrin Biomaterials**
K. Lorentz¹, P. Frey^{1,2}, and J. A. Hubbell¹
¹Swiss Federal Institute of Technology (EPFL), Lausanne, VD, Switzerland, ²Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, VD, Switzerland
- 2:00PM **OP-9-2-1C - A Biohybrid Composite of Extracellular Matrix Gel and Elastomeric Fibers for Soft Tissue Repair**
Y. Hong^{1,2}, A. Huber^{1,2}, R. Hashizume^{1,2}, N. J. Amoroso¹, S. F. Badylak^{1,2}, and W. R. Wagner^{1,2}
¹McGowan Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, ²Department of Surgery, University of Pittsburgh, Pittsburgh, PA
- 2:15PM **OP-9-2-1D - Synthetic Collagen Fiber and Elastin-like Protein Composites for Abdominal Wall Repair**
J. M. Caves¹, W. Cui¹, J. Wen¹, V. A. Kumar^{1,2}, A. W. Martinez^{1,2}, and E. L. Chaikof^{1,2}
¹Emory University, Atlanta, GA, ²Georgia Inst Technology, Atlanta, GA

- 2:30PM **OP-9-2-1E - Encapsulation and Culture of Neural Stem Cells in Hyaluronic Acid and Collagen-Based Microcapsules**
C. B. Highley¹, S. H. Bakhru¹, and S. F. Zappe¹
¹Carnegie Mellon University, Pittsburgh, PA
- 2:45PM **OP-9-2-1F - Engineering Differentiated Cells and Stem Cells Using GAG-Chitosan Capsules as Tissue Modules**R. T. Annamalai¹, D. R. Armant¹, and H. W. Matthew¹
¹Wayne State University, Detroit, MI

Track: Systems Biology, Bioinformatics and Computational Biology - 9-2-2

Signals and Networks in Cancer and Disease - II

Chairs: Mark Brynildsen, Gert Cauwenberghs, David Meaney
Room 12B

- 1:30PM **OP-9-2-2A - An Integrated Microfluidic-Coupled-Ion Mobility-Mass Spectrometer for Investigating Leukocyte Dynamics**
C. Marasco¹, J. Enders¹, K. Seale¹, J. McLean¹, and J. Wikswo¹
¹Vanderbilt University, Nashville, TN
- 1:45PM **OP-9-2-2B - Computational Analysis of Extracellular Matrix Degradation in Tumor Microenvironments**
M. O. Platt¹, Z. T. Barry¹, and C. L. Wilder¹
¹Georgia Institute of Technology, Atlanta, GA
- 2:00PM **OP-9-2-2C - Modeling the Electrophysiology of the Mammalian Circadian Clock**
C. Diekman¹, and D. Forger¹
¹University of Michigan, Ann Arbor, MI
- 2:15PM **OP-9-2-2D - A Computational Model of Interactions between Human APOBEC3G and HIV Vif**
I. Hosseini¹, and F. Mac Gabhann¹
¹Johns Hopkins University, Baltimore, MD
- 2:30PM **OP-9-2-2E - Network Analysis-directed Assessment of FDA Approved Drugs for Antileishmanial Activity**
A. K. Chavali¹, and J. A. Papin¹
¹University of Virginia, Charlottesville, VA
- 2:45PM **OP-9-2-2F - Identifying Potential Roles for EGFR Family Cross-Talk During Lesion Formation in Endometriosis**
M. T. Beste¹, N. Doyle¹, A. Starzinski-Powitz², D. A. Lauffenburger¹, K. B. Isaacson³, and L. G. Griffith¹
¹Massachusetts Institute of Technology, Cambridge, MA, ²Goethe Universität, Frankfurt am Main, Germany, ³Newton-Wellesley Hospital, Newton, MA

Track: Biomedical Imaging and Optics - 9-2-3

Biophotonics - III

Chairs: Brian Applegate, Tomasz Tckazyk
Room 19A

- 1:30PM **OP-9-2-3A - Multiphoton Imaging to Aid in Microdissection Testicular Sperm Extraction**
D. M. Huland¹, R. Ramasamy², T. Southard¹, S. Mukherjee², W. W. Webb¹, and C. Xu¹
¹Cornell University, Ithaca, NY, ²Weill Cornell Medical College, New York, NY
- 1:45PM **OP-9-2-3B - Molecular Imaging with Pump-Probe Optical Coherence Microscopy**
Q. Wan¹, and B. Applegate¹
¹TAMU, College Station, TX
- 2:00PM **OP-9-2-3C - MEMS Based Hyperspectral Imaging System Towards Imaging of Biological Tissue**
S. Bish¹, Y. Wang¹, J. W. Tunnell¹, and J. X. Zhang¹
¹University of Texas at Austin, Austin, TX

- 2:15PM **OP-9-2-3D - Ultrashort Pulse Nonlinear Optical Microscopy Spectral Imaging System**
A. Lee¹, S. Vitha¹, A. Holzenburg¹, and A. Yeh¹
¹Texas A&M University, College Station, TX
- 2:30PM **OP-9-2-3E - Using a Photonic Crystal Fiber Supercontinuum Source for Multispectral Photoacoustic Microscopy**
Y. N. Billeh¹, M. Liu², and T. Buma²
¹University of Michigan, Ann Arbor, MI, ²University of Delaware, Newark, DE
- 2:45PM **OP-9-2-3F - Simultaneous co-registered morphological and biochemical imaging of coronary atherosclerotic plaques using a dual-modal optical system combining OCT and FLIM**
J. Park¹, B. E. Applegate¹, S. Shrestha¹, P. Pande¹, and J. A. Jo¹
¹Texas A&M University, College Station, TX

Track: Neural Engineering - 9-2-4

Neural Engineering Technology

Chairs: Pat Crago, Justin Williams

Room 19B

- 1:30PM **OP-9-2-4A - STEP-Aligned Polymer Fiber Meshes Direct Migration and Neuronal Differentiation of Neural Stem Cells**
S. Bakhru¹, and A. S. Nain²
¹Carnegie Mellon University, Pittsburgh, PA, ²Virginia Tech, Blacksburg, VA
- 1:45PM **OP-9-2-4B - Perfusion System for Enhanced Viability and Local Chemical Stimulation of Organotypic Brain Slices**
H. H. Caicedo¹, M. Vignes^{2,3}, B. Brugg², and J. M. Peyrin²
¹University of Illinois at Chicago, Chicago, IL, ²Université Pierre et Marie Curie, Paris, France, ³Institut Curie, Paris, France
- 2:00PM **OP-9-2-4C - Dissecting *C. elegans* Neural Circuitry and Behavior in Microfluidic Arenas**
D. R. Albrecht¹, and C. Bargmann¹
¹The Rockefeller University, New York, NY
- 2:15PM **OP-9-2-4D - PEDOT Improves Sensitivity and Fidelity of *In Situ* Nerve Conduction Signals**
C. M. Frost¹, K. Ewing¹, B. Wei¹, Z. Baghmanli¹, P. Cederna¹, and M. Urbanek¹
¹University of Michigan, Ann Arbor, MI
- 2:30PM **OP-9-2-4E - Novel Packaging and Interconnect Techniques for Implantable MEMS Devices for the Brain**
J. Sutanto¹, S. Anand¹, A. Sridharan¹, and J. Muthuswamy¹
¹Arizona State University, Tempe, AZ
- 2:45PM **OP-9-2-4F - An Optoelectronic Hybrid Device for *In Vivo* Stimulation and Recording of Neural Microcircuits**
J. Wang¹, and D. Borton¹
¹Brown University, Providence, RI

Track: Biomedical Engineering Education - 9-2-5

Teaching Tools and Strategies

Chairs: Aura Gimm, Joe Tranquillo

Room 18A

- 1:30PM **OP-9-2-5A - A Project-Oriented BME Survey Course: Making Pass-Fail Grading Work**
J. A. Smith¹
¹Ryerson University, Toronto, ON, Canada
- 1:45PM **OP-9-2-5B - Program Improvement through Assessment and Evaluation**
L. Herz¹
¹Lehigh University, Bethlehem, PA

- 2:00PM **OP-9-2-5C - Developing a Novel Approach to Training Biomedical Innovation Leaders: The New Johns Hopkins Center for Bioengineering Innovation & Design: Outcomes from Year One**
Y. Yazdi¹, S. Acharya¹, A. Polsani¹, A. J. Khanna¹, R. H. Allen¹, M. B. Sachs¹, L. Aronhime¹, A. A. Shoukas¹
¹Johns Hopkins University, Baltimore, MD
- 2:15PM **OP-9-2-5D - Digital Ink in the BME Classroom: Application in Quantitative Physiology**
S. A. Carey¹, S. Daniel¹, and C. A. Reinhart-King¹
¹Cornell University, Ithaca, NY
- 2:30PM **OP-9-2-5E - Implementation of Problem-Based Learning in Two Sophomore Bioengineering Courses**
A. Saterbak¹, J. Jacot¹, and T. Volz¹
¹Rice University, Houston, TX
- 2:45PM **OP-9-2-5F - Acquiring Experimental Design Skills Through Problem-Based Learning**
S. M. George¹, and B. B. Fasse¹
¹Georgia Institute of Technology, Atlanta, GA

Track: Cellular and Molecular Engineering - 9-2-6

Mechanotransduction - II

Chairs: Adam Engler, Alisha Sieminski
Room 18B

- 1:30PM **OP-9-2-6A - Coupled Biomechanical Signal Integration Reveals Nonlinear Cell Responses through Cell Alignment**
R. Steward Jr.¹, C-M. Cheng², and P. LeDuc¹
¹Carnegie Mellon University, Pittsburgh, PA, ²Harvard University, Cambridge, MA
- 1:45PM **OP-9-2-6B - Nanoscale Mechanical Manipulation of the Endothelial Cell Surface Reveals Mechanical Coupling of Membrane Rafts**
D. Fuentes¹, C. Bae², and P. J. Butler¹
¹Penn State University, University Park, PA, ²State University of New York at Buffalo, Buffalo, NY
- 2:00PM **OP-9-2-6C - Suggested Structure of Activated Vinculin**
J. Golji¹, and M. Mofrad¹
¹UC Berkeley, Berkeley, CA
- 2:15PM **OP-9-2-6D - The Primary Cilium: A Potential Receptor Antenna in Human Adipose Stem Cells?**
J. C. Bodle¹, A. R. Sakhare¹, S. H. Bernacki¹, J. Qi², A. J. Banes³, and E. G. Lobo¹
¹North Carolina State University, Raleigh, NC, ²Flexcell International Inc., Hillsborough, NC, ³University of North Carolina, Hillsborough, NC
- 2:30PM **OP-9-2-6E - Mechanochemical Regulation of Actin Depolymerization Kinetics**
C-Y. Lee^{1,2}, J. Lou^{1,3}, K-K. Wen⁴, S. Ono², S. G. Eskin^{1,2}, P. A. Rubenstein⁴, C. Zhu^{1,2}, and L. V. McIntire^{1,2}
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA, ³Chinese Academy of Sciences, Beijing, China, People's Republic of, ⁴University of Iowa, Iowa City, IA
- 2:45PM **OP-9-2-6F - Stem Cell Durotaxis - Trafficking to Fibrotic Scars**
M. Raab¹, and D. Discher¹
¹University of Pennsylvania, Philadelphia, PA

Track: Cardiovascular Engineering - 9-2-7

Cardiac Stents and Arterial Devices

Chairs: Jun Liao, James Moore, Jr.
Room 18C

- 1:30PM **OP-9-2-7A - Incorrect Stent Sizing Promotes In-stent Restenosis: Role of Endothelial Shear Stress and Intramural Wall Stress**
H. Y. Chen¹, D. Bhatt², and G. Kassab³
¹Purdue University, Indianapolis, IN, ²Harvard Medical School, Boston, MA, ³Indiana University School of Medicine, Indianapolis, IN

- 1:45PM **OP-9-2-7B - Modelling and Experiments to Aid Performance Assessment of Biodegradable Metallic Stents**
J. Grogan¹, S. Leen¹, and P. McHugh¹
¹NUI Galway, Galway, Galway, Ireland
- 2:00PM **OP-9-2-7C - *In Vitro* and *In Vivo* Characterization of Biodegradable Polymer-based Drug Eluting Stent**
S. K. Yazdani¹, M. Vorpahl¹, S-H. Su², J. Schulze², F. D. Kolodgie¹, and R. Virmani¹
¹CVPath Institute, Gaithersburg, MD, ²Biosensors International, Singapore, Singapore, Singapore
- 2:15PM **OP-9-2-7D - Exploiting the Differential Cellular Effects of Elastin as a Device Coating**
B. D. Wilson¹, L. K. Sorensen¹, C. C. Gibson¹, M. Yoklavich², L. L. Kelley¹, Y-T. Shiu¹, and D. Y. Li¹
¹University of Utah, Salt Lake City, UT, ²OrbusNeich Medical, Fort Lauderdale, FL
- 2:30PM **OP-9-2-7E - A 360-deg Digital Image Correlation Optical System for Arterial Strain Measurement *In Vitro***
Y-U. Lee¹, K. Genovese², and J. D. Humphrey¹
¹Texas A&M University, College Station, TX, ²Università degli Studi della Basilicata, POTENZA, POTENZA, Italy
- 2:45PM **OP-9-2-7F - Physiology-based Control System for a Novel Pediatric Adjustable Systemic-Pulmonary Artery Shunt**
A. R. Connor¹, W. I. Douglas², and M. W. Mohiuddin¹
¹Michael E. DeBakey Institute, TX A&M University, College Station, TX, ²The University of Texas Health Science Center, Houston, TX

Track: Cardiovascular Engineering - 9-2-8

Vascular MechanoSignal Transduction

Chairs: Anthony Passerini, Cynthia Reinhart-King,
Room 18D

- 1:30PM **OP-9-2-8A - Nesprin-3 Regulates Human Aortic Endothelial Cell Morphology**
J. T. Morgan¹, G. Peng¹, E. R. Pfeiffer¹, T. L. Thirkill¹, G. C. Douglas¹, D. A. Starr¹, and A. I. Barakat¹
¹University of California, Davis, Davis, CA
- 1:45PM **OP-9-2-8B - HSPG-Mediated FAK Activation Plays a Mechanotransduction Role in Interstitial Flow-Induced MMP Expression**
Z-D. Shi¹, and J. M. Tarbell¹
¹City College and Graduate Center of City University of New York, New York, NY
- 2:00PM **OP-9-2-8C - Shear Stress Modulates Metallothionein Expression and Intracellular Zinc Level in Endothelial Cells**
S. Lee¹, D. E. Conway², S. G. Eskin¹, A. K. Shah¹, and L. V. McIntire¹
¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA
- 2:15PM **OP-9-2-8D - Shear Stress Suppresses TNF α Induced Apoptosis; In Part by Modulating DAPK Expression and Activity**
K. Rennie¹, and J. Y. Ji¹
¹Indiana University Purdue University Indianapolis, Indianapolis, IN
- 2:30PM **OP-9-2-8E - MicroRNA-10a Regulation of Pro-inflammatory Phenotype in Athero-susceptible Endothelium *In Vivo* and *In Vitro***
Y. Fang¹, C. Shi¹, E. Manduchi¹, M. Civelek¹, and P. F. Davies¹
¹University of Pennsylvania, Philadelphia, PA
- 2:45PM **OP-9-2-8F - Shear Stress Modulates Metallothionein Expression and Intracellular Zinc Level in Endothelial Cells**
S. Lee¹, D. E. Conway², S. G. Eskin¹, A. K. Shah¹, and L. V. McIntire¹
¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA

Track: Respiratory Engineering - 9-2-9

Mechanobiology in the Lung

Chairs: Steve George, Cheryl Miller
Room 17A

- 1:30PM **OP-9-2-9A - Alveolar Epithelial Cells Respond to Mechanical Stretch Through Primary Cilia Formation**
R. L. Heise¹, and S. Garantziotis¹
¹National Institute of Environmental Health Sciences, Research Triangle Park, NC

- 1:45PM **OP-9-2-9B - Role of Microtubule Dynamics in the Response of Airway Smooth Muscle Cells to Cyclic Uniaxial Stretching**
H. Parameswaran¹, M. Morioka², S. Ito², and B. Suki¹
¹Boston University, Boston, MA, ²Nagoya University, Nagoya, Aichi Prefecture, Japan
- 2:00PM **OP-9-2-9C - Mechanical Properties of Migrating Alveolar Epithelial Cells**
A. Bada¹, C. E. Cozad¹, L. M. Crosby², E. Roan¹, and C. M. Waters²
¹University of Memphis, Memphis, TN, ²University of Tennessee Health Science Center, Memphis, TN
- 2:15PM **OP-9-2-9D - In Vivo Optical Coherence Elastography of the Trachea**
C. J. Robertson¹, Y-C. Ahn¹, S-W. Lee¹, S. Mahon¹, Z. Chen¹, M. Brenner¹,
and S. C. George¹
¹UCI, Irvine, CA
- 2:30PM **OP-9-2-9E - PTEN and Akt Mediated Biomechanical Mechanisms of Lung Epithelial Cell Migration and wound repair**
C. Cosmin¹, S. Bao², D. Knoell², and S. Ghadiali²
¹The Ohio State University, Columbus, OH, ²Ohio State University, Columbus, OH
- 2:45PM **OP-9-2-9F - PECAM-1 Mechanosensing Contributes to ROS Generation with Loss of Shear in the Ex Vivo Mouse Lung**
J. Noel¹, N. Hong¹, K. DeBolt¹, A. Fisher¹, and S. Chatterjee¹
¹University of Pennsylvania, Philadelphia, PA

Track: Orthopedic and Rehabilitation Engineering - 9-2-10

Orthopedic Hard Tissue Biomechanics

Chairs: Warren Grayson, Jiro Nagatomi
Room 17B

- 1:30PM **OP-9-2-10A - Architectural Predictors for Human Trabecular Bone Strength**
T. Guda^{1,2}, B. E. Pollot², and J. Ong²
¹Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, ²University of Texas at San Antonio, San Antonio, TX
- 1:45PM **OP-9-2-10B - From CT Scans to Bone Resorption Pattern – A Patient Specific Bone Remodeling Simulation for THR**
X. Liu¹, S. Govindarajan¹, S. Sett¹, B. Veeckmans², P. Lopes², and E. Boelen²
¹Dassault Systemes Simulia Corp, Providence, RI, ²Materialise, Leuven, Flemish Brabant, Belgium
- 2:00PM **OP-9-2-10C - Acetabular Cup Design and Orientation Affect Periacetabular Loading Distribution**
M. E. Berend¹, S. R. Small¹, L. Howard², D. Tunc², C. A. Buckley², and M. A. Ritter¹
¹JRSI Foundation, Inc., Mooresville, IN, ²Rose-Hulman Institute of Technology, Terre Haute, IN
- 2:15PM **OP-9-2-10D - Four Point Bending Stiffness of Fractured Rat Femora Treated with Two Different Methods of Fixation**
H. Kim¹, C. Griffith², S. Leung², L. Gitajn³, L. Murphy³, A. H. Hsieh^{1,2}, R. V. O'Toole², and V. D. Pellegrini²
¹University of Maryland, College Park, MD, ²University of Maryland, Medical Center, Baltimore, MD, ³University of Maryland, Baltimore, MD
- 2:30PM **OP-9-2-10E - Deletion of Osteocalcin and Osteopontin from Extracellular Matrix Leads to Increased Bone Fragility**
A. A. Poudarik¹, C. Gundberg², and D. Vashishth¹
¹Rensselaer Polytechnic Institute, Troy, NY, ²Yale University, New Haven, CT
- 2:45PM **OP-9-2-10F - Measurement of Osteopontin and Osteocalcin from Laser Microdissected Microdamaged Regions in Bone**
L. Karim¹, G. Sroga¹, and D. Vashishth¹
¹Rensselaer Polytechnic Institute, Troy, NY

Track: Devices: Nano to Micro - 9-2-11

Biosensors, Bio-Interfaces and Implantable Devices - I

Chairs: Peter Gascoyne, Chenzhong Li
Room 16A

- 1:30PM **OP-9-2-11A - Long-Term Evaluation of the Implantable Magnetic Microactuators**
H. Lee¹, A. K. Gill¹, M. Bergsneider¹, and J. W. Judy¹
¹UCLA, Los Angeles, CA

- 1:45PM **OP-9-2-11B - Electronic Nanobiosensors for Genomic and Proteomic Biomarkers Analysis at Single Cell Level**
S. Prabhulkar¹, and C-Z. Li¹
¹Florida International University, Miami, FL
- 2:00PM **OP-9-2-11C - An Implantable Biochip to Influence Patient Outcomes Following Trauma-induced Hemorrhage**
A. Guiseppi-Elie¹
¹Clemson University, Clemson, SC
- 2:15PM **OP-9-2-11D - NanoCluster Beacon (NCB): a DNA-silver Nanocluster Probe that Fluoresces Upon Hybridization**
H-C. Yeh¹, J. Sharma¹, J. J. Han¹, J. S. Martinez¹, and J. H. Werner¹
¹Los Alamos National Laboratory, Los Alamos, NM
- 2:30PM **OP-9-2-11E - Nanoscale Growth of Individual Bacteria with Hydrodynamic Sensing**
P. Kinnunen¹, I. Sinn¹, D. Newton¹, M. Burns¹, B. H. McNaughton¹, and R. Kopelman¹
¹University of Michigan, Ann Arbor, MI
- 2:45PM **OP-9-2-11F - On-chip Labeling via Enzymatic DNA Polymerization for Nucleic Acid Detection**
V. Tjong¹, H. Yu¹, A. Hucknall¹, S. Rangarajan¹, and A. Chilkoti¹
¹Duke University, Durham, NC

Track: Devices: Nano to Micro - 9-2-12

Emerging Concept of Medical Micro Devices

Chairs: Mark Feldman, Keith Johnson

Room 16B

- 1:30PM **OP-9-2-12A - Nanoporous Silica as Membrane for Implantable Ultra-thin Biofuel Cells (iBFCs)**
T. Sharma¹, Y. Hu¹, M. Stoller¹, R. S. Ruoff¹, M. Feldman², M. Ferrari³, and X. Zhang¹
¹Univ of Texas at Austin, Austin, TX, ²Univ of Texas Health Science Center at San Antonio, San Antonio, TX, ³Univ of Texas Health Science Center at Houston, Houston, TX
- 1:45PM **OP-9-2-12B - Immunoaffinity Microchip for Hematopoietic Stem Cell Enrichment From Human Blood**
J. Zhang¹, H. Gaskins¹, and P. J. Kenis¹
¹Univeristy of Illinois at Urbana Champaign, Urbana, IL
- 2:00PM **OP-9-2-12C - Monodisperse Artificial Oxygen Carriers Generated on a Droplet Microfluidics Platform**
S-Y. Teh¹, and A. P. Lee¹
¹University of California, Irvine, Irvine, CA
- 2:15PM **OP-9-2-12D - Controlled Perturbation of Cells Using Magnetic Nanorods**
A. Celedon¹, and D. Wirtz²
¹Catholic University/Johns Hopkins, Santiago, Metropolitana, Chile, ²Johns Hopkins University, Baltimore, MD
- 2:30PM **OP-9-2-12E - Thermoresponsive Nanocomposite Hydrogels as Self-Cleaning Membranes for Glucose Biosensors**
M. A. Grunlan¹, R. Fei¹, G. Cote¹, and A. A. Abraham¹
¹Texas A&M University, College Station, TX
- 2:45PM **OP-9-2-12F - Electrospun Polymer Fibers With Zinc Oxide Nanoparticles Provide Efficient Antibacterial Surfaces**
J. T. Seil¹, and T. J. Webster¹
¹Brown University, Providence, RI

Track: Drug Delivery Systems * - 9-2-13

Targeted Drug Delivery - II

Chairs: Daniel Kamei, Justin Saul

Room 14

** Drug Delivery Systems Track is sponsored by Acta Biomaterialia*

- 1:30PM **OP-9-2-13A - TLR9-targeted Biodegradable Nanoparticles as Immunization Vectors Protect Against West Nile Encephalitis**
S. L. Demento¹, N. Bonafe², W. Cui¹, S. M. Kaech¹, M. J. Caplan¹, E. Fikrig¹, M. Ledizet², and T. M. Fahmy¹
¹Yale University, New Haven, CT, ²L2 Diagnostics, New Haven, CT

- 1:45PM **OP-9-2-13B - Lupus Immunotherapy Using a CD4 Targeted, Hydrogel-Based Nanoparticle System**
M. Look¹, E. Stern¹, Q. Wang¹, L. DiPlacido¹, J. E. Craft¹, and T. M. Fahmy¹
¹Yale University, New Haven, CT
- 2:00PM **OP-9-2-13C - Comprehensive Immunomodulatory Treatment via Targeted Drug Delivery to ICAM-1**
S. Kang¹, and M. M. Jin¹
¹Cornell University, Ithaca, NY
- 2:15PM **OP-9-2-13D - Transcellular Transport of Nanocarriers Across Gastrointestinal Epithelial Cells by Targeting ICAM-1**
R. Ghaffarian¹, T. Bhowmick¹, and S. Muro¹
¹University of Maryland, College Park, MD
- 2:30PM **OP-9-2-13E - Development of Novel Single Chain Antibodies for Fibrin-targeted Theranostics**
S. E. Stabenfeldt¹, W. E. Brown¹, L. Cao¹, and T. H. Barker¹
¹Georgia Institute of Technology / Emory University, Atlanta, GA
- 2:45PM **OP-9-2-13F - T Cell Vehicles Enhance Tumor Accumulation of Gold Nanoparticles**
L. Carpin^{1,2}, A. Bear^{2,3}, J. Young¹, N. Lewinski¹, A. Foster^{2,3}, and R. Drezek¹
¹Rice University, Houston, TX, ²Baylor College of Medicine, Houston, TX, ³Texas Children's Hospital, Houston, TX

Track: New Frontiers in Bioengineering - 9-2-14

Integrated Cellular Systems

Chairs: K. Jimmy Hsia, Robert Nerem

Room 15

- 1:30PM **OP-9-2-14A - Integrated Cellular Systems: An Engineering Approach to Constructing Multi-cellular Organisms**
R. D. Kamm¹
¹Massachusetts Institute of Technology, Cambridge, MA
- 1:45PM **OP-9-2-14B - Engineering the Differentiation of Multicellular Stem Cell Systems**
T. C. McDevitt¹
¹Georgia Institute of Technology, Atlanta, GA
- 2:00PM **OP-9-2-14C - Electrophysiological Sorting of Pluripotent Stem Cell-Derived Cardiomyocytes in a Microfluidic Platform**
F. B. Myers¹, O. J. Abilez², C. K. Zarins², and L. P. Lee¹
¹University of California, Berkeley, Berkeley, CA, ²Stanford University, Stanford, CA
- 2:15PM **OP-9-2-14D - Enabling Technologies for Development and Characterization of Integrated Cellular Systems**
R. Bashir¹
¹UIUC, Urbana, IL
- 2:30PM **OP-9-2-14E - Mechanical Regulation of Tissue Morphogenesis**
N. Gjorevski¹, and C. M. Nelson¹
¹Princeton University, Princeton, NJ
- 2:45PM **OP-9-2-14F - Synthetic Biology: From Modules to Systems**
R. Weiss¹
¹MIT, Cambridge, MA

Track: Tissue Engineering * - 9-2-15

Stem Cells and Tissue Engineering - II

Chairs: Eben Alsberg, Shyni Varghese

Ballroom E

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 1:30PM **OP-9-2-15A - Bioreactor Type and Culture Parameters Significantly Influence ES Cell Differentiation**
K. M. Fridley¹, I. Fernandez¹, R. Ambler¹, and K. Roy¹
¹The University of Texas at Austin, Austin, TX

- 1:45PM **OP-9-2-15B - Role of Substrate Stiffness on ESC Differentiation into Endoderm Lineage**
M. Jaramillo¹, S. Singh¹, J. Candiello¹, P. Kumta¹, and I. Banerjee¹
¹University of Pittsburgh, Pittsburgh, PA
- 2:00PM **OP-9-2-15C - Endoderm Expression in Embryonic Stem Cells is driven by Scaffold Structure**
W. Helen¹, C. C. King¹, and A. J. Engler¹
¹UC San Diego, San Diego, CA
- 2:15PM **OP-9-2-15D - Quantification and Enhancement of Contractile Characteristics in hESC and iPSC Derived Cardiomyocytes**
S. D. Lundy¹, M. J. Bloemink², M. A. Geeves², M. A. Laflamme¹, and M. Regnier¹
¹University of Washington, Seattle, WA, ²University of Kent, Canterbury, Kent, United Kingdom
- 2:30PM **OP-9-2-15E - Peripheral Nerve Regeneration by Using Induced Pluripotent Stem Cell-Derived Neural Crest Stem Cells**
A. Wang¹, Z. Tang¹, I-H. Park², Y. Zhu¹, S. Patel¹, G. Q. Daley³, and S. Li¹
¹UC Berkeley, Berkeley, CA, ²Yale School of Medicine, New Haven, CT, ³Harvard Medical School, Boston, MA
- 2:45PM **OP-9-2-15F - Generation of Hematopoietic progenitors from Induced Pluripotent Stem Cells under Feeder Free System**
I. Fernandez¹, J. Lin², and K. Roy²
¹University of Texas at Austin, Austin, TX, ²University of Texas at Austin, Austin, TX

Track: Tissue Engineering * - 9-2-16

Cardiovascular Tissue Engineering - III

Chairs: Guohao Dai, Mariah Hahn

Ballroom F

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 1:30PM **OP-9-2-16A - Understanding Mechanisms by Which Injectable Materials Preserve Cardiac Function Post-MI**
A. Rane¹, J. S. Chuang¹, A. Shah¹, D. P. Hu¹, N. D. Dalton¹, Y. Gu¹, K. L. Peterson¹, J. H. Omens¹, and K. L. Christman¹
¹University of California San Diego, La Jolla, CA
- 1:45PM **OP-9-2-16B - Cell-Seeded Fibrin Scaffolds for Cardiac Tissue Engineering**
K. S. Thomson¹, G. D. Robinson¹, F. S. Korte¹, C. M. Giachelli¹, B. D. Ratner¹, M. Scatena¹, and M. Regnier¹
¹University of Washington, Seattle, WA
- 2:00PM **OP-9-2-16C - Evaluating the Mechanical Contribution of De-novo Matrix in Engineered Heart Valve Scaffolds**
J. A. Stella¹, N. J. Amoroso¹, J. E. Mayer², W. R. Wagner¹, and M. S. Sacks¹
¹University of Pittsburgh, Pittsburgh, PA, ²Children's Hospital Boston, Boston, MA
- 2:15PM **OP-9-2-16D - In Situ Regeneration of the Heart Valve**
D. Raghavan¹, J. K. Williams¹, J. Yoo¹, S. J. Lee¹, J. E. Jordan¹, and A. Atala¹
¹Wake Forest University, Winston-Salem, NC
- 2:30PM **OP-9-2-16E - Characterization of Sex-related Differences in the Phenotype of Valvular Interstitial Cells**
C. M. McCoy¹, and K. S. Masters¹
¹University of Wisconsin-Madison, Madison, WI
- 2:45PM **OP-9-2-16F - Comparison of Fibrin-based Engineered Tissue from Neonatal Versus Adult Human Dermal Fibroblast**
Z. Syedain¹, and R. Tranquillo¹
¹University of Minnesota, Minneapolis, MN

Track: Tissue Engineering * - 9-2-17

Bioreactors and Bioprocessing in Tissue Engineering

Chairs: Milica Radisic, Vassilios Sikavitsas

Ballroom G

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 1:30PM **OP-9-2-17A - Effect of Strain on the Tensile Properties and mRNA Expression of a Tissue-Engineered Flexor Tendon**
P. W. Whitlock¹, T. M. Seyler¹, C. N. Northam¹, T. L. Smith¹, M. E. Van Dyke¹, G. G. Poehling¹, and L. A. Koman¹
¹Wake Forest University Health Sciences, Winston-Salem, NC

- 1:45PM **OP-9-2-17B - hMSC Culture in a Tubular Perfusion System Enhances Late Osteoblastic Differentiation**
A. B. Yeatts¹, and J. P. Fisher¹
¹University of Maryland, College Park, MD
- 2:00PM **OP-9-2-17C - Mechanical Loading of Mesenchymal Stem Cells on Electrospun Scaffolds for Ligament Tissue Engineering**
R. Shaffer¹, J. Kluge², L. Dahlgren³, A. Goldstein¹, and D. Kaplan⁴
¹Virginia Tech, Blacksburg, VA, ²University of Pennsylvania, Philadelphia, PA, ³Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA, ⁴Tufts University, Medford, MA
- 2:15PM **OP-9-2-17D - *In Situ* Bioluminescence Imaging of BMP-2 Expression in a Perfusion Bioreactor**
S. J. Lapp¹, H. Shen¹, L. A. Bashur¹, G. Wang¹, and A. S. Goldstein¹
¹Virginia Tech, Blacksburg, VA
- 2:30PM **OP-9-2-17E - Engineering Biomimetic Microenvironments for the Functional Regeneration of Vocal Fold Lamina Propria**
A. J. Farran¹, A. K. Jha¹, R. L. Duncan¹, and X. Jia¹
¹University of Delaware, Newark, DE
- 2:45PM **OP-9-2-17F - Characterization of Engineered Tissue Development with Biaxial Mechanical Testing and Microscopy**
Y. Bai¹, J. D. Humphrey¹, and A. T. Yeh¹
¹Texas A&M University, College Station, TX

Track: Undergraduate - 9-2-18

Undergraduate Research II

Chairs: Connie Hall, Hossein Tavana
Room 13B

- 1:30PM **OP-9-2-18A - Using Ultrasonic Decorrelation Algorithms To Improve In Vivo Visualization of Injected Anesthetics**
S. L. Lipman¹, K. R. Nightingale¹, S. Grant², D. MacLeod², and M. L. Palmeri^{1,2}
¹Duke University, Durham, NC, ²Duke University Medical Center, Durham, NC
- 1:45PM **OP-9-2-18B - Experimentation and Modeling of Beta-cell Ca²⁺ Oscillations**
P. Eich¹, N. Tamarina¹, L. Fridlyand¹, and L. Philipson¹
¹University of Chicago, Chicago, IL
- 2:00PM **OP-9-2-18C - Developing a Microbead-based, maAPC Platform to Generate Antigen-Specific Cytotoxic Lymphocytes**
A. A. Tu¹, Y-L. Chiu¹, M. Oelke², and J. Schneck²
¹Johns Hopkins University, Baltimore, MD, ²Johns Hopkins University School of Medicine, Baltimore, MD
- 2:15PM **OP-9-2-18D - Monovalent PEGylated Fibrin 'A' Knob Peptides Inhibit Hemostatic Clot Formation**
N. M. Aboujamous¹, S. E. Stabenfeldt¹, A. Soon¹, and T. H. Barker¹
¹Georgia Institute of Technology, Atlanta, GA
- 2:30PM **OP-9-2-18E - Assessing Intracellular Oxidative Stress in Co-Exposures of Carbon Black & Iron Oxide Nanoparticles**
S. H. Ho¹, J. M. Berg¹, W. Hwang¹, R. Taylor¹, B. Guo¹, and C. M. Sayes¹
¹Texas A&M University, College Station, TX
- 2:45PM **OP-9-2-18F - Cranberry Juice Does Not Alter Bacterial Growth but May Inhibit Bacterial Adhesion**
R. A. Richard¹, A. Tao², Y. Zhang², and T. Camesano²
¹Bay Path College, Longmeadow, MA, ²Worcester Polytechnic Institute, Worcester, MA

PLATFORM SESSION - 9-3 - 3:15PM - 4:45PM

Track: Tissue Engineering *- 9-3-1

Novel Biomaterials and Scaffolds - V

Chairs: Gudrun Schmidt, Anirban Sen Gupta

Room 12A

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 3:15PM **OP-9-3-1A - Interfacial Polyelectrolyte Complexation (IPC) Fibers and Scaffolds for Tissue Engineering**
A. C. Wan¹, B. C. Tai¹, K. Narayanan¹, M. F. Leong¹, J. K. Toh¹, H. Lu¹, C. Du¹, K.-J. Leck¹, S. Gao¹, and J. Y. Ying¹
¹Institute of Bioengineering and Nanotechnology, Singapore, Singapore
- 3:30PM **OP-9-3-1B - Electrospun Scaffolds with Depth-dependent Alignment to Mimic the Structure of Articular Cartilage**
I. L. Kim¹, H. G. Sundararaghavan¹, and J. A. Burdick¹
¹University of Pennsylvania, Philadelphia, PA
- 3:45PM **OP-9-3-1C - Tunable Silk Fibers: Mimicking Natural Silkworm Processing with Microfluidics**
M. E. Kinahan¹, E. Filippidi², S. Köster³, H. M. Evans⁴, T. Pfohl⁵, D. L. Kaplan⁶, and J. Y. Wong¹
¹Boston University, Boston, MA, ²New York University, New York, NY, ³Georg-August-Universität Goettingen, Goettingen, Germany, ⁴Max-Planck-Institute for Dynamics and Self-Organization, Goettingen, Germany, ⁵Universität Basel, Basel, Switzerland, ⁶Tufts University, Medford, MA
- 4:00PM **OP-9-3-1D - Active Porous Scaffolds for Triggered Drug and Cell Delivery**
X. Zhao¹, C. A. Cezar¹, and D. J. Mooney¹
¹Harvard University, Cambridge, MA
- 4:15PM **OP-9-3-1E - Trifunctional Porogens for the Development of an Injectable Putty to Treat Traumatic Bone Defects**
R. Buchanan^{1,2}, M. Murphy², D. Yoon³, X. Liu^{1,2}, K. Kasper³, P. Simmons², A. Mikos³, M. Ferrari^{1,2}, E. Tasciotti², A. Henslee³, and M. Nair³
¹The University of Texas at Austin, Austin, TX, ²The University of Texas Health Science Center at Houston, Houston, TX, ³Rice University, Houston, TX
- 4:30PM **OP-9-3-1F - Replicating the Topography of Intestinal Basement Membrane**
C. Pfluger¹, and R. Carrier¹
¹Northeastern University, Boston, MA

Track: Systems Biology, Bioinformatics and Computational Biology - 9-3-2

Systems Cell Biology

Chairs: Timothy Galitski, Pamela Kreeger

Room 12B

- 3:15PM **OP-9-3-2A - Single Cell Analysis Reveals that HIV Viral Integration Position Alters the Mode of Stochastic HIV Gene Expression from Poisson to Infrequent Bursting**
J. E. Foley¹, R. Skukspyt², A. Arkin^{1,2}, and D. V. Schaffer¹
¹UC Berkeley, Berkeley, CA, ²Lawrence Berkeley National Lab, Berkeley, CA
- 3:30PM **OP-9-3-2B - A Comprehensive Computational Model of Mycoplasma Genitalium**
J. Sanghvi¹, J. Karr¹, and M. Covert¹
¹Stanford University, Stanford, CA
- 3:45PM **OP-9-3-2C - Temporal Cascades of Perturbed Biological Processes in Engineered Liver Mimics**
C. D. Lasher¹, Y. Kim¹, T. Murali¹, and P. Rajagopalan¹
¹Virginia Tech, Blacksburg, VA
- 4:00PM **OP-9-3-2D - Pairwise Agonist Scanning of Human Platelets Reveals the High-dimensional Calcium Response to Combinatorial Mediators of Thrombosis**
M. S. Chatterjee¹, J. E. Purvis¹, and S. L. Diamond¹
¹University of Pennsylvania, Philadelphia, PA

- 4:15PM **OP-9-3-2E - A Common Mechanism of Antifungal-Induced Cell Death Mediated by Reactive Oxygen Species**
P. A. Belenky^{1,2}, D. Camacho¹, and J. J. Collins^{1,2}
¹Howard Hughes Medical Institute, Boston, MA, ²Boston University, Boston, MA
- 4:30PM **OP-9-3-2F - Computational Analysis of the Compartmentalization of Phosphatase-Mediated Regulation of EGFR**
C. S. Monast¹, and M. J. Lazzara¹
¹University of Pennsylvania, Philadelphia, PA

Track: Biomedical Imaging and Optics - 9-3-3

Imaging Hardware and Software

Chairs: May Wang, Steve Wright
Room 19A

- 3:15PM **OP-9-3-3A - An Eight Channel Parallel Transmitter for use with Existing Systems**
N. A. Hollingsworth¹, K. L. Moody¹, K. Feng¹, M. P. McDougall¹, and S. M. Wright¹
¹Texas A&M University, College Station, TX
- 3:30PM **OP-9-3-3B - A 64-Channel Parallel MRI Transmitter**
K. Feng¹, N. A. Hollingsworth¹, J. C. Bosshard¹, C-W. Chang¹, K. L. Moody¹, M. P. McDougall¹, and S. M. Wright¹
¹Texas A&M University, College Station, TX
- 3:45PM **OP-9-3-3C - Automatic Color Segmentation of Histological Images for Cancer Diagnosis**
S. Kothari¹, Q. Chaudry¹, J. H. Phan², A. N. Young³, and M. D. Wang²
¹Georgia Tech, Atlanta, GA, ²Georgia Tech and Emory University, Atlanta, GA, ³Emory University, Atlanta, GA
- 4:00PM **OP-9-3-3D - TissueWikiMobile: An Easy Way to Access Large-scale Histology Image Data Using iPhone**
C. Cheng¹, T. H. Stokes¹, S. Hang¹, and M. D. Wang¹
¹Georgia Institute of Technology, Atlanta, GA
- 4:15PM **OP-9-3-3E - Soft-threshold Filtering Approach for Compressive Sampling based Computed Tomography Reconstruction**
H. Yu¹, and G. Wang²
¹Wake Forest University Health Sciences, Winston-Salem, NC, ²Virginia Tech., Blacksburg, VA
- 4:30PM **OP-9-3-3F - Pregnant Female Anthropometry from Computed Tomography Scan for Finite Element Model Development**
K. L. Loftis¹, M. G. Halsey², E. Y. Anthony², S. M. Duma³, and J. D. Stitzel¹
¹VT-WFU Center for Injury Biomechanics, Winston-Salem, NC, ²Wake Forest University School of Medicine, Winston-Salem, NC, ³VT-WFU Center for Injury Biomechanics, Blacksburg, VA

Track: Neural Engineering - 9-3-4

Neural Electrode Tissue Interface

Chairs: Jeff Capadona, Dustin Tyler
Room 19B

- 3:15PM **OP-9-3-4A - Improving Neural Implant Biocompatibility via Biomimetic Design**
T. Cui^{1,2}
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA
- 3:30PM **OP-9-3-4B - Integrating the Prodrug Approach for Therapeutic Interventions at the Neural Interface**
W. He¹, and Y. Cao¹
¹The University of Tennessee, Knoxville, TN
- 3:45PM **OP-9-3-4C - Biodegradable Electronic Materials and Devices for Neural Interfaces**
C. J. Bettinger¹
¹Carnegie Mellon University, Pittsburgh, PA

- 4:00PM **OP-9-3-4D -In Situ Analysis of Brain Tissue-Implant Interfaces**
J. Williams¹
¹Univ. of Wisconsin- Madison, Madison, WI
- 4:15PM **OP-9-3-4E -Biological Constraints on Reliable Neural Interfacing**
R. V. Bellamkonda¹
¹Georgia Institute of Technology, Atlanta, GA
- 4:30PM **OP-9-3-4F -Molecular Approaches to Understanding and Modulating Gliosis at the Cortical Electrode Interface**
J. R. Capadona^{1,2}, K. A. Potter^{1,2}, and B. Gui^{1,2}
¹Case Western Reserve University, Cleveland, OH, ²L. Stokes Cleveland Department of Veteran's Affairs, Cleveland, O

Track: Biomedical Engineering Education - 9-3-5

Learning Modules and Instructional Materials

Chairs: Tim Allen
Room 18A

- 3:15PM **OP-9-3-5A - Natural Engineering: Developmental Biology as a Frontier for Engineering and Therapeutic Discovery**
J. Butcher¹
¹Cornell University, Ithaca, NY
- 3:30PM **OP-9-3-5B - Introducing Cellular Labs in BME Undergraduate Courses**
S. Archer¹
¹Cornell University, Ithaca, NY
- 3:45PM **OP-9-3-5C - An Argument for Writing about the History of Technology as Part of an Engineering Education**
R. G. Voss¹, and M. Ali¹
¹UT at Austin, Austin, TX
- 4:00PM **OP-9-3-5D - Project Modules in a Course on Cellular Bioengineering**
A. L. Sieminski¹
¹Franklin W. Olin College of Engineering, Needham, MA
- 4:15PM **OP-9-3-5E - Rationale and Resources for a Course Module in Athletic Performance Engineering**
D. C. Clarke¹, and P. F. Skiba²
¹Massachusetts Institute of Technology, Cambridge, MA, ²Jersey Shore University Medical Center, Neptune, NJ
- 4:30PM **OP-9-3-5F - Cell Transplantation - A Course Linking Bio-therapies With Survival Surgery and Experimentation**
T. R. Cardinal¹
¹Cal Poly State University, San Luis Obispo, CA

Track: Cellular and Molecular Engineering - 9-3-6

The Physics and Engineering of Cancer Cells and Their Microenvironment

Chairs: Nastaran Kuhn, Jerry Lee
Room 18B

- 3:15PM **OP-9-3-6A - Cancer Cell Motility in a 3D Matrix**
D. Wirtz¹
¹Johns Hopkins University, Baltimore, MD
- 3:30PM **OP-9-3-6B - Using Microfluidics for Real-Time Studies of Tumor Cell Behavior under Flow or Interacting with an Intact Endothelium**
I. Zervantonakis¹, W. J. Polacheck¹, J. L. Charest², and R. D. Kamm¹
¹Massachusetts Institute of Technology, Cambridge, MA, ²The Charles Stark Draper Laboratory, Cambridge, MA

- 3:45PM **OP-9-3-6C - Metastatic Cells from Breast and Prostate Generate Increased Force Compared to Non-Metastatic Cells**
C. Kraning-Rush¹, S. Carey¹, J. Califano¹, and C. Reinhart-King¹
¹Cornell University, Ithaca, NY
- 4:00PM **OP-9-3-6D - Cell Stiffness Dictates Cytoskeleton Dependent Cancer Cell Invasion and Signaling**
V. Swaminathan¹, K. Myhreye², E. O'Brien¹, G. C. Blobel², and R. Superfine¹
¹University of North Carolina, Chapel Hill, NC, ²Duke University, Durham, NC
- 4:15PM **OP-9-3-6E - Vascular Recruitment of Retinoblastoma Stem Cells by Multicellular Adhesive Interactions with Circulating Leukocytes**
Y. Geng¹, G. M. Seigel², and M. R. King¹
¹Cornell University, Ithaca, NY, ²State University of New York at Buffalo, Buffalo, NY
- 4:30PM **OP-9-3-6F - Interstitial Flow Affects Invasive Potentials of Metastatic Tumor Cells**
H. Qazi¹, Z-D. Shi¹, X-Y. Ji¹, and J. M. Tarbell¹
¹The City College of New York, New York, NY

Track: Cardiovascular Engineering - 9-3-7

Heart Valve Biomechanics II: Mechanics and Simulation

Chairs: Zhaoming He, Sarah Wells
Room 18C

- 3:15PM **OP-9-3-7A - An FSI Study of Aortic Valve Sparing Procedures on Coaptation and Durability**
G. Marom¹, R. Haj-Ali¹, M. Rosenfeld¹, E. Raanani², and H. J. Schaeffers³
¹Tel-Aviv University, Tel Aviv, Israel, ²Chaim Sheba Medical Center, Tel Hashomer, Israel, ³University Hospitals of Saarland, Homburg, Saarland, Germany
- 3:30PM **OP-9-3-7B - Biomechanical Remodeling in Valves and Aortas of FBN1 Mutant Mice: Insights into Marfan Syndrome**
R. A. Gould¹, R. Sinha¹, H. Aziz², R. Rouf², D. Judge², and J. Butcher¹
¹Cornell University, Ithaca, NY, ²Johns Hopkins University School of Medicine, Baltimore, MD
- 3:45PM **OP-9-3-7C - In Situ Estimation of Extracellular Matrix Stiffness-Interstitial Cell Mechanical Coupling in the Heart Valve Leaflet**
M. S. Sacks¹
¹University of Pittsburgh, Pittsburgh, PA
- 4:00PM **OP-9-3-7D - Vortex Interaction and Dissipation under Edge-to-Edge Repair**
L. Shi¹, Y. Hu¹, and Z. He¹
¹Texas Tech University, Lubbock, TX
- 4:15PM **OP-9-3-7E - In Vivo Dynamic Stresses in the Functional Mitral Valve**
C. E. Eckert¹, M. Morita², K. Koomalsingh², M. Minakawa², R. C. Gorman², J. H. Gorman III², and M. S. Sacks¹
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pennsylvania, Philadelphia, PA
- 4:30PM **OP-9-3-7F - Remodeling of the Mitral Valve in Response to the Physiological Effects of Pregnancy**
C. Pierlot¹, A. Moeller¹, M. Lee¹, and S. Wells¹
¹Dalhousie University, Halifax, NS, Canada

Track: Cardiovascular Engineering - 9-3-8

Thrombosis and Hemostasis

Chairs: Guillermo Ameer, Alisha Sieminski
Room 18D

- 3:15PM **OP-9-3-8A - In Vitro Modulation of Shear-Induced Platelet Sensitization**
J. Sheriff¹, G. Girdhar¹, M. Xenos¹, J. Jesty¹, and D. Bluestein¹
¹Stony Brook University, Stony Brook, NY

- 3:30PM **OP-9-3-8B - Dynamic Spreading of Platelets using Reflection Interference Contrast Microscopy**
D. Lee¹, K. P. Fong¹, L. F. Brass¹, and D. A. Hammer¹
¹University of Pennsylvania, Philadelphia, PA
- 3:45PM **OP-9-3-8C - Novel FRET Proteins that Quantify Structural Changes in VWF and ADAMTS-13 Mediated Proteolysis**
K. M. Dayananda¹, S. Gogia¹, G. P. Visentin², and S. Neelamegham¹
¹State University of New York at Buffalo, Buffalo, NY, ²GTI Diagnostics, Waukesha, WI
- 4:00PM **OP-9-3-8D - Development of a Novel Nano Particle Scaffold to Regenerate Endothelium *In Situ***
L-C. Su^{1,2}, R. Tran^{1,2}, J. Yang^{1,2}, and K. T. Nguyen^{1,2}
¹University of Texas at Arlington, Arlington, TX, ²University of Southwestern Medical Center at Dallas, Dallas, TX
- 4:15PM **OP-9-3-8E - *In Vivo* Performance of Small Diameter Vascular Grafts Lined with Endothelial Progenitor Cells Overexpressing Thrombomodulin**
J. D. Stroncek¹, R. Licheng¹, J. H. Lawson², B. Klitzman¹, and W. M. Reichert¹
¹Duke University, Durham, NC, ²Duke University Medical Center, Durham, NC
- 4:30PM **OP-9-3-8F - Thrombogenicity Optimization of Ventricular Assist Devices (VAD) - Case-Study with the HeartAssist 5**
G. Girdhar¹, Y. Alemu¹, M. Xenos¹, R. Benkowski², M. Slepian³, J. Jesty¹, S. Einav¹, and D. Bluestein¹
¹Stony Brook University, Stony Brook, NY, ²MicroMed Cardiovascular Inc., Houston, TX, ³University of Arizona, Tucson, AZ

Track: Respiratory Engineering - 9-3-9

Lung Computational Fluid Dynamics and Particle Deposition

Chairs: Ching-Long Lin, Merryn Tawhai

Room 17A

- 3:15PM **OP-9-3-9A - Effect of Alveolar Wall Motion on Simulated Aerosol Dispersion in the Lung**
C. Darquenne¹, and B. Ma²
¹University of California, San Diego, La Jolla, CA, ²University of Vermont, Burlington, VT
- 3:30PM **OP-9-3-9B - An initial analysis of enhanced condensational growth (ECG) for respiratory drug delivery**
G. Tian¹, G. Su¹, M. Hindle¹, and P. W. Longest¹
¹Virginia Commonwealth University, Richmond, VA
- 3:45PM **OP-9-3-9C - Prediction of the Focal Sites of Ozone-Induced Tissue Injury in the Respiratory Tract through Numerical Simulation in Anatomically-Accurate Airway Structures**
B. Keshavarzi¹, J. Ultman², and A. Borhan²
¹The Pennsylvania State University, University Park, PA, ²The Pennsylvania State University, University Park, PA
- 4:00PM **OP-9-3-9D -Comparative Computational Fluid Dynamics Simulations of Airflows in the Full Respiratory System of Rats, Monkeys, and Humans**
S. Kabilan¹, J. P. Carson², R. E. Jacob², A. P. Kuprat², K. R. Minard², R. Glenn¹, E. M. Postlethwait³, D.R. Einstein², and R. A. Corley²
¹University of Washington, Seattle, WA, ²Pacific Northwest National Laboratory, Richland, WA, ³University of Alabama at Birmingham, Birmingham, AL
- 4:15PM **OP-9-3-9E - Numerical Simulations of the Propagation of a Liquid Plug through a 2D Airway Bifurcation**
B. L. Vaughan, Jr.¹, and J. B. Grotberg¹
¹University of Michigan, Ann Arbor, MI
- 4:30PM **OP-9-3-9F - Multiscale Simulation of Airflow and Particle Transport in a CT-based Human Airway Model**
C-L. Lin¹, A. R. Lambert¹, M. H. Tawhai², and E. A. Hoffman¹
¹The University of Iowa, Iowa City, IA, ²University of Auckland, Auckland, New Zealand

Skeletal Biomechanics

Chairs: Yingxin Gao, Deepak Vashishth
Room 17B

- 3:15PM **OP-9-3-10A - A Finite Element Model of the Effects of Subchondral Bone Geometrical and Mechanical Properties on Cartilage Axial Contact Loading**
K. A. Waller¹, M. J. Rainbow¹, D. C. Moore², and J. T. Crisco²
¹Brown University, Providence, RI, ²Alpert Medical School of Brown University and Rhode Island Hospital, Providence, RI
- 3:30PM **OP-9-3-10B -Calcium- and Phosphorus-Supplemented Diet Increases Bone Quantity and Strength in Exercising Mice**
M. A. Friedman¹, A. M. Bailey¹, and D. H. Kohn¹
¹University of Michigan, Ann Arbor, MI
- 3:45PM **OP-9-3-10C -Local and Systemic Effects of Dynamic Hydraulic Pressure Stimulation on Mitigation of Bone Loss**
M. Hu¹, J. Cheng¹, S. Ferreri¹, F. Serra-Hsu¹, W. Lin¹, and Y-X. Qin¹
¹Stony Brook University, Stony Brook, NY
- 4:00PM **OP-9-3-10D -Static Evaluation of Shear Loading Associated With Extension/Compression of the CerviCore Intervertebral Disc**
A. Valdevit^{1,2}, K. Stascavage¹, M. Brophy¹, A. Lisi¹, T. Errico², and A. Ritter¹
¹The Stevens Institute of Technology, Hoboken, NJ, ²NYU Hospital for Joint Diseases, New York, NY
- 4:15PM **OP-9-3-10E -Effects of Muscle Activation on Occupant Kinematics in Frontal Sled Tests**
S. Beeman¹, A. Kemper¹, M. Madigan², and S. Duma¹
¹Virginia Tech - Wake Forest, Blacksburg, VA, ²Virginia Tech, Blacksburg, VA
- 4:30PM **OP-9-3-10F -The Rat Skull is an “Energy Pathway” to the Brain during Shock Wave Exposure**
R. Bolander¹, C. Bir¹, B. Mathie¹, and P. VandeVord^{1,2}
¹Wayne State University, Detroit, MI, ²John D. Dingell VA Medical Center, Research & Development Service, Detroit, MI

Biosensors, Bio-Interfaces and Implantable Devices - II

Chairs: John McDevitt, John X.J. Zhang
Room 16A

- 3:15PM **OP-9-3-11A - Bioactive Electroconductive Hydrogels as Hosting Membranes for Enzyme-based Biosensors**
C. Kotanen¹, and A. Guiseppi-Elie²
¹Clemson University, Anderson, SC, ²Clemson University, Clemson, SC
- 3:30PM **OP-9-3-11B - Magnetoelastic Materials as Novel Bioactive Coatings for Control of Cell Adhesion**
E. Vlaisavljevich¹, H. Holmes¹, K. Ong¹, and R. Rajachar¹
¹Michigan Technological University, Houghton, MI
- 3:45PM **OP-9-3-11C - In Vivo Glucose Monitoring with Polyethylene Glycol (PEG) Bonded Hydrogel Fibers**
Y. Heo^{1,2}, H. Shibata^{2,3}, T. Okitsu^{2,4}, Y. Tsuda^{1,2}, T. Kawanish^{2,3}, and S. Takeuchi^{1,2}
¹The University of Tokyo, Meguro-ku, Tokyo, Japan, ²BEANS Project, Meguro-ku, Tokyo, Japan, ³TERUMO Co., Ashigarakami, Kanagawa, Japan, ⁴Kyoto University, Sakyo, Kyoto, Japan
- 4:00PM **OP-9-3-11D- Large Deflection, Linear Transduction Pressure Sensor for Ventricular Research**
J. V. Clark¹, and A. G. Akingba²
¹Purdue University, West Lafayette, IN, ²Indiana University, Indianapolis, IN
- 4:15PM **OP-9-3-11E - Surface Plasmon Resonance for Dynamic Analysis of Cell Secreting Behavior**
S-H. Wu¹, M-T. Wei², A. Chiou¹, P-K. Wei³, and X. Cheng²
¹National Yang-Ming University, Taipei, Taiwan, Taiwan, ²Lehigh University, Bethlehem, PA, ³Academia Sinica, Taipei, Taiwan, Taiwan
- 4:30PM **OP-9-3-11F - Development of a Minimally Invasive Bladder Pressure Monitoring System**
J. N. Weaver¹, J. C. Alspaugh¹, and B. Behkam¹
¹Virginia Tech, Blacksburg, VA

Track: New Frontiers in Bioengineering - 9-3-12

Systems-Level Approaches in Bioengineering

Chairs: Jason Papin, Shayn Peirce-Cottler

Room 16B

- 3:15PM **OP-9-3-12A - Direct Reprogramming as a Random Drift in Cell State**
K. Saha¹, J. Hanna¹, B. Pando², A. van Oudenaarden², and R. Jaenisch¹
¹Whitehead Institute/MIT, Cambridge, MA, ²MIT, Cambridge, MA
- 3:30PM **OP-9-3-12B - Proteolytic Activity Matrix (PrAM) Analysis for Simultaneous Determination of Multiple Protease Activities**
M. A. Miller¹, L. Barkal¹, K. Jeng², L. G. Griffith¹, and D. A. Lauffenburger¹
¹Massachusetts Inst. of Tech., Cambridge, MA, ²Boston Univ. School of Public Health, Boston, MA
- 3:45PM **OP-9-3-12C - Rapid Miniaturized Assays to Quantify Glycosyltransferase activity**
S. A. Patil¹, and S. Neelamegham¹
¹The State University of New York at Buffalo, Buffalo, NY
- 4:00PM **OP-9-3-12D - Ex Vivo Perfusion Optimization of Donor Liver Grafts for Transplantation and Cell Isolation**
M-L. Izamis¹, T. Herman¹, B. Uygun¹, F. Berthiaume¹, K. Uygun¹, and M. Yarmush¹
¹Massachusetts General Hospital, Boston, MA
- 4:15PM **OP-9-3-12E - Model of Lingual Motion During Swallowing Derived From Mechanics of Myofiber Tracts Imaged by MRI**
S. M. Mijailovich^{1,2}, B. Stojanovic^{3,4}, M. Kojic^{1,5}, A. Liang⁶, V. J. Wedeen⁷, and R. J. Gilbert²
¹Harvard School of Public Health, Boston, MA, ²Caritas St. Elizabeth's Medical Center, Boston, MA, ³Research and Development Center for Bioengineering, Kragujevac, Serbia, Yugoslavia, ⁴University of Kragujevac, Kragujevac, Serbia, Yugoslavia, ⁵The University of Texas Health Science Center, Houston, TX, ⁶Massachusetts Institute of Technology, Cambridge, MA, ⁷Massachusetts General Hospital, Charlestown, MA
- 4:30PM **OP-9-3-12F - A Hybrid Game Theoretical Approach for Stochastic Control of Drug Delivery in HIV Infection**
J. Wu¹, S. Lenaghan¹, and M. Zhang¹
¹University of Tennessee, Knoxville, TN

Track: Drug Delivery Systems * - 9-3-13

Targeted Drug Delivery - III

Chairs: Daniel Kamej, Justin Saul

Room 14

* Drug Delivery Systems Track is sponsored by Acta Biomaterialia

- 3:15PM **OP-9-3-13A - Engineered Transferrin Improves the Delivery of Therapeutics to Brain Tumors**
D. J. Yoon¹, G. Y. Lam¹, B. H. Kwan¹, F. C. Chao¹, T. P. Nicolaides², J. J. Phillips², A. B. Mason³, W. A. Weiss², and D. T. Kamej¹
¹UCLA, Los Angeles, CA, ²UCSF, San Francisco, CA, ³University of Vermont, Burlington, VT
- 3:30PM **OP-9-3-13B - Nitric Oxide Delivery to Glioblastomas: Specificity and Therapeutic Efficacy**
S. Safdar¹, and L. J. Taite¹
¹Georgia Institute of Engineering, Atlanta, GA
- 3:45PM **OP-9-3-13C - Development of Enzyme-Activated Nanoconjugates for Hepatic Cancer Therapy**
S. Medina¹, M. Chevliakov¹, D. S. Shewach¹, W. D. Ensminger¹, and M. E. El-Sayed¹
¹University of Michigan, Ann Arbor, MI
- 4:00PM **OP-9-3-13D - Targeted Virus Nanoparticles for Localized Chemotherapy of Breast Cancer**
F. Wei¹, K. I. McConnell¹, T-K. Yu², and J. Suh¹
¹Rice University, Houston, TX, ²The University of Texas M. D. Anderson Cancer Center, Houston, TX
- 4:15PM **OP-9-3-13E - Targeting Pc 4 Conjugated Gold Nanoparticles to Tumors Improves Drug Accumulation and PDT Efficacy**
A-M. Broome¹, Y. Cheng¹, J. Meyers¹, R. S. Agnes¹, M. E. Kenney¹, C. Burda¹, and J. P. Basilion¹
¹Case Western Reserve University, Cleveland, OH

4:30PM **OP-9-3-13F - Stem Cell-Directed Theranostic Nanovectors for Cancer Intervention**
J. O. Martinez¹, F. Amaya², R. Serda¹, X. Liu¹, M. Ferrari^{1,3}, M. Kolonin², and E. Tasciotti¹
¹The University of Texas Health Science Center, Houston, TX, ²The University of Texas Health Science Center - Houston, Houston, TX, ³The University of Texas MD Anderson Cancer Center, Houston, TX

Track: New Frontiers in Bioengineering - 9-3-14

Cellular and Subcellular Mechanics

Chairs: Roger Kamm, Mohammed Mofrad
Room 15

3:15PM **OP-9-3-14A - Measuring Mechanical Tension Across Vinculin Reveals Regulation of Focal Adhesion Dynamics**
B. D. Hoffman¹, C. Grashoff¹, M. D. Brenner², R. Zhou², M. Parsons³, M. T. Yang⁴, M. A. McLean², S. G. Sligar², C. S. Chen⁴, T. Ha², and M. A. Schwartz¹
¹University of Virginia, Charlottesville, VA, ²University of Illinois, Urbana, IL, ³King's College London, London, SE1 1UL, United Kingdom, ⁴University of Pennsylvania, Philadelphia, PA

3:30PM **OP-9-3-14B - Programmed Subcellular to Study the Dynamics of Cell Detachment**
B. E. Wildt¹, P. C. Searson¹, and D. Wirtz¹
¹Johns Hopkins University, Baltimore, MD

3:45PM **OP-9-3-14C - Mechanical Behavior of Neurons in Live Drosophila Embryos**
J. Rajagopalan¹, A. Tofangchi¹, and T. A. Saif¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

4:00PM **OP-9-3-14D - The Cell Nucleus as a Dominant Structure in the Mechanics of Adult Stem Cells**
A. J. Ribeiro¹, and K. N. Dahl¹
¹Carnegie Mellon University, Pittsburgh, PA

4:15PM **OP-9-3-14E - A Coarse-grained Model of the Functional State of the Nuclear Pore Complex**
R. Moussavi Baygi¹, Y. Jamali¹, R. Karimi², and M. Mofrad¹
¹UC Berkeley, Berkeley, CA, ²Massachusetts Institute of Technology, Cambridge, MA

4:30PM **OP-9-3-14F - Substrate Stiffness and Cell Area Predict Traction Stresses in Single Cells and Cells in Contact**
J. P. Califano¹, and C. A. Reinhart-King¹
¹Cornell University, Ithaca, NY

Track: Tissue Engineering * - 9-3-15

Stem Cells and Tissue Engineering - III

Chairs: Catherine Kuo, Fan Yang
Ballroom E

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

3:15PM **OP-9-3-15A - Geometric Control of Stem Cell Motility in 3D Synthetic Scaffolds**
S. Peyton¹
¹MIT, Cambridge, MA

3:30PM **OP-9-3-15B - A Multilayer Hydrogel Capable of Regenerating Zonally Organized Articular Cartilage from a Single Stem Cell Population**
L. H. Nguyen¹, N. Saxena¹, and K. Roy¹
¹University of Texas at Austin, Austin, TX

3:45PM **OP-9-3-15C - Elastomeric Tissue Constructs Mimicking Structural and Mechanical Properties and 3-D Cellular Anisotropy of Soft Tissues**
J. Guan¹, F. Wang¹, and Z. Li¹
¹The Ohio State University, Columbus, OH

4:00PM **OP-9-3-15D - Effects of Nanog and Oct4 Overexpression on Mesenchymal Stem Cells for Vascular Tissue Engineering**
J. Han¹, S. Row¹, D. D. Swartz², and S. T. Andreadis¹
¹University at Buffalo, The State University of New York, Amherst, NY, ²Women and Children's Hospital of Buffalo, University at Buffalo, The State University of New York, Buffalo, NY

- 4:15PM **OP-9-3-15E - Engineering Stem Cell-interactive Biomaterials for the Treatment of Inflammatory Diseases**
C. Griffith¹, A. L'huillier², D. Bolikal¹, Y. Shi³, J. Kohn¹, and P. V. Moghe¹
¹Rutgers University, Piscataway, NJ, ²Robert Wood Johnson Medical School, UMDNJ, Piscataway, NJ, ³Robert Wood Johnson Medical School, Piscataway, NJ
- 4:30PM **OP-9-3-15F - Enhancement of Skeletal Muscle Stem Cell Engraftment by Dual Delivery of VEGF and IGF-1 from a Macroporous Alginate Gel**
C. Borselli¹, C. A. Cezar¹, D. Shvartsman¹, H. H. Vandenburg², and D. J. Mooney¹
¹Harvard University, Cambridge, MA, ²Brown University, Providence, RI

Track: Tissue Engineering * - 9-3-16

Controlled Release in Tissue Engineering

Chairs: Debra Auguste, Danielle Benoit

Ballroom F

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 3:15PM **OP-9-3-16A - Release of TGF- β from PEGylated Fibrin Gels Promotes EC Stabilization and SMC Differentiation**
C. T. Drinnan¹, R. S. Stowers¹, M. A. Alexander¹, and L. J. Suggs¹
¹University of Texas at Austin, Austin, TX
- 3:30PM **OP-9-3-16B - Sustained Protein Release from Novel Aptamer-Functionalized Hydrogels**
B. Soontornworajit¹, J. Zhou¹, M. T. Shaw¹, T-H. Fan¹, and Y. Wang¹
¹University of Connecticut, Storrs, CT
- 3:45PM **OP-9-3-16C - Electrospun Fiber – Hydrogel Controlled Release Composites**
N. Han¹, J. Johnson¹, K. Parikh¹, P. Bradley¹, A. Hissong¹, J. Lannutti¹, and J. O. Winter¹
¹The Ohio State University, Columbus, OH
- 4:00PM **OP-9-3-16D - Covalent Conjugation of Transforming Growth Factor-beta1 to Fibrin Hydrogel for Tissue Engineering**
M-S. Liang¹, and S. T. Andreadis¹
¹State University of New York at Buffalo, Amherst, NY
- 4:15PM **OP-9-3-16E - Nano-Structured Silicon/Polymer Composite Microspheres for Sustained Release of Biomolecules**
D. Fan¹
¹The University of Texas Health Science Center at Houston, Houston, TX
- 4:30PM **OP-9-3-16F - Controlled Release of Dexamethasone From Electrospun Fibers Decreases the Immune Response to Implants**
P. Hill¹, N. Vacanti¹, H. Cheng¹, T. Dang¹, M. Ma¹, R. Langer¹, and D. G. Anderson¹
¹Massachusetts Institute of Technology, Cambridge, MA

Track: Tissue Engineering * - 9-3-17

Bioinspired Materials

Chairs: Joel Collier, Sarah Stabenfeldt

Ballroom G

* Tissue Engineering Track sponsored by Kinetic Concepts, Inc.

- 3:15PM **OP-9-3-17A - Bioinspired Collagen-Binding Peptidoglycans – Designing Key Tissue Ingredients for Tissue Engineering**
J. Paderi¹, K. Stuart¹, and A. Panitch¹
¹Purdue University, West Lafayette, IN
- 3:30PM **OP-9-3-17B - Tunable Proteolytic Degradation of Molecularly Engineered PEG Hydrogels to Enhance Cellular Invasion**
J. Patterson¹, and J. A. Hubbell¹
¹Ecole Polytechnique Fédérale de Lausanne, Lausanne, Vaud, Switzerland
- 3:45PM **OP-9-3-17C - General Bioinspired Platform for the Engineering of Novel “Smart” Protein-Polymers**
F. Garcia Quiroz¹, and A. Chilkoti¹
¹Duke University, Durham, NC

- 4:00PM **OP-9-3-17D - Engineering Biomaterial-Associated Complement Activation for Immune Modulation**
S. N. Thomas¹, M. A. Swartz¹, and J. A. Hubbell¹
¹Swiss Federal Institute of Technology, Lausanne, VD, Switzerland
- 4:15PM **OP-9-3-17E - S1P-Enhanced Vascularization in Porous Poly(ethylene glycol) Modular Scaffolds *In Vivo***
P. K. Nguyen¹, M. R. MacEwan¹, L. Li¹, L. V. Wang¹, and D. L. Elbert¹
¹Washington University in St. Louis, Saint Louis, MO
- 4:30PM **OP-9-3-17F - Insights from Biology for the Development of Tissue Engineering Scaffolds: the Beetle Exoskeleton**
P. A. Huber¹, J. Lomakin¹, R. Thomas², Y. Arakane³, K. J. Kramer³, R. W. Beeman⁴, M. R. Kanost³, and S. H. Gehrke¹
¹University of Kansas, Lawrence, KS, ²Haskell Indian Nations University, Lawrence, KS, ³Kansas State University, Manhattan, KS, ⁴Grain Marketing and Production Research Center, US Department of Agriculture, Manhattan, KS