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EMORY UNIVERSITY

GEORGIA TECH BIOMATERIALS DAY

Next Generation Biomaterials

October 10, 2014
Georgia Institute of Technology
Marcus Nanotechnology Building
Atlanta, GA

Georgia Tech Biomaterials

Georgia Tech Biomaterials Day - Next Generation Biomaterials

October 10, 2014

AGENDA

7:30am Registration Check-in, Continental Breakfast

8:00am Opening Remarks & Welcome – Julie Babensee, Georgia Tech

8:10am Plenary Speaker - Patrick Stayton, University of Washington

Proteins & Cells at Interfaces

Session Chair - Todd McDevitt

8:50am Presentation - Alison Douglas, Georgia Tech
Enhancing Cell Motility and Angiogenesis in Dense Fibrin-based Biomaterials

9:05am Rapid Fire - Rikhav Gala, Mercer, Mercer University
Formulation of Oral Particulate Ovarian Cancer Vaccine

9:10am Rapid Fire - Shantanu Pradhan, Auburn University
PEG-fibrinogen Hydrogel Microspheres Support Tumorigenic Phenotype of MCF7 Breast Cancer Cells

9:15am Rapid Fire - Jhilmil Dhulekar, Clemson University
Delivery of Polymeric Nanoparticles Loaded with Non-Toxic Drug to Overcome Drug Resistance for the Treatment of Neuroblastoma

9:20am Rapid Fire Discussion

9:30am Faculty Presentation – Andrés García, Georgia Tech

10:00am Break

Rationally Designed Biomaterials

Session Chair - Julie Champion

10:30am Faculty Presentation – Ravi Bellamkonda, Georgia Tech

11:00am Presentation - Graham Temples, Clemson University
Folate-functionalized Polymeric Micelle Delivering Combinatorial Therapy to Overcome Drug Resistant Breast Cancer

11:15am Rapid Fire - Michael Tanes, Georgia Tech
Spatiotemporal Oxygen Sensing Nanofibers for the Study of Tissue Engineering Constructs

11:20am Rapid Fire - Devon Headen, Georgia Tech
Microfluidic Cell and Cell-Cluster Encapsulation in PEG-4MAL Hydrogel Microspheres

57. Ian Hale - Clemson University - Non-invasive Deep Tissue Imaging of Polymer Degradation using X-Ray
58. Marian Hettiaratchi - Georgia Tech - Heparin Microparticle Delivery of Bone Morphogenetic Protein-2 (BMP-2) for Bone Regeneration
59. Michael Jaeggli - Clemson University - Using Patient-specific Geometry to Develop Scaffolds for Aortic Heart Valve Tissue Engineering
60. Christopher Johnson - Georgia Tech - Bacteriophage Therapy to Reduce Bacterial Burden in Infected Bone Regenerative Implants
61. Vaideesh Paraseam - Clemson University - Enhanced Matrix Elastin Production and Organization using Pentagalloyl Glucose in Pulmonary Fibroblast Cultures
62. Ashwin Parenky - Mercer University - A Detailed Mechanistic Study on Adjuvants and Optimizing Antigenicity of Particulate Cancer Vaccines
63. Akia Parks - Georgia Tech - Cathepsin Activity in Supraspinatus Tendinopathy: Identification in Human Chronic Tears and Temporal Induction an a Rat Overuse Model
64. Lindsey Sanders - Clemson University - Characterization of a Multi-functional Tetronic Surgical Adhesive for Soft Tissue Applications
65. Jessica Weaver - Georgia Tech - Microfluidic-based Islet Encapsulation and Transplantation

Stem Cells

67. Sooneon Bae - Clemson University - Osteogenesis of Mesenchymal Stem Cells in Dexamethasone-Releasing Semi-IPN Hydrogels
68. Amy Clark - Georgia Tech - Integrin-specific Hydrogels for the Delivery of Human Mesenchymal Stem Cells in Bone Repair
69. Elizabeth Duncan - University Of Memphis - The Effect of Adenosine on the Proliferation and Osteogenic Differentiation of Rat Mesenchymal Stem Cells
70. Petra Kerscher - Auburn University - Production of 3D Engineered Cardiac Tissues using a Highly Reproducible One-step Encapsulation Procedure of Human Induced Pluripotent Stem Cells
71. Katy Lassahn - Georgia Tech - Engineering the Microenvironment of Embryoid Bodies via Heparin-modified Gelatin Microparticle Incorporation
72. Torri Rinker - Georgia Tech - Heparin Biomaterials for Modulation of Endochondral Differentiation
73. Denise Sullivan - Georgia Tech - P(N-Isopropylmethacrylamide) Microparticles for Controlled BMP4 Delivery within Embryonic Stem Cell Aggregates
74. Liane Tellier - Georgia Tech - Degradation of GAG-based Microparticles in Mesenchymal Stem Cell Spheroids

3:50pm Rapid Fire - Petra Kerscher, Auburn University
Production of 3D Engineered Cardiac Tissues using a Highly Reproducible One-step Encapsulation Procedure of Human Induced Pluripotent Stem Cells

3:55pm Rapid Fire - Amy Clark, Georgia Tech
Integrin-specific Hydrogels for the Delivery of Human Mesenchymal Stem Cells in Bone Repair

4:00pm Rapid Fire - Torri Rinker, Georgia Tech
Heparin Biomaterials for Modulation of Endochondral Differentiation

4:05pm Rapid Fire Discussion

4:15pm Plenary Speaker - Kevin Healy, University of California - Berkeley

4:45pm Poster Session & Reception - Celebrating the Community &
Ravi Bellamkonda's Clemson Award

6:30pm Poster winners announced

POSTER SESSION

Proteins & Cells

1. Tigran Abramyan - Clemson University - Cluster Analysis of Ensembles of Conformational States of Adsorbed Proteins in Molecular Dynamics Simulations of Protein Adsorption
2. Guillemro Alas - Georgia Tech - Protein and Cell Resistant Brush Polymer on Medical Grade Stainless Steel
3. Elizabeth Campbell - Georgia Tech - Effects of CD3 Antibody Density and Microparticle Size on T Cell Cytolytic Activity
4. Varun Chawla - Clemson University - Effects of Clinically Relevant Mechanical Forces on Vascular Smooth Muscle Cells Under Hyperglycemia: An in vitro Dynamic Disease Model
5. Jhilmil Dhulekar - Clemson University - Delivery of Polymeric Nanoparticles Loaded with Non-Toxic Drug to Overcome Drug Resistance for the Treatment of Neuroblastoma
6. Sucheta D'S - Mercer University - In vitro Immunogenicity Assessment of Whole Cell Lysate Melanoma Vaccine and Adjuvant Microparticles
7. Rikhav Gala - Mercer University - Formulation of Oral Particulate Ovarian Cancer Vaccine
8. Astha Khanna - Clemson University - Fabrication of Human Serum Albumin Nanofilms for Enhanced Hemocompatibility and Smooth Muscle Cell Response
9. Elliott Mappus - Clemson University - Effect of Heparin-magnetite Nanoparticles on Vascular Smooth Muscle Cell Proliferation
10. Nihal Mulla - Mercer University - Formulation Development and Characterization of Microparticles as Vaccine and Adjuvant Delivery Systems
11. Nasim Nosoudi - Clemson University - Local Inhibition of Mmps in Abdominal Aortic Aneurysm Rat Model using Anti-elastin Decorated Nanoparticles Loaded with Batimastat
12. Sharon Olang - Clemson University - Investigation of Cysteine-rich Peptides from Herbal Plants
13. Timothy Olsen - Clemson University - Manipulation of Cellular Spheroid Composition and the Effects on Tissue Fusion
14. Shantuanu Pradhan - Auburn University - PEG-fibrinogen Hydrogel Microspheres Support Tumorigenic Phenotype of MCF7 Breast Cancer Cells
15. Jorge Rodriguez-Devora - Clemson University - Biomaterial Improves Compactness for Reproducible Cell-based Biological Targets for High Throughput Screening
16. Nathan Rohner - Georgia Tech - Size-dependent Molecular Dissemination from Tumors into Regional and Systemic Tissues
17. Apoorva – Salimath - Georgia Tech - Biofunctionalized Hydrogels for Skeletal Muscle Force Actuators
18. Atanu Sen - Clemson University - Fiber-based Microcarriers Enhance Proliferation of Hydrogel-encapsulated Cells
19. Noel Vera-Gonzalez - Duke University - Oxygen Sensing Microparticles for Use in Tissue Engineering Scaffolds
20. Trinh Vo - Mercer University - In vitro and in vivo Studies on Transdermal Particulate HPV Vaccine
21. Aline Thomas - Georgia Tech - Immunomodulatory Materials for the Attenuation of Multiple Sclerosis

Materials

22. Samuel Bearden - Clemson University - A New Method for Molecular Detection and Identification In A Metallic Nanopore
23. Jayesh Betala - Clemson University - Inhibition Of Smooth Muscle Cell Proliferation Using Drug -Loaded Polymeric Micelles
24. Jeffery Borden - University of Louisville - Toward Determining the Time Course of the Mechanical Properties of a Bone Graft Substitute Used to Fill a Drill-hole Defect: A Micro-CT and Micro-FEA Study
25. Colin Burns-Heffner - Clemson University - Tissue Fixation and Digestion Chemicals Impact the Mechanical Properties of Surgical Mesh
26. Erin Casey - Clemson University - Tissue Digestion Method Suitable for Explanted Hernia Mesh
27. Thripthy Chandran - Mercer University - Trastuzumab Functionalized Poly-Ɛ-Caprolactone/Pluronic Based Nanoparticles for Targeted Delivery of Docetaxel
29. Michael Dibalsi - Clemson University - Heparin-immobilized Electrospun Nanofibers for Vascular Sutures
30. Melissa Gaillard - Clemson University - Polymeric Polylactide Beads as Microcarriers in Targeted Cell Therapy
31. Kayla Gainey - Clemson University - Glucosense: Design of a Low Cost Diabetes Glucometer System
32. Dmitry Gil - Clemson University - Polypropylene Hernia Meshes: In vitro Modeling of Degradation
33. Ben Green - Clemson University - Polymeric Micelle as a Drug and Gene Delivery Carrier for Brain Tumor
34. Mohammad Mahdi Hasani-Sadrabadi - Georgia Tech - Microfluidic Fabrication of Ph-responsive Core-shell Nanoparticles for Oral Delivery of Cancer Therapeutics

35. Devon Headen - Georgia Tech - Microfluidic Cell and Cell-cluster Encapsulation in PEG-4MAL Hydrogel Microspheres
36. Devante Horne - Clemson University - Effects of Industrially Processed PLGA Thin Films on Drug Delivery and Material Properties
37. Olukayode Karunwi - Clemson University - Biofabrication of a Dual Responsive Glucose And Lactate Implantable Biosensor
38. Amanda Macaluso - Clemson University - A Simple Assay for Detecting Biofilm Accumulation on Commonly used Medical Device Materials
39. Nicholas Marais - Clemson University - Cited Causes of TKR Failure in the United States and the Associated Financial Burden
40. Veeander Mealing - Clemson University - Bone Decomposition after Death: Developing a Forensic Bioreactor to Mimic Burial Settings
41. Olanrewaju Oludipe - Morehouse College - Preparation and Characterization of Thermo-sensitive Nanofibers with Neuroprotective Nanoparticles
42. Sean Patterson - Morehouse College - Investigating Thermal & Gelation Properties of Poly(N-Vinyl Caprolactam) Crosslinked Hydrogels
43. Matthew Pysh - Clemson University - Analytical Methods for Assessing Bone Biochemistry to Determine Citrate Concentration and Mineral Content: Applications for Forensic Anthropology
44. Sarah Rowlinson - Clemson University - Clemson University Bioengineering Society's Biomaterials Education and Outreach
45. Alex Schudel - Georgia Tech - S-Nitrosated Poly(Propylene Sulfide) Nanoparticles for Enhanced Nitric Oxide Delivery
46. Kevin Schwartzman - Clemson University - Metrology of Explanted Joint Replacements with Modular Tapers: Validation of Non-destructive Profilometry using PVS Impression Molds
47. Justin Shaw - Clemson University - Finding the Ideal Nonthermal Plasma Treatment Settings for Maximum PLGA Bioadhesion
48. Kyle Snethen - Clemson University - Manufacturing Tolerance Impacts Stresses in Bore-cone Taper Junctions of Modular Total Knee Replacements: A Finite Element Analysis
49. Christine Stamer - Clemson University - Quantifying Variations in the Femoral Head-neck Moment Arm and Associated Surface Changes on Retrieved Modular Total Hip Replacements
50. Qining Sun - Georgia Tech - Xylan Reinforcement on Cellulose Bionanocomposite Film
51. Michael Tanes - University Of Virginia/Georgia Tech - Spatiotemporal Oxygen Sensing Nanofibers for the Study of Tissue Engineering Constructs
52. Marsalas Whitaker - University of Memphis - Extended in vitro and in vivo Degradation Evaluation of Sodium Acetate Buffered Chitosan Sponges
53. Joseph Wortkoetter - Clemson University - A Self-assembly Approach on Perylene Monoimide Dye
54. So Jung Gwak - Clemson University - Polymeric Nanotherapeutics as Combinatorial Therapy for Spinal Cord Tumor

Tissue Repair

55. Christopher Deborde - Clemson University - Development of a Tissue Engineered Construct for Mitral Valve Regeneration
56. José Garcia - Georgia Tech - PEG Hydrogels Functionalized with a Collagen-mimetic Peptide and Vascular Endothelial Growth Factor for Regeneration of Critically-sized Bone Defects

11:25am Rapid Fire - Olukayode Karunwi, Clemson University
Biofabrication of a Dual Responsive Glucose and Lactate Implantable Biosensor

11:30am Rapid Fire Discussion

Biomaterials in Industry

11:40am Industry Panel & Working Lunch

Panelists: **Bryan Baker,** Biochemist, Materials Research Lab, 3M; **Kathleen Burzycki,** Segment Marketer for Biologics Division, Bose Electroforce; **Sean Coyer**, Product Specialist, W.L. Gore & Associates; **Ken Gall,** Director, MedShape & Professor, School of Materials Science & Engineering, Georgia Tech; **Ray Gould**, Sales Representative, Biospherix

1:00pm Industry Speaker – Sean Coyer, W.L. Gore & Associates, Inc.

Biomaterials Design for Tissue Repair

Sponsored by Bose Electroforce

Session Chair - Bob Nerem

1:30pm Invited Faculty Presentation - Karen Burg, Clemson University

2:00pm Presentation - Juana Mendenhall, Morehouse College
The Effect of Hypoxia on Thermosensitive Poly(N-vinylcaprolactam) Hydrogels for Cartilage Tissue Engineering

2:15pm Rapid Fire - Christopher DeBorde, Clemson University
Development of a Tissue Engineered Construct for Mitral Valve Regeneration

2:20pm Rapid Fire - Marian Hettiaratchi, Georgia Tech
Heparin Microparticle Delivery of Bone Morphogenetic Protein-2 (BMP-2) for Bone Regeneration

2:25pm Rapid Fire - Ian Hale, Clemson University
Non-invasive Deep Tissue Imaging of Polymer Degradation Using X-Ray

2:30pm Rapid Fire Discussion

2:40pm Break

Stem Cell-Biomaterial Interactions

Sponsored by BioSpherix

Session Chair - Andrés García

3:10pm Faculty Presentation – Todd McDevitt, Georgia Tech

3:40pm Presentation - Jennifer Lei, Georgia Tech
Heparin Coating for Controlled Biomolecule Presentation to Mesenchymal Stem Cell Spheroids