



Preliminary Program*
*Program is subject to change.

Annual Conference and Exhibition Program

MONDAY, DECEMBER 2, 2019

6:30 AM – 7:00 PM **Registration**
Grand Caribbean Pre-Function North

PRE-CONFERENCE WORKSHOPS

Pre-Registration Required. Ticket sessions.

7:30 AM – 3:30 PM **A Celebration of Research Excellence and Achievement on the Occasion Of Tony Mikos' 60th Birthday**
Sponsored by Mary Ann Liebert Inc., Publishers

Grand Caribbean 1/2

Description: Join us for a full-day symposium of invited speakers honoring Dr. Tony Mikos in celebration of his 60th birthday. In the morning session, we will have leaders in tissue engineering selected from Dr. Mikos' collaborators and former trainees. The afternoon session will be focused on 3D printing experts associated with the Center for Engineering Complex Tissues. The symposium will end with a presentation and remarks by Dr. Tony Mikos. Breakfast, lunch and morning breaks are included in attendee registration.

Session Chair: Elizabeth Cosgriff-Hernandez

Program:

7:30 AM - 8:15 AM	Registration and Breakfast
8:15 AM - 8:30 AM	Welcome and Opening Remarks
8:30 AM– 9:00 AM	Musculoskeletal Tissue Engineering Mike Yaszemski, <i>Mayo Clinic</i>
9:00 AM – 9:20 AM	Advanced Wound Care Suzie Riley, <i>Organogenesis Inc.</i>
9:20 AM – 9:40 AM	Drug Refillable Polymer Implants for Chronic and Recurrent Disease Horst von Recum, <i>Case Western Reserve University</i>

9:40 AM – 10:00 AM	Biomaterials in Regenerative Medicine Laura Suggs, <i>University of Texas</i>
10:00 AM - 10:30 AM	Break
10:30 AM - 10:50 AM	Sigilon Therapeutics, Biomaterials and Tissue Engineering in Industry Susan Drapeau, <i>Sigilon Therapeutics, Inc.</i>
10:50 AM - 11:10 AM	Delivery of Cells and Proteins for Rotator Cuff Muscle Repair Johnna Temenoff, <i>Georgia Tech</i>
11:10 AM – 11:30 AM	Surface Functionalization of Biomaterials for Bone Tissue Regeneration Heungsoo Shin, <i>Hanyang University</i>
11:30 AM – 11:50 AM	Biomedical Applications of Emulsion Templating Elizabeth Cosgriff-Hernandez, <i>University of Texas</i>
11:50 AM – 12:10 PM	Biomaterials-based Cancer Immunotherapy Platforms for Intratumoral Delivery of Head and Neck Tumors Simon Young, <i>The University of Texas Health Science Center</i>
12:10 PM– 12:30 PM	Biomaterials-based strategies for tissue engineering and cancer treatment and engaging undergraduate students in research Sue Anne Chew, <i>The University of Texas Rio Grande Valley</i>
12:30 PM - 1:45 PM	Lunch
1:45 PM - 2:10 PM	3D Printing for Engineering Complex Tissues John Fisher, <i>University of Maryland</i>
2:10 PM – 2:30 PM	Innovation, Education, and Collaboration through Resource Centers Tony Melchiorri, <i>Rice University</i>
2:30 PM– 3:00 PM	Regenerative Medicine: 3D Printing Strategies Tony Atala, <i>Wake Forest School of Medicine</i>
3:00 PM - 3:30 PM	Tony Mikos and Closing Remarks
9:30 AM – 3:30 PM	Amplify Your Translational Impact: Considerations For De-Risking Tissue Engineering And Regenerative Medicine Therapies <i>Sponsored by ARMI BioFabUSA & RoosterBio, Inc.</i>

Grand Caribbean 3-5

Many regenerative medicine and applied therapeutic products originate from academic research labs or small companies that have a strong scientific background but may not have the experience for bringing a product to market. Regardless of development stage, knowledge of key considerations in the product development process will streamline technology transfer from the lab to the clinic and ultimately to the market. This workshop will cover early to late phase considerations for de-risking the development of a regenerative medicine product, including scale-up considerations, implementation of quality systems, and navigating the regulatory landscape. The goal of this workshop is to learn from those who already have experience with these issues. The format of the workshop is geared toward a short presentation of “Lessons Learned” from the speakers but focused primarily on lively discussion among the panelists and workshop attendees.

Program:

9:30 AM – 9:45 AM	Session Introduction Taby Ahsan, <i>Vice President, Research & Development, RoosterBio, Inc</i>
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Mary Clare McCorry, *Director, Technical and Process Development, Advanced Regenerative Manufacturing Institute (ARMI)*

9:45 AM – 10:15 AM

Evolving the Manufacture of Cell-Based Therapies: Lessons Learned and Future Concepts

Rodney Rietze, *CEO, iVexSol*

10:15 AM – 11:15 AM

Scale-up Considerations for Meeting Growing Production Needs

Moderators: Mary Clare McCorry, *ARMI*; Taby Ahsan, *RoosterBio*

Automation of Stem and Progenitor Colony Analysis and Selection with Cell X™
George Muschler, *Dir., Reg. Medicine Laboratory, Cleveland Clinic & CSO, Cell X™ Technologies*

Technology Strategies for Reducing Development Timelines for hMSC Products
Jon Rowley, *Founder and CPO, RoosterBio*

Scale-up Considerations for Productions of Immunotherapies
Doris A. Taylor, *Director, Texas Heart Institute*

Panel Discussion and Audience Q&A

11:15 AM – 11:30 AM

Break & Networking

11:30 AM – 12:30 AM

Strategies for Navigating the Regulatory Landscape

Moderators: Richard McFarland, *BioFab*

20 Years of Skin Substitutes
Gail Naughton, *CSO, Histogen*

Biopreservation Solutions as a Case Study for a Global Strategy
Aby J. Mathew, *SVP & CTO, BioLife Solutions, Inc.*

Overview of Current FDA Regulatory Pathways
Becky Robinson-Zeigler, *Deputy Chief Regulatory Officer, ARMI*

Panel Discussion and Audience Q&A

12:30 AM – 1:00 PM

Lunch & Networking

1:00 PM – 2:00 PM

Timely Deployment of Quality Systems

Moderators: Becky Robinson-Zeigler, *BioFab*

GMP Strategies for Young Startups
Adam Jakus, *CTO, Dimension Inx*

Supply Chain Management and Raw Materials
Claudia Zylberberg, *CEO, Akron*

Deployment of Quality Systems at Various Stages of TEMP Development and Production

Thomas Gilbert, *Vice President of Research and Development, Miromatrix*

Panel Discussion and Audience Q&A

2:00 PM – 2:15 PM

Break & Networking

2:15PM – 3:15 PM

Acquiring Funding to Support Tech Transfer

Moderators: Rosemarie Hunziker, BioFab

Small Business Innovation Research (SBIR) and Small Business Technology Transfer Programs (STTR)

Speaker TBD

Increasing Capital Through Partnership

Luke Burnett, CEO, KeraNetics

Crafting Your Technology Pitch

Emily English, CEO, Gemstone Therapeutics

Panel Discussion and Audience Q&A (Speakers)

3:00 PM – 3:15 PM

Closing Remarks

1:00 PM – 3:30 PM

Multi-Cellular Engineered Living Systems: Principles, Challenges, And Applications

Sponsored by NSF Center for Emergent Behaviors of Integrated Cellular Systems

Grand Caribbean 8-10

Significant progress in the fields of systems biology, synthetic biology, and developmental biology, combined with recent advances in organoid and induced pluripotent stem cell technologies, have inspired new visions for the design and manufacture of multi-cellular engineered living systems (M-CELS) with useful functionality by design. M-CELS open new possibilities for transformative health and assistive technologies, from biorobotic systems that can be guided by light, to organ-on-chip systems developed as drug screening assays or models of disease. The process of engineering M-CELS is enhanced by understanding how emergent structures naturally arise during developmental processes through mechanical, biochemical and electrical communication. Which aspects of these processes can be circumvented, accelerated or modified according to specification to yield robust, reproducible organoids and microphysiological systems? Computational models that simulate the growth, division, and differentiation of multicellular systems into emergent organization from an initial pluripotent population of cells are an important step in understanding and predicting multicellular systems-level behavior. This interactive workshop will engage participants in conversation about the principles, challenges, and applications of M-CELS.

Schedule:

1:00 PM - 1:05 PM

Welcome and Introduction
Roger Kamm, MIT

1:05 PM - 1:35 PM

In Vitro Platforms for Multi-Cellular Engineered Living Systems
Roger Kamm, MIT

1:35 PM - 2:05 PM

Computational Methods in Multi-Cellular Engineered Living Systems
Melissa Kemp, Georgia Tech

2:05 PM - 2:15 PM

Break

2:15 PM - 2:45 PM

Applications of Synthetic Biology in Multi-Cellular Engineered Living Systems
Ron Weiss, MIT

2:45 PM - 3:15 PM Genetically Engineered hiPSCs in In Vivo Environments
Valerie Gouon-Evans, Boston University

3:15 PM - 3:30 PM Discussion
Moderated by Melissa Kemp, Georgia Tech

SCIENTIFIC PROGRAM

4:00 PM – 6:00 PM **Opening Plenary Session:**
Welcome Message - TERMIS President and TERMIS-AM Chair
Welcome Message - TERMIS-AM 2019 Conference Co-Chairs
Opening Plenary Panel:
Pain Points for Translating Tissue Engineering Approaches into Clinical Therapies
Moderator: Dr. Taby Ahsan, Vice President of Research & Development, RoosterBio, Inc.
Panelists:
Dr. Anthony Davies, Executive Chairman, Dark Horse Consulting
Dr. Blanka Sharma, Assistant Professor of Biomedical Engineering, University of Florida
Dr. Christopher Gemmiti, VP of Operations, Sentien Biotechnologies, Inc.
Tim Bertram, CEO, InRegen, CEO, Twin City Bio

Grand Caribbean 7

6:00 PM - 8:00 PM **Welcome Reception/Poster Session 1**

Kingston Hall **Exhibits**

TUESDAY, DECEMBER 3, 2019

7:00 AM – 6:30 PM **Registration**
Grand Caribbean Pre-Function North

7:00 AM – 8:00 AM **SYIS Peer Mentor Breakfast & Undergraduate Poster Session**
Kingston Hall

8:00 AM – 9:00 AM **Plenary Symposium I: Dr. Joseph Wu**
Grand Caribbean 7

9:00 AM – 9:30 AM **Lifetime Achievement Award**
Dr. Stephen Badylak

Grand Caribbean 7

9:30 AM - 10:00 AM
Kingston Hall

Coffee Break

10:00 AM - 11:30 AM

Scientific Session 1

Grand Caribbean 1/2

ASMB Guest Symposium: The Extracellular Matrix in Morphogenesis and Repair

Session Chairs: Thomas Barker and Jeffrey Jacot

Keynote Speaker:

10:00 AM – 10:30 AM

Engineering Integrin Specific Materials for Tissue Repair

Tatiana Segura

ORAL PRESENTATIONS:

10:30 AM – 10:45 AM

1

Presentation Of The Integrin Binding Domain Of Fibronectin Impacts Lung Cells Phenotype

L. Moretti, T. H. Barker;

BME, University of Virginia, Charlottesville, VA.

10:45 AM – 11:00 AM

2

Synthetic Platelet Microgels Containing Fibrin B Knob Targeting Motifs Enhance Clotting Responses

S. Nandi^{1,2}, E. P. Mihalko^{1,2}, K. A. Nellenbach^{1,2}, Y. Li¹, M. Castaneda¹, M. G. Harp³, S. Menegatti^{4,2}, T. H. Barker³, A. C. Brown^{1,2};

¹Joint Department of Biomedical Engineering, North Carolina State University/University of North Carolina - Chapel Hill, Raleigh, NC, ²Comparative Medicine Institute, Raleigh, NC, ³Department of Biomedical Engineering, University of Virginia, Charlottesville, VA, ⁴Joint Department of Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC.

RAPID FIRE PRESENTATIONS:

11:00 AM – 11:05 AM

3

The Role Of Extracellular Matrix Developmental Age On Cardiac Fibroblast Remodeling Response

L. R. Perreault¹, M. C. Watson¹, R. C. Bretherton¹, L. D. Black III^{1,2};

¹Biomedical Engineering, Tufts University, Medford, MA, ²Cellular, Molecular, and Developmental Biology Program, Tufts University School of Medicine Sackler School for Graduate Biomedical Sciences, Boston, MA.

11:05 AM – 11:10 AM

4

Withdrawn

Q&A Discussion

11:10 AM – 11:15 AM

5

Methods For Isolation Of Matrix Bound Nanovesicles

L. M. Quijano¹, J. D. Naranjo¹, S. O. El-Mossier¹, C. Pineda¹, L. Zhang¹, N. Turner¹, L. White², H. Li³, Y. Sadovsky³, S. F. Badylak¹;

¹McGowan Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, ²School of Pharmacy, University of Nottingham, Nottingham,

UNITED KINGDOM, ³Department of Obstetrics, Gynecology, and Reproductive Sciences, Magee-Womens Research Institute, Pittsburgh, PA.

11:15 AM – 11:20 AM

6

Keratin'S Modulation Of Protein Aggregation And Autophagy Pathways May Underlie Its Cytoprotective Effects.

J. Hollars¹, S. Phillips¹, E. Zipay¹, Z. Billings¹, C. Davis², R. Youker¹, **H. B. Coan¹**;
¹Biology, Western Carolina University, Cullowhee, NC, ²Pratt School of Engineering, Duke University, Cullowhee, NC.

11:20 AM – 11:25 AM

7

Microwell Scaffolds Using Collagen-IV And Laminin-111 Lead To Improved Insulin Secretion Of Human Islets

E. Hadavi;

Fraunhofer Project Center (FPC), University of Twente, Enschede, Netherlands.

11:25 AM – 11:30 AM

8

Restoration Of Ovarian Function By Tissue Engineering

M. Shachar Goldenberg¹, S. Felder², H. Masasa², S. Cohen²;

¹The Department of Chemical Engineering, SCE College of Engineering, Ashdod, ISRAEL, ²Avram and Stella Goldstein-Goren Department of Biotechnology Engineering, Ben-Gurion University of the Negev, Beer-Sheva, ISRAEL.

10:00 AM - 11:30 AM
Grand Caribbean 3-5

Scientific Session 1

Strategies for Tissue Microvascularization

Session Chairs: Christopher Bashur and Ngan Huang

ORAL PRESENTATIONS:

10:00 AM – 10:15 AM

9

Induction Of Designed Micro-vascular Network With 3D Bioprinting

J. Son, S. Hong, **H. Kang**;

Life Science, UNIST, Ulsan, KOREA, REPUBLIC OF.

10:15 AM – 10:30 AM

10

Tuning Of Matrix Proteolytic Degradation And Cell Adhesive Peptide Ligand Concentration Synergistically Enhance 3d Vascular Sprouting

Y. He¹, M. Santana¹, M. Moucka², A. Shuaibi¹, M. Pimentel¹, S. Wexler¹, J. Quirk¹, M. Vaicik¹, M. Rashid³, A. Cinar³, G. Papavasiliou¹;

¹Biomedical Engineering, Illinois Institute of Technology, Chicago, IL, ²Biomedical Engineering, Texas A&M University, Austin, TX, ³Chemical and Biological Engineering, Illinois Institute of Technology, Chicago, IL.

10:30 AM – 10:45 AM

11

Spatial Variations In Degradation, Elastic Modulus, And Cell Adhesion Peptide Ligand Concentration Influence 3d Vascular Sprouting

Y. He, M. Santana, M. Pimentel, G. Papavasiliou;

Biomedical Engineering, Illinois Institute of Technology, Chicago, IL.

10:45 AM – 11:00 AM

12

The Role Of Hemodynamics And Viscoelasticity On The Pre-vascularization Of Thick, Bioengineered Tissues

C. J. Stephens¹, E. J. Stowe¹, J. A. Spector^{2,1}, J. T. Butcher¹;

¹Nancy E. and Peter C. Meinig School of Biomedical Engineering, Cornell

University, Ithaca, NY, ²Division of Plastic Surgery, Weill Cornell Medical College, Ithaca, NY.

11:00 AM – 11:15 AM

13

Neovessel Invasion Through Tissue Interfaces Is Stromal Cell Dependent
H. Strobel¹, S. Labelle², L. Krishnan³, J. Dale⁴, A. Rauff², A. M. Poulson, IV², K. Aliaj², J. A. Weiss², J. B. Hoying¹;

¹Advanced Solutions Life Sciences, Manchester, NH, ²University of Utah, Salt Lake City, UT, ³University of Louisville, Louisville, KY, ⁴University of Louisville, Louisville, KY.

11:15 AM – 11:30 AM

14

3d Hydrogel System To Promote Distinct Arterial-venous Specification For Tissue-engineered Vasculature

B. Mahadik¹, M. Patsy¹, Z. Keepers¹, R. Frayman², J. Fisher¹;

¹Bioengineering, University of Maryland, College Park, MD, ²Wake Forest University, Winston-Salem, NC.

10:00 AM - 11:30 AM
Grand Caribbean 8-10

Scientific Session 1

3D Tissue Engineered Cancer/Disease Models

Session Chair: Subhas C. Kundu

Keynote Speakers:

10:00 AM – 10:18 AM

Biomaterials for 3D In Vitro Cancer Models for Drug Screening

Subhas C. Kundu

10:18 AM – 10:36 AM

Robust Organ on Chip Platforms for Modeling Human Diseases

Ashutosh Agarwal

10:36 AM – 10:54 AM

Emulating Highly Invasive Diseases with 3D Cell Culture

Molly S. Shoichet

10:54 AM – 11:12 AM

Tumor-On-Chip Platforms to Study Heterotypic Cell-Cell Interactions and T Cell Recruitment

Shyni Varghese

11:12 AM – 11:30 AM

Tissue Engineered Microenvironment for Screening Novel Cancer Therapeutics

Allison P. McGuigan

10:00 AM - 11:30 AM
Grand Caribbean 6

Scientific Session 1

In Vitro and Translational Studies in Neural and Spine Engineering

Session Chairs: Adele Doyle and Mike Modo

Keynote Speaker:

Engineering Rapidly Assembling Pentapeptides for Injectable Delivery (RAPID) Hydrogels for Neural Cell Injection and Differentiation

Kyle Lampe

10:00 AM – 10:30 AM

ORAL PRESENTATIONS:

- 10:30 AM – 10:45 AM **15**
Tissue Nano-transfection Promotes Localized Delivery Of Therapeutics To The Peripheral And/or Central Nervous System Via Minimally Invasive Methods
J. T. Moore¹, N. Higueta-Castro², C. G. Wier³, S. J. Kolb³, I. Valerio⁴, D. Gallego-Perez²;
¹Biomedical Engineering, The Ohio State University, Columbus, OH, ²Biomedical Engineering/Surgery, The Ohio State University, Columbus, OH, ³Neurology, The Ohio State University Wexner Medical Center, Columbus, OH, ⁴Plastic Surgery, The Ohio State University Wexner Medical Center, Columbus, OH.
- 10:45 AM – 11:00 AM **16**
Enriching For Distinct Subtypes Of Mouse Embryonic Stem Cell Derived V1 Interneurons
N. White, S. Sakiyama-Elbert;
Biomedical Engineering, University of Texas at Austin, Austin, TX.
- 11:00 AM – 11:15 AM **305**
T Cells Regulate Il-4 Within Acellular Nerve Allograft Repaired Nerves To Promote Regeneration Of Myelinated Axons
D. Pan, D. A. Hunter, S. Mackinnon, M. Wood;
Washington University in St Louis, Saint Louis, MO.
- 11:15 AM – 11:30 AM **18**
Assessment Of A Peripheral Nerve Extracellular Matrix Derived Hydrogel For Improving Functional Recovery Following Nerve Reconstruction
T. J. Meder, B. N. Brown, C. Skillen, L. Marchal, V. Yupanqui, T. Prest;
Bioengineering, University of Pittsburgh, Pittsburgh, PA.
- 11:30 AM – 12:15 PM
Grand Caribbean 1/2
Grand Caribbean 3-5
Grand Caribbean 6
- 11:30 – 1:00 PM **Twig Meetings:**
Scaffolds, Matrices & Biomaterials
Cardiovascular/Angiogenesis/Blood
Neural & Spine
- 11:30 – 1:00 PM **Lunch (on own)**
- 11:30 AM - 1:00 PM
Grand Caribbean 11/12
- 11:30 AM – 2:00 PM **SYIS Student Meet Mentor Lunch**
- St. Croix 3**
- 11:30 AM – 2:00 PM **TERMIS-AM Council Meeting & Lunch**
- 1:00 PM - 2:30 PM **Scientific Session 2**
Grand Caribbean 1/2 **3D Bioprinting in Engineering Tissues and Organs I**

Session Chairs: Lijie Grace Zhang and Vassilios Sikavitsas

ORAL PRESENTATIONS:

- 1:00 PM – 1:15 PM **19**
Processing Temperatures For The Development Of Polymeric Formulations For Extrusion-based Three-dimensional Printing With Growth Factors
G. L. Koons, P. D. Kontoyiannis, L. Diaz-Gomez, A. J. Melchiorri, A. G. Mikos;
Bioengineering, Rice University, Houston, TX.
- 1:15 PM – 1:30 PM **20**
The Effect Of Peptide-tethering Bioinks On The Differentiation Of Human Dental Pulp Stem Cells In The Bioprinted Dental Construct
J. Park¹, G. Gillispie¹, J. Copus¹, W. Zhang², A. Atala¹, J. Yoo¹, P. Yelick², S. Lee¹;
¹Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine, Winston-Salem, NC, ²Department of Orthodontics, Tufts University, Boston, MA.
- 1:30 PM – 1:45 PM **21**
3d Bioprinting A Contractile Ventricle Using Human Stem Cell-derived Cardiomyocytes
A. Lee¹, J. Bliley¹, D. Shiwarski¹, J. Tashman¹, A. Hudson², A. W. Feinberg²;
¹Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA, ²Biomedical Engineering, Materials Science & Engineering, Carnegie Mellon University, Pittsburgh, PA.
- 1:45 PM – 2:00 PM **22**
3d Bioprinted Dermoepidermal Human Skin Equivalent As An Experimental In Vitro Model For The Evaluation Of Antibacterial Topical Treatments
A. Suarez-Arnedo, S. Londoño, J. A. Serna, J. Cifuentes, L. N. Muñoz, J. C. Cruz, C. Muñoz-Camargo;
Department of Biomedical Engineering, Universidad de los Andes, Bogota, COLOMBIA.
- RAPID FIRE PRESENTATIONS:**
- 2:00 PM – 2:05 PM **23**
Development Of An Air-brush Hand-held Biopen For Skin Tissue Biofabrication.
C. Chocarro-Wrona¹, G. Jimenez¹, J. Marchal Corrales¹, L. Moroni², D. N. García³;
¹Embriology and Human Anatomy, University of Granada, Granada, SPAIN, ²MERLN Institute for Technology Inspired Regenerative Medicine, Maastrich University, Maastrich, NETHERLANDS, ³Applied Physics, University of Santiago de Compostela, Santiago de Compostela, SPAIN.
- 2:05 PM – 2:10 PM **24**
Assessment Of A Universal Printing Technology For Biphasic Scaffolds Containing Decellularized Bone And Cartilage Matrix
S. M. Gruber¹, S. Murab², P. W. Whitlock², J. C. Lin³;
¹Biomedical Engineering, University of Cincinnati, Cincinnati, OH, ²Orthopaedic Surgery, Cincinnati Childrens Hospital Medical Center, Cincinnati, OH, ³Orthopaedic Surgery, COM Orthopaedic Surgery, Cincinnati, OH.
- 2:10 PM – 2:15 PM **25**
A 3D Printed Hybrid Nasal Cartilage With Functional Electronic Olfactory

Epithelium

Y. A. Jodat;

Department of Medicine, Harvard Medical School, BWH, Cambridge, MA.

2:15 PM – 2:20 PM

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Development Of A Universal Bioink Technology For Multi-modality Bioprinting Compatibility And Support Of Multiple Tissue Construct Types

A. Skardal;

Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine, Winston-Salem, NC.

2:20 PM – 2:25 PM

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A Comparative Study Of 3d Bioprinting Strategies For Biomedical Applications

J. Park, S. J. Crofts, K. M. Petersen, S. J. Hollister;

Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA.

2:25 PM – 2:30 PM

28

Manufacturing Of Functional Tissues In Vitro Using Bioprinting And Bioreactors. Application In Spinal Cord Tissue Regeneration.

J. Baena;

CEO, Regemat3D, Granada, SPAIN.

1:00 PM - 2:30 PM

Scientific Session 2

Grand Caribbean 3 - 5

Translating Microphysiological Systems Technology to Preclinical Drug Development and Disease Modeling I

Session Chair: George Truskey

Keynote Speaker:

29

1:00 PM – 1:30 PM

Drug Efficacy And Safety Determination In Drug-dosed Human-on-a-chip Systems

J. J. Hickman^{1,2};

¹NanoScience Technology Center, University of Central Florida, Orlando, FL,

²Hesperos, Inc, Orlando, FL.

ORAL PRESENTATIONS:

1:30 PM – 1:45 PM

30

Integrated Human Multi-tissue Platform For Preclinical Modeling Of Drug Toxicity And Disease

K. Ronaldson-Bouchard, K. Yeager, D. Tavakol, G. Vunjak-Novakovic;

Biomedical Engineering, Columbia University, New York, NY.

1:45 PM – 2:00 PM

31

Microfluidic Enabled In Vitro Analysis Of The PK/PD/Efficacy Relationship For Preclinical Testing Of Oncology Compounds

D. Singh¹, A. Bray¹, P. Golby¹, S. Deosarkar², C. Scott², T. Kostrzewski¹;

¹CNBio, Welwyn garden city, UNITED KINGDOM, ²AstraZeneca, Waltham, MA.

2:00 PM – 2:15 PM

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Cardiac Amyloidosis On A Chip

G. Tansik^{1,2}, A. Alassaf¹, J. Musi¹, G. Sharma³, V. Mayo¹, R. Prabhakar³, A.

Agarwal^{1,2};

¹Department of Biomedical Engineering, University of Miami, Coral Gables, FL,

²DJTMF Biomedical Nanotechnology Institute, Miami, FL, ³Department of Chemistry, University of Miami, Coral Gables, FL.

2:15 PM – 2:30 PM

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Differentiation And Characterization Of HiPSC-cortical Neurons And Their Application To Drug Evaluation In CNS Disease Models

K. Autar¹, X. Guo¹, N. Akanda¹, A. Goswami¹, M. Jackson², J. W. Rumsey², C. Long², J. Hickman¹;

¹University of Central Florida, Orlando, FL, ²Hesperos, Inc., Orlando, FL.

1:00 PM - 2:30 PM

Scientific Session 2

Grand Caribbean 8-10

In Situ Regeneration of Complex Tissues by Recruitment of Endogenous Stem Cells

Session Chair: Chang Lee

Keynote Speakers:

1:00 PM – 1:30 PM

Biomaterials Design Strategy for In Situ Tissue Regeneration

Sang Jin Lee

1:30 PM – 2:00 PM

Roles of Substance-P in Tissue Repair

Hyun Sook Hong

2:00 PM – 2:30 PM

SDF-1 Responsive Cartilage Progenitors Migrate to Fibrocartilage Injuries and Stimulate Healing

Chathuraka T. Jayasuriya

1:00 PM - 2:30 PM

Scientific Session 2

Grand Caribbean 6

Frontiers in Biocomposites for Cell Modulation

Session Chairs: Sue Anne Chew and Serena Danti

Keynote Speakers:

1:00 PM – 1:30 PM

Osteoinductive Emulsion Inks for 3D Printed Bone Grafts

Elizabeth Cosgriff-Hernandez

1:30 PM – 2:00 PM

PHA- Based Composites for Cell Modulation

Ipsita Roy

2:00 PM – 2:15 PM

Composite Scaffolds with Continuous Gradients for Bone Regeneration

Carlos Mota

2:15 PM – 2:30 PM

Polyurethane-Based 3D Structures as Model for Bone Cells Behavior

Silvia Farè

2:30 PM – 3:00 PM

TWIG Meeting:

Grand Caribbean 1/2

Biofabrication and Bioreactors

2:30 PM - 3:00 PM
Kingston Hall

Coffee Break

3:00 PM - 4:30 PM
Grand Caribbean 1/2

Scientific Session 3
Skin, Wound Healing, and Inflammation

Session Chairs: Aaron Morris and Wendy Liu

ORAL PRESENTATIONS:

3:00 PM – 3:15 PM

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Integration Of Bioprinted Skin In Full-thickness Wounds Promotes Epidermal Barrier Formation And Normal Collagen Organization

A. M. Jorgensen¹, M. Varkey¹, C. Clouse¹, A. Gorkun^{1,2,3}, J. Molnar^{1,4}, S. Lee¹, J. Yoo¹, A. Atala¹, S. Soker¹;

¹Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine, Winston-Salem, NC, ²FSBSI Institute of General Pathology and Pathophysiology, Moscow, RUSSIAN FEDERATION, ³Institute for Regenerative Medicine, Sechenov First Moscow State Medical University, Moscow, RUSSIAN FEDERATION, ⁴Department of Plastic and Reconstructive Surgery, Wake Forest School of Medicine, Winston Salem, NC.

3:15 PM – 3:30 PM

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A Fibronectin-derived Peptide, Engineered To Resist Endo- And Exopeptidases, Enhances Cell Survival In Vitro, And Speeds Healing And Reduces Scarring In Vivo

R. A. Clark, A. Prasad, F. Lin;
NeoMatrix Therapeutics, Stony Brook, NY.

3:30 PM – 3:45 PM

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Bioactive Silk Dressing For Accelerated Wound Healing

D. Ghosh¹, S. Godeshala², M. Bejarano³, S. G. Patil³, H. Muralikrishnan², D. DiCaudo⁴, J. Kilbourne⁵, K. Rege²;

¹Biological Design, Arizona State University, Tempe, AZ, ²Chemical Engineering, Arizona State University, Tempe, AZ, ³Biomedical Engineering, Arizona State University, Tempe, AZ, ⁴Mayo Clinic, Scottsdale, AZ, ⁵DACT, Arizona State University, Tempe, AZ.

3:45 PM – 4:00 PM

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Effects Of Covalent Nanosilver Incorporation On Platelet-like Particle Properties

E. Chee, S. Nandi, E. Mihalko, K. Nellenbach, L. Morrill, J. Sollinger, A. Brown;
Joint Department of Biomedical Engineering at NCSU and UNC- Chapel Hill, North Carolina State University, Raleigh, NC.

RAPID FIRE PRESENTATIONS:

4:00 PM – 4:05 PM

38

Microphysiological Body-on-a-chip System To Evaluate Transdermal Drug Delivery And Toxicity

C. P. Pires de Mello¹, C. McAleer², C. Carmona-Moran³, C. Oleaga³, A. Riu⁴, R. Note⁴, S. Teissier⁴, J. Langer⁵, J. J. Hickman¹;

¹NanoScience Technology Center, University of Central Florida, Orlando, FL, ²Hesperos, Orlando, FL, ³University of Central Florida, Orlando, FL, ⁴L'Oreal Research and innovation division, L'Oreal, Aulnay-sous-Bois, FRANCE, ⁵L'Oreal Research and innovation division, L'Oreal, Clark, NJ.

4:05 PM – 4:10 PM

39

Improving Third Degree Burn Wound Healing By Using Non-enzymatic Detachment Of Keratinocyte Sheets Cultured On Temperature Responsive Dishes

S. Alharbi^{1,2}, Y. Niimi³, D. Wiener⁴, H. Hawkins¹, R. Cox¹, V. Popov¹, A. Osada³, H. Sakurai³, D. Herndon^{1,5}, D. Prough¹, P. Enkhbaatar^{1,5};

¹University of Texas Medical Branch, Galveston, TX, ²King Abdulaziz University, Jeddah, SAUDI ARABIA, ³Tokyo Women's Medical University, Tokyo, JAPAN, ⁴Texas A&M University, Collage Station, TX, ⁵Shriners Hospitals for Children, Galveston, TX.

4:10 PM – 4:15 PM

40

Assessment Of UBM Products In A Porcine Third-degree Burn Model

S. V. Murphy, C. Clouse, R. Nelson, C. Scott, A. M. Jorgensen, A. Atala; Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine, Winston Salem, NC.

4:15 PM – 4:20 PM

41

Lxw7 Functionalized Ecm Scaffolds Loaded With Endothelial Progenitor Cells Potentiate Neovascularization And Promote Diabetic Ischemic Wound Healing

S. He^{1,2}, T. Walimbe³, H. Chen¹, K. Gao^{1,2,4}, D. Hao^{1,4}, P. Kumar^{1,4}, R. Liu⁵, D. L. Farmer^{1,4}, K. Lam⁵, J. Zhou², A. Panitch³, A. Wang^{1,3,4};

¹Department of Surgery, Surgical Bioengineering Laboratory, UC Davis, Sacramento, CA, ²Department of Plastic Surgery, The Third Xiangya Hospital, Central South University, Changsha, CHINA, ³Department of Biomedical Engineering, UC Davis, Davis, CA, ⁴Institute for Pediatric Regenerative Medicine, Shriners Hospitals for Children, Sacramento, CA, ⁵Department of Biochemistry and Molecular Medicine, UC Davis, Sacramento, CA.

4:20 PM – 4:25 PM

42

Primary Human Skin Cells Self-organize To Form Layered, Pigmented, Spherical Organoids

A. M. Jorgensen¹, A. Gorkun^{1,2,3}, S. Lee¹, J. Yoo¹, A. Atala¹, S. Soker¹;

¹Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine, Winston-Salem, NC, ²FSBSI Institute of General Pathology and Pathophysiology, Moscow, RUSSIAN FEDERATION, ³Sechenov First Moscow State Medical University, Moscow, RUSSIAN FEDERATION.

4:25 PM – 4:30 PM

43

Therapeutic Intradermal Delivery Of Exosome-encapsulated Curcumin Using Dissolvable Microneedle Arrays For Enhanced Treatment Of Inflammatory Skin Diseases

E. P. Yalcintas¹, S. S. Yerneni², J. D. Smith³, S. Averick⁴, P. G. Campbell², B. O. Ozdoganlar^{1,2,5};

¹Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA, ²Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA, ³Integrated Innovation Institute, Carnegie Mellon University, Pittsburgh, PA, ⁴Neuroscience

Institute, Allegheny Health Network Research Institute, Pittsburgh, PA, ⁵Material Science and Engineering, Carnegie Mellon University, Pittsburgh, PA.

3:00 PM - 4:30 PM
Grand Caribbean 3-5

Scientific Session 3
New Approaches to Cardiovascular Repair and Regeneration I

Session Chairs: Yi Hong and Laura Suggs

Keynote Speaker: **In Situ Transformation of Synthetic Scaffolds into Autologous Arterial Conduits**
Yadong Wang

3:00 PM – 3:30 PM

ORAL PRESENTATIONS:

3:30 PM – 3:45 PM

44
Engineering Arterial Substitutes that Recapitulate Vessel Microstructure
D. Miranda-Nieves¹, S. Malladi², C. Tarabani³, D. Wong³, C. Haller³, E. L. Chaikof³;
¹MIT, Cambridge, MA, ²University of Toronto, Toronto, ON, CANADA, ³BIDMC, Boston, MA.

3:45 PM – 4:00 PM

45
Fibrin-modulating Nanogels For Treatment Of Disseminated Intravascular Coagulation
E. Mihalko, K. Nellenbach, M. Sandry, N. Mininni, A. Brown;
North Carolina State University, Raleigh, NC.

4:00 PM – 4:15 PM

46
Jagged1 Presenting Cell Surrogate Biomaterials For Notch Signaling
K. Zohorsky¹, S. Lin², K. Mequanint²;
¹Biomedical Engineering, Western University, London, ON, CANADA, ²Chemical and Biochemical Engineering, Western University, London, ON, CANADA.

4:15 PM – 4:30 PM

47
ECM-associated II-33: A Mechanism By Which Fibrosis And Tissue Restoration Are Regulated
M. C. Cramer¹, J. L. Dziki², G. S. Hussey², H. R. Turnquist³, S. F. Badylak¹;
¹Bioengineering, University of Pittsburgh, Pittsburgh, PA, ²Surgery, University of Pittsburgh, Pittsburgh, PA, ³Immunology, University of Pittsburgh, Pittsburgh, PA.

3:00 PM - 4:30 PM
Grand Caribbean 8-10

Scientific Session 3
Engineering Implants for the Treatment of Endocrine/Metabolic Diseases

Session Chairs: Jessica Weaver and Maria Coronel

Keynote Speaker: **Vascularizing Device for Pancreatic Islet Encapsulation**
Omid Veisheh

3:00 PM – 3:30 PM

ORAL PRESENTATIONS:

- 3:30 PM – 3:45 PM **48**
Engineering An Oxygen-generating Microbeads Scaffolds For Islet Transplantation Within An Extrahepatic Site
J. Liang, R. Accolla, M. Soundirarajan, A. Emerson, M. Coronel, C. Stabler;
 University of Florida, Gainesville, FL.
- 3:45 PM – 4:00 PM **49**
An Engineered Fail-safe Approach For Pancreatic Cell-Replacement Therapy
M. Izadifar^{1,2}, M. Massumi^{1,2}, A. Nagy^{1,2};
¹Institute of Medical Science, University of Toronto, Toronto, ON, CANADA,
²Lunenfeld-Tanenbaum Research Institute, Sinai Health System, Toronto, ON, CANADA.
- 4:00 PM – 4:15 PM **50**
A Bioengineered Artificial Interstitium Supports High Density Islet Cell Transplantation Without Immunosuppression In Nonhuman Primates
 J. Janecek¹, N. Pheil², B. Willenberg³, T. O'Brien⁴, **M. Graham**¹;
¹Department of Surgery, University of Minnesota, Saint Paul, MN, ²CellSafe Life Sciences, Skokie, IL, ³Department of Internal Medicine, University of Central Florida, Orlando, FL, ⁴Veterinary Population Medicine, University of Minnesota, Saint Paul, MN.
- 4:15 PM – 4:30 PM **51**
A New Multibore Hollow Fiber Device For Macroencapsulation Of Islets Of Langerhans
 K. Skrzypek¹, J. Visser², P. De Vos², **D. Stamatialis**¹;
¹Bioartificial organs, University of Twente, Enschede, NETHERLANDS,
²Pathology and medical biology, Groningen UMC, Groningen, NETHERLANDS.

3:00 PM - 4:30 PM

Scientific Session 3

Grand Caribbean 6

The Next Generation of Clinical Product Manufacturing: Where Will They Come from and Who Will Train Them?

Session Chairs: Dr Julie Allickson, Dr. Christina Celluzzi

Keynote Speakers:

3:00 PM – 3:30 PM

NIIMBL: Educating and Training a World-Class Biopharmaceutical Workforce

John Balchunas

3:30 PM – 4:00 PM

Academic Clinical Translation Facilitating Bedside Therapies in Regenerative Medicine

Julie Allickson

4:00 PM – 4:30 PM

"K to Gray" Training for Tissue Engineered Medical Product (TEMP) Manufacturing

Mary Q. Stewart

3:00 PM - 4:30 PM

Scientific Session 3

Grand Caribbean 11/12

Business Plan Competition – Presentation of Full Business Plan Proposals

Session Chairs: Pedro Costa and Suzanne Tabaa

Presenting Finalists:

Bio Vitro
Matthew Ishahak

CardioMetry
Ben Swanson

Cell X Technologies
Venkata Mantripragada

Ratner Biomeidcal
Jay Nair

4:30 PM – 5:00 PM
Grand Caribbean 1/2

4:30 PM - 6:30 PM
Kingston Hall

6:00 PM – 7:00 PM
St. Croix 3

TWIG Meeting:
Skin, Wound Healing and Inflammation

Exhibit Viewing/Reception/Poster Session 2

2020 SAC Meeting

WEDNESDAY, DECEMBER 4, 2019

6:15 AM - 7:30 AM **5K Fun Run SYIS Activity**
Starting Point: Loews Sapphire Falls - Main Entrance

7:00 AM – 6:30 PM **Registration Open**
Grand Caribbean Pre-Function North

7:00 AM – 8:00 AM **TWIG Chairs Meeting**
St. Croix 3

8:00 AM – 9:00 AM **Plenary Symposium I: Dr. Milica Radisic**
Grand Caribbean 7

9:00 AM – 9:30 AM **Senior Scientist Award: Farshid Guilak**
Grand Caribbean 7
Educational Awards: Natasha Maurmann

9:30 AM - 10:00 AM **Coffee Break**
Kingston Hall

10:00 AM - 11:30 AM **Scientific Session 4**
Grand Caribbean 1/2 **3D Bioprinting in Engineering Tissues and Organs II**

Session Chairs: James Hoying and Sang Jin Lee

ORAL PRESENTATIONS:

- 10:00 AM – 10:15 AM **52**
In Vivo MRI Of 3d Bioprinted Cartilage Constructs
M. Amoroso¹, M. Montelius², P. Apelgren¹, K. Säljö¹, L. Strid Orrhult³, P. Gatenholm³, L. Kölby¹;
¹Department of Plastic Surgery, Institute of Clinical Sciences, Göteborg, SWEDEN, ²Department of Radiology, Institute of Clinical Sciences, Göteborg, SWEDEN, ³Department of Chemistry and Chemical Engineering, Chalmers University of Technology, Göteborg, SWEDEN.
- 10:15 AM – 10:30 AM **53**
Bioprinting An In Vitro Head And Neck Cancer Model Using A Decellularized Extracellular Matrix Bioink
J. Kort-Mascort¹, O. ElKashty², S. Flores-Torres¹, J. Munguia-Lopez¹, T. Jiang¹, S. D. Tran², J. M. Kinsella¹;
¹Bioengineering, McGill University, Montreal, QC, CANADA, ²Dentistry, McGill University, Montreal, QC, CANADA.

- 10:30:AM – 10:45 AM **54**
Thermal Inkjet Printing Elicits Activation Of The Nf-kb Pathway In Primary And Cancer Cells
L. H. Solis, B. P. Oropeza, A. Campbell, S. N. Hosseini, **T. Boland**;
The University of Texas at El Paso, El Paso, TX.
- 10:45 AM – 11:00 AM **55**
A Dual Crosslinking Approach To Improve The Mechanical Properties And Stability Of Cell-laden Printable Collagen-Based Constructs
N. S. Kajave, T. Schmitt, T. Nguyen, V. Kishore;
Biomedical and Chemical Engineering and Sciences, Florida Institute of Technology, Melbourne, FL.
- RAPID FIRE PRESENTATIONS:**
- 11:00 AM – 11:05 AM **56**
3D Bioprinted Renal Tissue Constructs Using A Novel Photo-crosslinkable Kidney ECM-derived Bioink
G. Carreno-Galeano, M. Ali, J. Yoo, **S. Lee**, A. Atala;
Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine, Winston-Salem, NC.
- 11:05 AM – 11:10 AM **57**
A Poly(N-isopropylacrylamide)-Based Thermogelling Bioink For Extrusion Bioprinting
A. M. Navara, Y. Kim, A. G. Mikos;
Bioengineering, Rice University, Houston, TX.
- 11:10 AM – 11:15 AM **58**
A 3d Bioprinted Vascularized Omentum Model For Ovarian Cancer Metastasis
J. Fu, M. Ferrer, M. Song;
NCATS, NIH, Rockville, MD.
- 11:15 AM – 11:20 AM **59**
Biofabrication Of A Breast Cancer Microenvironment For In Vitro Modelling Cancer Process.
O. Ruiz¹, E. López-ruiz¹, J. Marchal Corrales¹, L. Moroni², **D. N. García**³;
¹Embriology and Human Anatomy, University of Granada, Granada, SPAIN, ²MERLN Institute for Technology Inspired Regenerative Medicine, Masstrich University, Masstrich, NETHERLANDS, ³Applied Physics, University of Santiago de Compostela, Santiago de Compostela, SPAIN.
- 11:20 AM – 11:25 AM **60**
Bioprinting Methods To Automate Biofabrication And Improve Regenerative Capacity For Implantable Tissue Engineered Muscle Repair Constructs
R. Bour¹, B. Shepherd², S. Presnell², W. Hess¹, C. Latvis¹, P. Sharma¹, S. Peirce³, G. Christ⁴;
¹University of Virginia, Charlottesville, VA, ²Organovo, San Diego, CA, ³Departments of Biomedical Engineering and Plastic Surgery, University of Virginia, Charlottesville, VA, ⁴Departments of Biomedical Engineering and Orthopaedic Surgery, University of Virginia, Charlottesville, VA.

11:25 AM – 11:30 AM

61

3D Printed Composite Scaffold Enhances Bone Healing In Rat Critical-sized Calvarial Defect

A. Akkouch¹, L. Hong², M. Sweat³, A. K. Salem⁴, B. A. Amendt⁵;

¹Orthopaedic Surgery, WMU Homer Stryker M.D. School of Medicine, Kalamazoo, MI, ²The University of Iowa, Iowa City, IA, ³Department of Anatomy and Cell Biology, The University of Iowa, Iowa City, IA, ⁴College of Pharmacy, The University of Iowa, Iowa City, IA, ⁵College of Dentistry, The University of Iowa, Kalamazoo, MI.

10:00 AM - 11:30 AM

Scientific Session 4

Grand Caribbean 3-5

Translating Microphysiological Systems Technology to Preclinical Drug Development and Disease Modeling II

Session Chair: James Hickman

Keynote Speaker:

Engineered Models of Brain Function and Disease

Roger Kamm

10:00 AM – 10:30 AM

ORAL PRESENTATIONS:

10:30 AM – 10:45 AM

62

A Multi-tissue Chip For The Modeling Of Osteoarthritis Pain

Z. Li¹, Z. Lin¹, M. Romero-Lopez², B. O'Donnell³, P. G. Alexander¹, S. B. Goodman⁴, B. Bunnell, PhD⁵, M. S. Gold⁶, H. Lin¹, R. S. Tuan¹;

¹Orthopaedic Surgery, University of Pittsburgh, Pittsburgh, PA, ²Orthopaedic Surgery, Stanford University, Stanford, CA, ³Center for Stem Cell Research & Regenerative Medicine, Tulane University, New Orleans, LA, ⁴Orthopaedic Surgery, Stanford University, Stanford, CA, ⁵Center for Stem Cell Research & Regenerative Medicine, Tulane University, New Orleans, PA, ⁶Pittsburgh Center for Pain Research, University of Pittsburgh, Pittsburgh, PA.

10:45 AM – 11:00 AM

63

An In Vitro Functional Assay To Predict And Study In Vivo Skeletal Muscle Stem Cell Engraftment Outcomes

B. Xu, S. Davoudi, A. P. McGuigan, **P. M. Gilbert**;

University of Toronto, Toronto, ON, CANADA.

11:00 AM – 11:15 AM

64

Modular Tissue Engineering Of Bone Microenvironment As An Extravasation Model

V. Mayo¹, A. C. Bowles², L. E. Wubker¹, D. Correa³, A. Agarwal⁴;

¹Biomedical Engineering, University of Miami, Miami, FL, ²Pathology, Orthopaedics, University of Miami, Miami, FL, ³Orthopaedics, University of Miami, Miami, FL, ⁴Pathology, Biomedical Engineering, University of Miami, Miami, FL.

11:15 AM – 11:30 AM

65

Characterization Study Of Fabricated Alginate-pectin Composite Foams By Control Of Pectin Content

G. Oh^{1,2}, **M. Kim**^{1,2}, W. Jung^{1,2}, S. Kim^{3,4};

¹Department of Biomedical Engineering, and Center for Marine-Integrated Biomedical Technology (BK21), Pukyong national university, Busan, KOREA, REPUBLIC OF, ²Marine-Integrated Bionics Research Center, Pukyong National University, Busan, KOREA, REPUBLIC OF, ³Biomedical engineering, Pukyong national university, Busan, KOREA, REPUBLIC OF, ⁴Marine-Integrated Bionics Research Center, Pukyong national university, Busan, KOREA, REPUBLIC OF.

10:00 AM - 11:30 AM
Grand Caribbean 8-10 **Scientific Session 4**
Biomaterials and Regeneration I

Session Chairs: Jeffrey Jacot and Donghui Zhu

Keynote Speaker: **66**
Development Of Zinc And Its Alloys As Biodegradable Metals
Y. ZHENG;
Department of Materials Science and Engineering, College of Engineering,
Peking University, Beijing, CHINA.

10:00 AM – 10:30 AM

ORAL PRESENTATIONS:

10:30 AM – 10:45 AM **67**
Sema3C: A Novel Coupling Factor In Bone Remodeling Mediated By
Microstructured Titanium Surfaces
J. Deng¹, E. M. Lotz¹, D. J. Cohen¹, Z. Schwartz^{1,2}, B. D. Boyan^{1,3};
¹Biomedical Engineering, Virginia Commonwealth University, Richmond, VA,
²University of Texas Health Science Center at San Antonio, San Antonio, TX,
³Georgia Institute of Technology, Atlanta, GA.

10:45 AM – 11:00 AM **68**
Reabsorbable Biografts For Tympanic Perforation Repair
A. S. Immich¹, P. Pennacchi², R. L. Boemo³, S. S. Maria-Engler², L. H. Catalani²;
¹Federal University of Santa Catarina, Blumenau, BRAZIL, ²University of São
Paulo, São Paulo, BRAZIL, ³Hospital Joana de Gusmão, Florianópolis, BRAZIL.

11:00 AM – 11:05 AM **69**
Kidney Regeneration With Biomimetic Vascular Scaffolds Based On
Vascular Corrosion Casts
J. Huling, S. Min, D. Kim, I. Ko, **J. Kim**, A. Atala, J. Yoo;
WFIRM, Winston Salem, NC.

RAPID FIRE PRESENTATIONS:

11:05 AM – 11:10 AM **70**
Cellular Micromechanical Environment In 3d-printed Scaffolds
M. I. Page, C. M. Puttlitz;
Colorado State University, Fort Collins, CO.

11:10 AM – 11:15 AM **224**
Ti6Al4v Lattice Structure Via Extrusion Based 3d Printing For Bone
Substitute
P. K. Srivas, P. Pal, P. Dadhich, S. Dhara;
School of Medical Science & Technology, IIT Kharagpur, Kharagpur, INDIA.

11:15 AM – 11:20 AM

72

Engineering Pulmonary Valve Tissue Sheets From Human Umbilical Cord Perivascular Cells And Electrospun Polyurethane

S. Parvin Nejad^{1,2}, J. P. Santerre^{1,2,3}, C. A. Caldarone^{4,5}, C. A. Simmons^{1,2,6};
¹Institute of Biomaterials and Biomedical Engineering, University of Toronto, Toronto, ON, CANADA, ²Translational Biology and Engineering Program, Ted Rogers Centre for Heart Research, Toronto, ON, CANADA, ³Faculty of Dentistry, University of Toronto, Toronto, ON, CANADA, ⁴Division of Cardiovascular Surgery, Department of Pediatrics, Hospital for Sick Children, Toronto, ON, CANADA, ⁵Congenital Heart Surgery, Heart Center Clinic, Texas Children's Hospital, Houston, TX, ⁶Department of Mechanical & Industrial Engineering, University of Toronto, Toronto, ON, CANADA.

11:20 AM – 11:25 AM

73

Off-the-Shelf Biomimetic Graphene Oxide-Collagen Hybrid Scaffolds Wrapped with Osteoinductive Extracellular Matrix for the Repair of Cranial Defects in Rats

S. Liu;

Department of Orthopaedics, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, CHINA.

11:25 AM – 11:30 AM

225

Biocompatibility Of Pt_{57.5}Cu_{14.7}Ni_{5.3}P_{22.5} Bulk Metallic Glass In Orthopaedic Applications.

T. R. Kyriakides¹, a. loye², S. Lee³, j. schroers⁴;

¹pathology and biomedical engineering, yale university, New Haven, CT, ²biomedical engineering, yale university, New Haven, CT, ³pathology, yale university, New Haven, CT, ⁴mechanical engineering, yale university, New Haven, CT.

**10:00 AM - 11:30 AM
Grand Caribbean 6**

Scientific Session 4

Multi-Cellular Engineered Living Systems: Ethics and Societal Impacts

Session Chair: Roger Kamm

Keynote Speakers:

10:00 AM – 10:30 AM

Title TBD

Megan Palmer

10:30 AM – 11:00 AM

Multi-Cellular Engineered Living Systems: Ethics and Societal Impacts

Insoo Hyun

11:00 AM – 11:30 AM

Title TBD

Karmella Haynes

11:30 AM – 1:00 PM

Lunch (on own)

11:30 AM – 1:00 PM

Grand Caribbean 11/12

Women in TERM Networking Event: Strategies For Negotiating

Luncheon will be provided

1:00 PM - 2:30 PM
Grand Caribbean 1/2

Scientific Session 5
Biomaterial, Scaffold and Cellular Strategies to Control Tissue Elasticity

Session Chairs: Christopher Bashur and Anand Ramamurthi

Keynote Speaker: **Elastin-Based Biomaterials for Regenerative Medicine**
Sarah Heilshorn

1:00 PM – 1:30 PM

ORAL PRESENTATIONS:

1:30 PM – 1:45 PM

75
Multifunctional Gene Silencing Nanotherapeutics For Elastic Matrix Regenerative Repair

S. Carney¹, N. Sharma¹, A. Ramamurthi²;

¹Dept of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, ²Dept of Biomedical Engineering, Cleveland Clinic, Cleveland, OH.

1:45 PM – 2:00 PM

76
The Maturation And 3D Organization Of The Novel D-HuSk-hCPC-based Cardiac Bioconstruct Is Improved In Vitro By Mechanical Stimulation

I. Belviso¹, A. Sacco¹, V. Romano¹, G. Putame², G. Ricci³, M. Cammarota³, D. Massai², D. Nurzynska¹, C. Schiraldi³, A. Catizone⁴, F. Schonauer¹, C. Maiello⁵, S. Montagnani¹, F. Di Meglio¹, C. Castaldo¹;

¹Public Health, University of Naples "Federico II", Naples, ITALY, ²Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, ITALY, ³Experimental Medicine, Università della Campania "Luigi Vanvitelli", Naples, ITALY, ⁴Anatomical, Histological, Forensic Medicine and Orthopedic Science, University of Rome La Sapienza, Rome, ITALY, ⁵Cardiovascular Surgery and Transplant, Monaldi Hospital, Naples, ITALY.

2:00 PM – 2:15 PM

77
Enzymatic Crosslinking Of Dynamic Thiol-norbornene Click Hydrogels.

H. Nguyen, **C. Lin**;

Department of Biomedical Engineering, Indiana University-Purdue University Indianapolis, Indianapolis, IN.

RAPID FIRE PRESENTATIONS:

2:15 PM – 2:20 PM

78
Stem Cell-Derived Extracellular Nanovesicles For Vascular Elastic Matrix Regenerative Repair

S. S. Thampi, A. Ramamurthi;

Biomedical Engineering, Cleveland Clinic, Cleveland, OH.

2:20 PM – 2:25 PM

79
Hydrogel Based Controlled Delivery Of 17 β -estradiol Towards Obesity Management

P. Pal, R. Maranon, A. Janorkar;

biomedical materials science, university of mississippi medical center, Jackson, MS.

2:25 PM – 2:30 PM

80
Development Of A New Biomaterial Through The Coaxial Eletctrospinning Technique For Use As A Skin Substitute

B. D. Alcantara;

Faculty of Pharmacy, UFRGS, Porto Alegre, BRAZIL.

1:00 PM - 2:30 PM
Grand Caribbean 3-5

Scientific Session 5
Respiratory, Urologic and Gastrointestinal Engineering

Session Chairs: Ricardo Gottardi and Andreas Kaasi

Keynote Speaker: **In Vitro Evaluation of Scaffold Cell Recruitment and Migration for In Situ Vocal Fold Tissue Engineering**
Luc Mongeau

1:00 PM – 1:30 PM

Oral Presentations:

1:30 PM – 1:45 PM

82

Reinforced Electrospun Trachea Patch Containing Cell Adhesion Or Antimicrobial Compounds For In Vivo Trachea Repair

J. M. Townsend¹, M. E. Hukill¹, K. Fung², D. G. Ohst³, J. K. Johnson³, R. Weatherly⁴, M. Detamore¹;

¹University of Oklahoma, Norman, OK, ²University of Oklahoma Health Sciences Center, Oklahoma City, OK, ³Nanofiber Solutions, Hilliard, OH, ⁴Children's Mercy Hospital, Kansas City, KS.

1:45 PM – 2:00 PM

83

Purification Of Anti-fibrotic Compounds From Ecklonia Cava And Application Of Pcl/phlorotannin Endotracheal Tube For Anti-stenosis In Rabbit Model

M. Jeong^{1,2}, S. Heo^{1,2}, **T. Kim^{1,2}**, H. Lee^{2,3}, W. Jung^{1,2};

¹Department of Biomedical Engineering & Center for Marine-Integrated Biomedical Technology (BK21Plus), Pukyong National University, Busan, KOREA, REPUBLIC OF, ²Marine-Integrated Bionics Research Center, Pukyong National University, Busan, KOREA, REPUBLIC OF, ³Department of Otolaryngology-Head and Neck Surgery, Kosin University College of Medicine, Busan, KOREA, REPUBLIC OF.

2:00 PM – 2:15 PM

84

A Simple Strategy To Develop Compliant Collagen-derived Materials For Urinary Tissue Engineering Applications

S. Sharma¹, J. Hui², S. Rajani², **A. Singh³**;

¹Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD, ²Biomedical Engineering, Johns Hopkins University, Baltimore, MD, ³Urology and Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD.

2:15 PM – 2:30 PM

85

Remodeling Of The Tumor Microenvironment Architecture And Its Effect On Cancer Progression In 3d Organoids

A. Dominijanni, M. Devarasetty, S. Soker;

Wake Forest University Institute for Regenerative Medicine, Winston Salem, NC.

1:00 PM - 2:30 PM Scientific Session 5
Grand Caribbean 8-10 **Translating TERM to the Market**
Session Chairs: Dr. Pedro Costa, Dr. James Yoo
SYIS Session Chair:
Keynote Speakers:

1:00 PM – 1:30 PM **Title TBD**
Julie Allickson

1:30 PM – 2:00 PM **Title TBD**
Gloria Matthews

Oral Presentations:

2:00 PM – 2:15 PM **86**
Production Assistance For Cellular Therapies (PACT) Program: Scope And Services For The Academic And Industry Applicants
A. El Fiky, R. Anderson, L. Ibenana, R. Lindblad;
PACT, The Emmes Company, LLC, Rockville, MD.

2:15 PM – 2:30 PM **87**
Commercializing Cellular Therapy
K. A. Buytaert-Hoefen;
PAREXEL, Lakewood, CO.

1:00 PM - 2:30 PM Scientific Session 5
Grand Caribbean 6 **Regenerative Rehabilitation: Combining Tissue Engineering and Cellular Therapies with Applied Biophysics to Optimize Outcomes**
Session Chairs: Dr. Stephen Badylak, Dr. Robert Guldberg

SYIS Session Chair:

Keynote Speakers:

1:00 PM – 1:10 PM **Introduction to/Overview of Regenerative Rehabilitation**
Nick Willett

1:10 PM – 1:30 PM **Utilizing Electrical Stimulation to Create the Optimal Environment for Neural Regeneration Following Stroke**
Paul George

1:30 PM – 1:50 PM **Reverse Dynamization: Optimizing Bone Regeneration by Mechanical Stimulation**
Vaida Glatt

1:50 PM – 2:10 PM **Comprehensive Evaluation of VML Injury and Repair in Biologically Relevant Animal Models: A Prerequisite to Improved Regenerative Rehabilitation**
George J. Christ

2:10 PM – 2:30 PM	<p>The Influence of Mechanical Loading Upon ECM-Mediated Functional Tissue Restoration Stephen Badylak</p>
2:30 PM - 3:00 PM Kingston Hall	Coffee Break
2:30 PM – 3:00 PM	TWIG Meetings
Grand Caribbean 3-5	Respiratory, Urologic, & Gastrointestinal
Grand Caribbean 8-10	Commercialization & Regulation
3:00 PM - 4:30 PM	Scientific Session 6
Grand Caribbean 1/2	<p>Immunomodulatory Strategies in Tissue Engineering and Regenerative Medicine</p>
Session Chairs:	Dr. Alice Tomei, Dr. Evan Scott
SYIS Session Chair:	
Oral Presentations:	
3:00 PM – 3:15 PM	<p>238 Localized Immune Modulation Of Pancreatic Islet Allografts Via Synthetic Biomaterials M. Coronel¹, J. Weaver¹, M. Hunckler¹, E. Yolcu², H. Shirwan², A. Garcia¹; ¹Georgia Institute of Technology, Atlanta, GA, ²University of Louisville, Louisville, KY.</p>
3:15 PM – 3:30 PM	<p>88 Immunoengineered Hydrogel Platform To Induce Tolerance In Type 1 Diabetes F. Zisi Tegou^{1,2}, D. Velluto², F. Gonzalez Badillo^{1,2}, A. Tomei^{1,2}; ¹Biomedical Engineering, University of Miami, Coral Gables, FL, ²Diabetes Research Institute, Miller School of Medicine, University of Miami, Miami, FL.</p>
3:30 PM – 3:45 PM	<p>91 Matrix Bound Nanovesicles As A Novel Therapeutic Option For Treating Rheumatoid Arthritis R. J. Crum, G. S. Hussey, S. F. Badylak; McGowen Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA.</p>
3:45 PM – 4:00 PM	<p>90 Tissue-engineered Stromal Reticulum To Study Lymph Node Fibroblastic Reticular Cell Networks In Autoimmune Diabetes F. Gonzalez Badillo^{1,2}, S. Wright^{1,2}, M. Scully^{1,2}, N. DeAngelis^{1,2}, F. Zisi Tegou^{1,2}, L. Harwell^{1,2}, A. A. Tomei^{2,1}; ¹Department of Biomedical Engineering - University of Miami, Coral Gables, FL,</p>

²Diabetes Research Institute – University of Miami, Miller School of Medicine, Miami, FL.

4:00 PM – 4:15 PM

92

In Vivo Tissue Engineered Diagnostic Sites For Prognosis And Treatment Monitoring In Autoimmunity

A. H. Morris, K. R. Hughes, R. S. Oakes, T. Kasputis, L. D. Shea;
Biomedical Engineering, University of Michigan, Ann Arbor, MI.

4:15 PM– 4:30 PM

93

Treatment Of Systemic Immune Dysregulation Following Severe Trauma With Synthetic Nanoparticle Antibodies

C. Vantucci¹, J. Liu¹, R. E. Guldberg², K. Roy¹;

¹Georgia Institute of Technology, Atlanta, GA, ²Georgia Institute of Technology, Eugene, OR.

3:00 PM - 4:30 PM

Scientific Session 6

Grand Caribbean 3-5

Bridging Regenerative to Transplant Medicine: A Proposal by The American Society of Transplantation Regenerative Medicine Community of Practice

Session Chairs:

Dr. Ipsita Banerjee, Dr. Giuseppe Orlando

SYIS Session Chair:

Keynote Speakers:

3:00 PM – 3:30 PM

Engineering Progenitors Cells into Insulin-Producing Cells

Cristina Nostro

3:30 PM – 4:00 PM

Organ Repair: Harnessing Regenerative Medicine and Preservation Technologies to Increase the Donor Pool

Korkut Uygun

4:00 PM – 4:30 PM

Kidney Regeneration: A Perspective from Renal Development and Cancer

Astgik Petrosyan

3:00 PM - 4:30 PM

Scientific Session 6

Grand Caribbean 8-10

Biomaterials for Central Nervous System Diseases and Regeneration with Focus on Imaging and Bio-Inspired Strategies

Session Chairs:

Dr. Mirek Janowski, Dr. Stephanie Seidlits

SYIS Session Chair:

Keynote Speakers:

3:00 PM – 3:30 PM

Image-Guided Delivery of Biomaterials for Neurological Applications

Piotr Walczak

3:30 PM – 4:00 PM

94

Neural Regenerative Rehabilitation For Traumatic Brain Injury

G. R. Bjorklund, G. Mousa, J. A. Kleim, **S. E. Stabenfeldt**;

School of Biological & Health Systems Engineering, Arizona State University,
Tempe, AZ.

Oral Presentations:

4:00 PM – 4:15 PM

95

Local Delivery Of Flavopiridol Repairs Rat Spinal Cord Injury By Regulation Of Astrocytes And Inflammation

H. Ren¹, H. Ouyang², J. Gao²;

¹Guangzhou Medical University, Guangzhou, CHINA, ²Zhejiang University, Hangzhou, CHINA.

4:15 PM – 4:30 PM

96

An iPSC-derived Electroconductive 3D Platform For Modeling Epileptic Networks

K. Kiaee, Y. Aliashrafi Jodat;

Medicine, Harvard Medical School, Cambridge, MA.

3:00 PM - 4:30 PM

Scientific Session 6

Grand Caribbean 6

Biomaterials and Regeneration II

Session Chairs:

Dr. Kelvin Yeung, Dr. Donghui Zhu

SYIS Session Chair:

Keynote Speaker:

3:00 PM – 3:30 PM

97

Controlled Delivery Of Magnesium Ions Enables In-situ Bone Regeneration

Z. Lin, K. Yeung;

Orthopaedics and Traumatology, The University of Hong Kong, Pokfulam, HONG KONG.

Oral Presentations:

3:30 PM – 3:45 PM

98

Cd86⁺ And/or Cd206⁺ Macrophages Are Determinants Of Implant Outcome Across Species

M. Kulkarni, B. Brown;

Department of Bioengineering, McGowan Institute for Regenerative Medicine, PITTSBURGH, PA.

3:45 PM – 4:00 PM

99

MicroRNA-200c Incorporated 3D-Printed Bio-Scaffolds Enhance Bone Regeneration

M. T. Remy¹, A. Akkouch¹, L. He¹, M. E. Sweat¹, F. Qian¹, X. Song¹, Z. Guo², Y. Zhang², B. A. Amendt¹, L. Hong¹;

¹University of Iowa, Iowa City, IA, ²Department of Neurosurgery, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, CHINA.

Rapid Fire Presentations:

4:00 PM – 4:05 PM

100

Bioengineering An Extra-hepatic Prevascularized Pouch For Subsequent

Islet Transplantation Using Vegf-loaded Polylactide Capsules

D. Kubies¹, A. Pátíková², M. Kumorek¹, E. Wawrzynska¹, A. Vojtíšková², J. Kříž²;

¹Dept. of Bioactive polymers, Institute of Macromolecular Chemistry, Czech Academy of Sciences, Prague, CZECH REPUBLIC, ²Dept. of Diabetes, Institute for Clinical and Experimental Medicine, Prague, CZECH REPUBLIC.

4:05 PM – 4:10 PM

101

Comparative Analysis Of The Regenerative Capacity Of Osteogenic Platforms In The Treatment Of A Rodent Mandibular Defect

A. J. Bow¹, S. Newby¹, B. K. Jackson², K. Alghazali², C. Griffin², S. Hecht³, A. S. Biris², D. E. Anderson¹, S. E. Bourdo², M. Dhar¹;

¹Large Animal Clinical Sciences, University of Tennessee, Knoxville, Knoxville, TN, ²Center for Integrative Nanotechnology Sciences, University of Arkansas at Little Rock, Little Rock, AR, ³Small Animal Clinical Sciences, University of Tennessee, Knoxville, Knoxville, TN.

4:10 PM – 4:15 PM

102

Efficient Differentiation Of Human ES And IPS Cells Into Cardiomyocytes On Biomaterials Under Xeno-free Conditions

A. Higuchi¹, A. Higuchi²;

¹Department of Chemical & Materials Engineering,, National Central University, Jhong-Li, TAIWAN, ²Center for Emergent Matter Science, Riken, Saitama, JAPAN.

4:15 PM – 4:20 PM

103

Effects Of Surface Pretreatments On 3D Polycaprolactone/nanopolyglycolic Acid Scaffolds For Tissue Engineering Of Human Auricular Cartilage

Q. Yu¹, R. Clements², R. D. Childs¹, J. Shelestak², W. Landis³, F. Reinauer⁴, T. Wolfram⁴, S. Grom⁴, N. Isogai⁵, A. Murthy¹;

¹Akron Children's Hospital, Akron, OH, ²Kent State University, Kent, OH, ³University of California San Francisco, San Francisco, CA, ⁴Karl Leibinger Medizintechnik GmbH & Co. KG, Muhlheim, GERMANY, ⁵Kindai University, Osaka, JAPAN.

4:20 PM – 4:25 PM

104

Development Of Topographical Microstructures Onto Fish Scale Collagen Scaffold To Manufacture A Tissue-engineered Oral Mucosa Equivalent

A. Suzuki¹, Y. Kodama², I. Yamaguchi², H. Kuwae³, K. Miwa³, E. Hoshikawa¹, K. Haga¹, J. Mizuno³, K. Izumi¹;

¹Biomimetics, Niigata University, Niigata, JAPAN, ²Taki Chemical Co.,Ltd., Japan, Hyogo, JAPAN, ³Research Organization for Nano and Life Innovation, Waseda University, Tokyo, JAPAN.

4:25 PM – 4:30 PM

105

Apoptosis-mediated Decellularization Approaches For Lung Tissue Engineering

Y. Song^{1,2}, M. Maynes², D. Visosevic², K. Daramola², C. Schmidt²;

¹Biomedical Engineering, University of Arkansas, Fayetteville, AR, ²Biomedical Engineering, University of Florida, Gainesville, FL.

3:00 PM - 4:30 PM

Scientific Session 6

Grand Caribbean 11/12

Tissue Engineering and TERMIS Leadership Session: The Importance of Scientific Rigor & Integrity

hosted by Mary Ann Liebert, Inc., Publishers

Panelists:

Dr. Antonios Mikos

Rice University

Dr. Molly Shoichet

University of Toronto

Dr. John Fisher

University of Maryland

Sophie Reisz, Editorial Director

Mary Ann Liebert, Inc., Publishers

4:30 PM - 6:30 PM

Kingston Hall

Exhibit Viewing/Reception - Poster Session 3

7:00 PM - 10:00 PM

Grand Caribbean Pre-Function South/Cayman Court

Conference Dinner

Thursday, December 5, 2019

7:00 AM – 3:15 PM

Grand Caribbean Pre-Function North

Registration Open

8:00 AM – 9:00 AM

Grand Caribbean 7

Plenary Symposium I: Dr. Vera Tiesler

9:00 AM – 9:45 AM
Grand Caribbean 7

Young Investigator Award: Dr. Jason Wertheim
Mary Ann Liebert, Inc. Outstanding Student Award: Dr. Adam Jorgensen
Innovation/Commercialization Award:

Gordana Vunjak-Novakovic, University Professor, Columbia University
Milica Radisic, Professor & Canada Research Chair, University of Toronto
Boyang Zhang, Assistant Professor, McMaster University
Kacey Ronaldson, Post-doctoral Associate, Columbia University
Yimu Zhao, PhD Candidate, University of Toronto

9:45 AM - 10:00 AM
Kingston Hall

Coffee Break

10:00 AM - 11:30 AM
Grand Caribbean 1/2

Scientific Session 7

New Approaches to Cardiovascular Repair and Regeneration II

Session Chairs:

Dr. Clotilde Castalado, Dr. Franca Di Meglio

SYIS Session Chair:

Oral Presentations:

10:00 AM – 10:15 AM

106

Treatment Of Abdominal Aortic Aneurysm Using Biomimetic Scaffolds Composed Of Human Smooth Muscle Progenitor Cells

N. F. Huang¹, J. Mulorz², C. Alcazar³, C. Hu³, M. Shayan¹, Y. Wen⁴, B. Chen⁵, P. S. Tsao²;

¹Cardiothoracic Surgery, Stanford University, Stanford, CA, ²Cardiovascular Medicine, Stanford University, Stanford, CA, ³Veterans Affairs Palo Alto Health Care System, Palo Alto, CA, ⁴Gynecology, Stanford University, Stanford, CA, ⁵Obstetrics and Gynecology, Stanford University, Stanford, CA.

10:15 AM – 10:30 AM

107

Ready-made Microvessels Integrate Into The Infarcted Coronary Vasculature Promoting Perfusion, Remuscularization And Function

S. Nunes Vasconcelos;

IBBME, University Health Network, University of Toronto, Toronto, ON, CANADA.

10:30 AM – 10:45 AM

108

Tissue-engineered Pediatric Pulmonary Valve In Growing Lamb Model

Z. Syedain, R. Bianco, **R. T. Tranquillo;**

University of Minnesota, Minneapolis, MN.

10:45 AM – 11:00 AM

109

Anisotropic Nanofibrous Cardiac-specific Extracellular Matrix Scaffold For Cardiac Tissue Engineering

W. Jia¹, **D. Sharma**¹, G. Wang¹, J. Zhang², T. Kamp², F. Zhao¹;

¹Biomedical Engineering, Michigan Technological University, Houghton, MI, ²University of Wisconsin-Madison, Madison, WI.

11:00 AM – 11:15 AM	110 Extracellular Matrix Hydrogel Therapy For Intracoronary Infusion M. T. Spang , G. Sandoval, T. S. Lazerson, S. Bhatia, C. Luo, K. Osborn, P. Cabrales, F. Contijoch, R. R. Reeves, A. N. DeMaria, K. L. Christman; University of California, San Diego, La Jolla, CA.
11:15 AM – 11:30 AM	111 The Role Of Monocytes In Endothelium Regeneration R. J. Smith, Jr. ¹ , B. Nasiri ² , D. D. Swartz ³ , S. T. Andreadis ¹ ; ¹ Biomedical Engineering, SUNY Buffalo, Amherst, NY, ² Chemical Engineering, SUNY Buffalo, Amherst, NY, ³ ONY Biotech, Amherst, NY.
10:00 AM - 11:30 AM	Scientific Session 7
Grand Caribbean 3-5	Stem Cell-Based Articular Cartilage Engineering
Session Chairs:	Dr. Hang Lin, Dr. Robert Mauck
SYIS Session Chair:	
Keynote Speakers:	
10:00 AM – 10:30 AM	Title TBD Clark Hung
10:30 AM – 11:00 AM	Chondroinductive Materials for Cartilage Regeneration Michael Detamore
Oral Presentations:	
11:00 AM – 11:15 AM	112 Engineering Cartilage From Aged Mscs: In Vitro Modeling Of Osteoarthritis N. Wang , R. S. Tuan, H. Lin; Orthopedics department, University of Pittsburgh, Pittsburgh, PA.
11:15 AM – 11:30 AM	113 Automated And Quantitative Assessment Of Clonal Cell Populations Derived From Human Articular Cartilage For Selection And Expansion In Vitro To Improve Cartilage Cell Therapy Products V. Mantripragada ¹ , E. Carson ² , O. Krebs ³ , G. Muschler ¹ ; ¹ Biomedical Engineering, Cleveland Clinic, Cleveland, OH, ² Biomedical Engineering, Case Western Reserve University, Cleveland, OH, ³ Cleveland Clinic, Cleveland, OH.
10:00 AM - 11:30 AM	Scientific Session 7
Grand Caribbean 8-10	Tools for Imaging and Assessment of Engineered Tissues and Biomaterials
Session Chairs:	Dr. Eric Brey, Dr. Marcella Vaicik
SYIS Session Chair:	
Oral Presentations:	

- 10:00 AM – 10:15 AM **114**
In Vivo Mapping Of Immune Cell Infiltration Into Extracellular Matrix Hydrogel In A Rat Model Of Stroke Using¹⁹F Magnetic Resonance Imaging.
H. Ghuman, R. Azar, S. Badylak, **M. Modo**;
University of Pittsburgh, Pittsburgh, PA.
- 10:15 AM – 10:30 AM **115**
Multimodal Assessment Of In-situ 3d Net Mold System-derived Myocardial Patch
A. Staneviciute¹, Y. Koda², R. Tung², N. Hibino², T. Ota², M. K. Vaicik¹, K. Kawaji¹;
¹Biomedical Engineering, Illinois Institute of Technology, Chicago, IL, ²University of Chicago, Chicago, IL.
- 10:30 AM – 10:45 AM **116**
Enabling Non-invasive Cell Tracking For Patient-specific Vascular Endothelial Cells
B. Jiang, C. Duan, G. Ameer;
Biomedical Engineering, Northwestern University, Evanston, IL.
- 10:45 AM – 11:00 AM **117**
Resonant Acoustic Viscoelastography For The Mechanical Characterization Of Soft Biomaterials
E. C. Hobson, C. X. Deng, J. P. Stegemann;
Biomedical Engineering, University of Michigan, Ann Arbor, MI.
- 11:00 AM – 11:15 AM **118**
Effects Of Freeze-thaw Cycling On Articular Cartilage Anisotropy Measured Using Ultrasound
M. Motavalli¹, C. Jones², J. Berilla³, M. Li⁴, M. Schluchter⁴, J. Mansour¹, J. Welter¹;
¹Biology, Case Western Reserve University, Cleveland, OH, ²Hathaway Brown High School, Cleveland, OH, ³Civil Engineering, Case Western Reserve University, Cleveland, OH, ⁴Biostatistics, Case Western Reserve University, Cleveland, OH.
- 11:15 AM – 11:30 AM **119**
Quantifying Bladder Tumor Induced Changes In Stromal Collagen Architecture
M. Devarasetty¹, S. Camalan², K. Niazi², M. N. Gurcan², S. Soker¹;
¹Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, ²Wake Forest Center for Biomedical Informatics, Winston-Salem, NC.

10:00 AM - 11:30 AM

Scientific Session 7

Grand Caribbean 6

Biomaterials for Stem Cell Culture and Therapy

Session Chairs:

Dr. Akon Higuchi, Dr. Anamaria Orza

SYIS Session Chair:

Keynote Speakers:

10:00 AM – 10:30 AM	Engineered Extracellular Systems for the Derivation of Organ-Specific Cell Types Samira Musah
10:30 AM – 11:00 AM	Efficient Differentiation of Human ES and iPS Cells into Cardiomyocytes on Biomaterials under Xeno-free Conditions Akon Higuchi
11:00 AM – 11:30 AM	Title TBD Anamaria Orza
11:30 AM - 1:00 PM Grand Caribbean 11/12	SYIS Career Panel Discussion
11:30 AM – 12:15 PM Grand Caribbean 8-10	TWIG Meetings Imaging & Assessment
1:00 PM - 2:30 PM Grand Caribbean 1/2	Scientific Session 8 Biobased Materials for Regenerative Medicine
Session Chairs:	Dr. Stefan Jockenhoevel, Dr. Lorenzo Moroni
SYIS Session Chair:	
Keynote Speakers:	
1:00 PM – 1:30 PM	Natural Origin Materials for Innovative TERM Approaches Rui Reis
1:30 PM – 2:00 PM	Role of Bio-based Materials for Regenerative Medicine Stefan Jockenhoevel
Rapid Fire Presentations:	
2:00 PM – 2:05 PM	120 Magnetically-actuated Alginate Scaffold: Effects On Macrophage Function And Angiogenesis L. A. Steele ¹ , K. Spiller ² , S. Cohen ³ , B. Polyak ¹ ; ¹ Surgery, Drexel University College of Medicine, Philadelphia, PA, ² Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia, PA, ³ Avram and Stella Goldstein-Goren Department of Biotechnology Engineering, Ben-Gurion University of the Negev, Beer Sheva, ISRAEL.
2:05 PM – 2:10 PM	217 Decellularized Vocal Fold Lamina Propria-ECM And Associated Matrix-bound Vesicles: Proteomic And In Vitro Characterization Of The TGF-β1 Mediated Fibrotic Response In Human Fibroblasts C. A. Mora-Navarro ^{1,2} , A. Badileanu ^{1,2} , E. A. Wrona ^{1,2} , L. Gaffney ^{1,2} , A. M. Gracioso Martins ¹ , J. R. Enders ³ , R. C. Branski ⁴ , D. O. Freytes ^{1,2}
2:10 PM – 2:15 PM	122 3d Bioprinting Of Biomimetic Pancreas With Biocompatible Hydrogel,

Adipose-derived Stem Cells And Islets

H. Scholz^{1,2}, S. Abadpour^{1,2}, Y. Zhao³, D. Josefsen⁴, H. P. Gullestad⁵, E. Thompson³, C. Troedsson³, **P. Gatenholm**⁶;

¹Transplant Medicine and Institute for Surgical Research, Oslo University Hospital, Oslo, NORWAY, ²Institute of Basic Medical Sciences, University of Oslo, Oslo, NORWAY, ³Ocean TuniCell, Blomsterdalen, NORWAY, ⁴Section for Cell Therapy, Oslo University Hospital, Oslo, NORWAY, ⁵Plastic and Reconstructive Surgery, Oslo University Hospital, Oslo, NORWAY, ⁶CELLHEAL, Sandvika, NORWAY.

2:15 PM – 2:20 PM

123

Ageing Affects The Immune Response To Synthetic And Biological Implants Through Divergent Mechanisms

B. Popovic¹, M. Kulkarni¹, L. Marchal¹, C. Skillen², B. Brown¹;

¹Bioengineering, McGowan Institute for Regenerative Medicine, Pittsburgh, PA, ²Bioengineering, McGowan Institute for Regenerative Medicine, Pittsburgh, PA.

2:20 PM – 2:25 PM

124

In Vitro Assessment Of Decellularized Human Skin As A Stand-alone Scaffold For Cardiac Regeneration

V. Romano¹, F. Di Meglio¹, I. Belviso¹, A. Sacco¹, G. Ricci², M. Cammarota², D. Nurzynska¹, C. Schiraldi², C. Maiello³, F. Schonauer¹, S. Montagnani¹, C. Castaldo¹;

¹Public Health, University of Naples "Federico II", Naples, ITALY, ²Experimental Medicine, Università della Campania "Luigi Vanvitelli", Naples, ITALY, ³Cardiovascular Surgery and Transplant, Monaldi Hospital, Naples, ITALY.

2:25 PM – 2:30 PM

125

Non-neoplastic Extracellular Matrix Components Mitigate Primary Human Glioma Cell Growth

M. H. Murdock¹, A. Iftikhar¹, J. T. Chang¹, R. C. Hill², K. C. Hansen², N. M. Amankulor¹, G. S. Hussey¹, S. F. Badylak¹;

¹University of Pittsburgh, Pittsburgh, PA, ²University of Colorado, Denver, CO.

1:00 PM - 2:30 PM

Scientific Session 8

Grand Caribbean 3-5

Tissue-Engineered Skeletal Muscle Technologies for Repair of Volumetric Muscle Loss

Session Chairs:

Dr. George Christ, Dr. Lisa Larkin

SYIS Session Chair:

Keynote Speakers:

1:00 PM – 1:22 PM

A Scaffoldless, Tissue Engineering Approach to Repair Volumetric Muscle Loss in a Large Animal Model

Lisa Larkin

1:22 PM – 1:44 PM

The Influence of Immunomodulatory Agents on Biologic Scaffold Mediated Treatment of Volumetric Muscle Loss

Christopher L. Dearth

- 1:44 PM – 2:06 PM **Optimizing Skeletal Muscle Function After Volumetric Muscle Loss Injury by Leveraging the Pathophysiology**
Sarah M Greising
- 2:06 PM – 2:28 PM **Functional Metrics and Computational Models for Evaluating the Degree of Physiological Impairment Following VML Injury and Repair**
George J. Christ
- 1:00 PM - 2:30 PM Scientific Session 8
- Grand Caribbean 8-10 **Regenerative Medicine in Ophthalmology**
- Session Chairs: Dr. Kapil Bharti, Dr. Xiaokun Wang
- SYIS Session Chair:
- Oral Presentations:**
- 1:00 PM – 1:15 PM **194**
Hypoxia-induced Choroidal Neovascularization In 3D Bioprinted Model Of Retinal Pigment Epithelium-Choroid Interface
E. Nguyen, R. Quinn, M. Song, K. Bharti;
National Eye Institute, National Institutes of Health, Bethesda, MD.
- 1:15 PM – 1:30 PM **127**
High-purity Photoreceptor Precursors From Human Induced Pluripotent Stem Cells For Photoreceptor Replacement Therapy
A. D. Dias¹, M. J. Phillips², B. C. Shelley¹, K. A. Wallace¹, B. J. Meline¹, M. J. Sternfeld¹, D. J. Phillips¹, M. Fenn¹, E. R. Berndt¹, L. D. Jager², A. L. Ludwig², K. L. Nilles², S. Stuedemann², A. A. Mack¹, C. Cliff³, D. M. Gamm², L. G. Chase¹;
¹R&D, FUJIFILM Cellular Dynamics, Inc., Madison, WI, ²Waisman Center, University of Wisconsin-Madison, Madison, WI, ³Opis Therapeutics, Madison, WI.
- 1:30 PM – 1:45 PM **128**
Hydrogels For Enhanced Transplanted Retinal Ganglion Cells Survival
P. Dromel¹, D. Singh², M. Young³, M. Spector⁴;
¹Material Science and Engineering, MIT, Harvard Medical School, Cambridge, MA, ²Ophthalmology, Harvard Medical School, Cambridge, MA, ³Ophthalmology, Harvard Medical School, Cambridge, MA, ⁴Department of Orthopedic Surgery, VA Boston Healthcare System, Brigham and Women's Hospital, Boston, MA.
- 1:45 PM – 2:00 PM **129**
Matrix Bound Nanovesicles (mbv) Prevent Retinal And Optic Nerve Damage Following Acute Ocular Injury
C. Pineda Molina¹, G. S. Hussey², S. F. Badylak³;
¹McGowan Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Surgery, University of Pittsburgh, Pittsburgh, PA, ³McGowan Institute for Regenerative Medicine, Surgery, Bioengineering, University of Pittsburgh, Pittsburgh, PA.
- 2:00 PM – 2:15 PM **130**
Antimicrobial Drug Eluting Hydrogels For The Treatment Of Bacterial Keratitis

R. A. D'Sa;

School of Engineering, University of Liverpool, Liverpool, UNITED KINGDOM.

2:15 PM – 2:30 PM

131

Characterization Of The Immune Pathways In Corneal Scarring And Immunomodulation To Promote A Healthy Repair

L. Chung¹, X. Wang¹, D. Maestas², J. Elisseeff²;

¹Biomedical Engineering, Johns Hopkins University, Baltimore, MD, ²Biomedical Engineering, Johns Hopkins University, Baltimore, MD.

1:00 PM - 2:30 PM

Scientific Session 8

Grand Caribbean 6

Applications and Challenges for Dental Pulp Stem Cells use in Tissue Engineering

Session Chairs:

Dr. Akishige Hokugo

SYIS Session Chair:

Keynote Speakers:

1:00 PM – 1:15 PM

The Use of Dental Pulp Stem Cells in Tissue Engineering: From Basic Science to Bedside

Daniela Franco Bueno

1:15 PM – 1:30 PM

New Strategies for Pulp Regeneration

Pamela Yelick

Oral Presentations:

1:30 PM – 1:45 PM

132

Bioengineered Alveolar Bone And Tooth Constructs

W. Zhang¹, W. Chang², S. Saxena², A. Fakhzadeh², T. Pashuck², S. Young³, J. Kohn², P. Yelick⁴;

¹Tufts University, School of Dental Medicine, Boston, MA, ²New Jersey Center for Biomaterials, Piscataway, NJ, ³The University of Texas Health Science Center at Houston, School of Dentistry, Houston, TX, ⁴Tufts University School of Dental Medicine, Boston, MA.

1:45 PM – 2:00 PM

133

Enhancing Peripheral Nerve Regeneration Using Scaffold-free Dental Pulp Stem Cell Sheets

M. N. Ahmed, M. Dailey, K. Rothermund, **F. Syed-Picard**;
University of Pittsburgh, Pittsburgh, PA.

Rapid Fire Presentations:

2:00 PM – 2:05 PM

134

Transplantation Of Islets Derived From Dental Pulp Stem Cells Into Diabetic Rats

K. Yaegaki;

Department of Oral Health, Nippon Dental University, Chiyodaku, JAPAN.

2:05 PM – 2:10 PM	<p>135 Decellularized Dental Pulp Extracellular Matrix For Pulp Regeneration S. Zaky¹, Q. AlQahtany¹, A. Patel¹, E. Beniash¹, H. Ray², C. Sfeir³; ¹Oral Biology, Center for Craniofacial Regeneration, Pittsburgh, PA, ²Department of Endodontics, Pittsburgh, PA, ³Periodontics, Center for Craniofacial Regeneration, Pittsburgh, PA.</p>
2:10 PM – 2:15 PM	<p>136 Utilization Of Antioxidant Agents For Thawing Of Stem Cells For Use In Regenerative Medicine D. B. Gomes¹, N. Maurmann¹, L. Alvorcem², G. Leipnitz², P. Pranke¹; ¹Hematology & Stem Cell Laboratory, Faculty of Pharmacy, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL, ²Programa de Pós Graduação em Ciências Biológicas: Bioquímica, Departamento de Bioquímica, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL.</p>
2:15 PM – 2:20 PM	<p>137 Processed Lipoaspirate Cells And Dental Pulp Stem Cells The Mirna Expression Profile C. M. Lopes-Ramos, C. G. Pinheiro, P. F. Asprino, R. B. Parmigiani, D. F. Bueno; Ensino e Pesquisa, HOSPITAL SÍRIO-LIBANÊS, SÃO PAULO, BRAZIL.</p>
2:20 PM – 2:25 PM	<p>138 Design And Characterization Of A Chitosan Hydrogel Scaffold For Dental Pulp Regeneration S. Moreira¹, G. Sarra², G. Lopes², F. G. Gonçalves¹, T. Araujo Silva³, M. Marques²; ¹Dentistry, Ibirapuera University, São Paulo, BRAZIL, ²Dentistry, University of São Paulo, São Paulo, BRAZIL, ³Dentistry, Ibirapuera University, São Paulo, BRAZIL.</p>
2:25 PM – 2:30 PM	<p>139 Novel Strategy Of Tissue Engineering ConstructFor Cartilage RegenerationFrom Dental Pulp Stem Cells T. L. Fenandes¹, J. C. SantAnna¹, I. Frisene¹, A. J. Hernandez¹, C. C. Pinheiro², D. F. Bueno³; ¹Sports Medicine Group, Universidade de Sao Paulo, Sao Paulo, BRAZIL, ²Hospital Sírio-Libanês, Sao Paulo, BRAZIL, ³Hospital Sirio-Libanês, Sao Paulo, BRAZIL.</p>
2:30 PM – 3:00 PM Grand Caribbean 3-5 Grand Caribbean 8-10 Grand Caribbean 6	TWIG Meetings Musculoskeletal Ophthalmologic Dental and Craniofacial
2:30 PM – 3:00 PM Grand Caribbean 7	WFIRM Awards

3:00 PM - 3:15 PM
Grand Caribbean 7

SYIS Oral and Poster Presentation Awards

3:15 PM - 4:00 PM
Grand Caribbean 7

Closing Ceremony & TERMIS-AM General Assembly Meeting