

WFIRM

Wake Forest Institute for
Regenerative Medicine



**WORLD
STEM CELL
SUMMIT**



**REGENERATIVE
MEDICINE**
FOUNDATION

2022 Virtual Regenerative Medicine Essentials Course & World Stem Cell Summit

June 6–11, 2022

<https://rmecoursewscs.com>

Welcome to the 2022 RME & WSCS

On behalf of the course organizing committee and a prominent group of course instructors, we welcome all to the Wake Forest Institute for Regenerative Medicine's (WFIRM) 9th Annual Regenerative Medicine Essentials: From the Fundamentals to the Future course, which is held in conjunction with the 19th Annual World Stem Cell Summit. This unique, co-joined event is formatted this year for virtual attendance.

Often referred to as the next evolution of modern health care, the regenerative medicine field touches many disciplines -- from clinical care and engineering to basic science and bioethics. We initiate this co-joined event with the RME "core curricula". The 3-day RME course, taught by leading experts in the field, addresses the multidisciplinary nature of regenerative medicine and provides attendees a firm foundation in this exciting field, insight into the current state of the field encompassing applications, challenges and a prognostic glance to the future.

Our primary objective is to provide an all-inclusive review of various aspects of RM including background material, key scientific components of the RM field, ethical, economic, educational, workforce and other issues important to RM, along with "virtually formatted" opportunities to network and meet leading professionals in the field. Participants are then able to move "beyond the essentials" as they then participate in the 19th Annual World Stem Cell Summit, held on June 10th and 11th.

In partnership with the Regenerative Medicine Foundation, the WFIRM organizing committee has put together a dynamic and informative course that covers the "essential" topics, fundamental principles and current progress in tissue engineering and regenerative medicine, including stem cells and cell therapy, biomaterials, technology-based tissue engineering and enabling technologies, as well as regulatory, ethical, economic issues critical to the field. Our instructors, including faculty from WFIRM as well as distinguished, prominent experts in the field from industry, academia and the government who join from across the globe, provides attendees a strong foundation along with insights into future directions and potential applications of tissue engineering and regenerative medicine.

We hope this distinctive, co-joined virtual event will further interactions among basic scientists engaged in discovery and development, translational researchers who bring laboratory discoveries to the clinical forefront, clinicians and those engaged with funding, regulatory and commercialization endeavors, and further broaden and facilitate interactions with future leaders in the field who join as students.

We look forward to an exciting, enjoyable and productive co-joined event for all.

Anthony Atala, MD
Director, WFIRM
RME 2022 Course Director

Joan F. Schanck, MPA
Chief Education Program Officer, WFIRM
RME 2022 Course Co-Director

Welcome to the 2022 RME & WSCS

On behalf of the Regenerative Medicine Foundation (RMF), I welcome you to the 2022 Virtual Regenerative Medicine Essentials Course and World Stem Cell Summit. We believe the course is a perfect platform for advancing the RMF mission to accelerate regenerative medicine to improve health and deliver cures.

Here at RMF, we recognize that the power of collaboration grows in a nonlinear fashion. One plus one is more than two, and one plus one plus one is much, much more than three — offering explosively positive and unpredictable possibilities. By attending this course, you will expand your knowledge in a totally immersive experience and gain personal connections and collaborations. Be open to all opportunities presented.

Interact with the outstanding interdisciplinary faculty and the superlative researchers of our host institution, the Wake Forest Institute for Regenerative Medicine, led by our treasured friend, Dr. Anthony Atala. We are here for you. Open to your questions and points of view.

This week I urge you to network with fellow attendees. Break bread, make new friends and remember to collect those opportunities.

Cordially,

Bernard Siegel, JD
Executive Director, Regenerative Medicine Foundation
Founder & Chair, World Stem Cell Summit

With Special Thanks and Recognition

Organizing Committee

Anthony Atala, MD
RME 2022 Course Director;
Director, WFIRM

Bernard Siegel, JD
RME 2022 Course Co-
Director; Executive Director,
Regenerative Medicine
Foundation

Joan F. Schanck, MPA
RME 2022 Course Co-
Director; Chief Education
Program Officer, WFIRM

Bonnie Davis
Chief Communications
Officer, WFIRM

Joseph Dawson
Director of Communications,
Regenerative Medicine
Foundation

Callie Allen
Education and Outreach
Coordinator, WFIRM

Emily Gregg
Web and Social Media
Manager, WFIRM

Kevin McMahon
Website Developer,
Regenerative Medicine
Foundation

Tracy Criswell, PhD
Associate Professor, WFIRM

RME 2022 Career Perspectives Committee

Damian Hutchins
Pre-Doctoral Fellow

Jao Ruiz Lucio de Lima Parra
Pre-Doctoral Fellow

Dariya Lizanet
Pre-Doctoral Fellow

Tim Dobroski
Pre-Doctoral Fellow

Bradford Kuhlman
Pre-Doctoral Fellow

Nicholas Edenhoffer
Pre-Doctoral Fellow

Other Contributors

Terri Bowen
Administrative Manager,
WFIRM

Ernie Lookabill
Financial Analyst, WFIRM

Bryanne Peterson
Digital Consultant, YNoti
Solutions

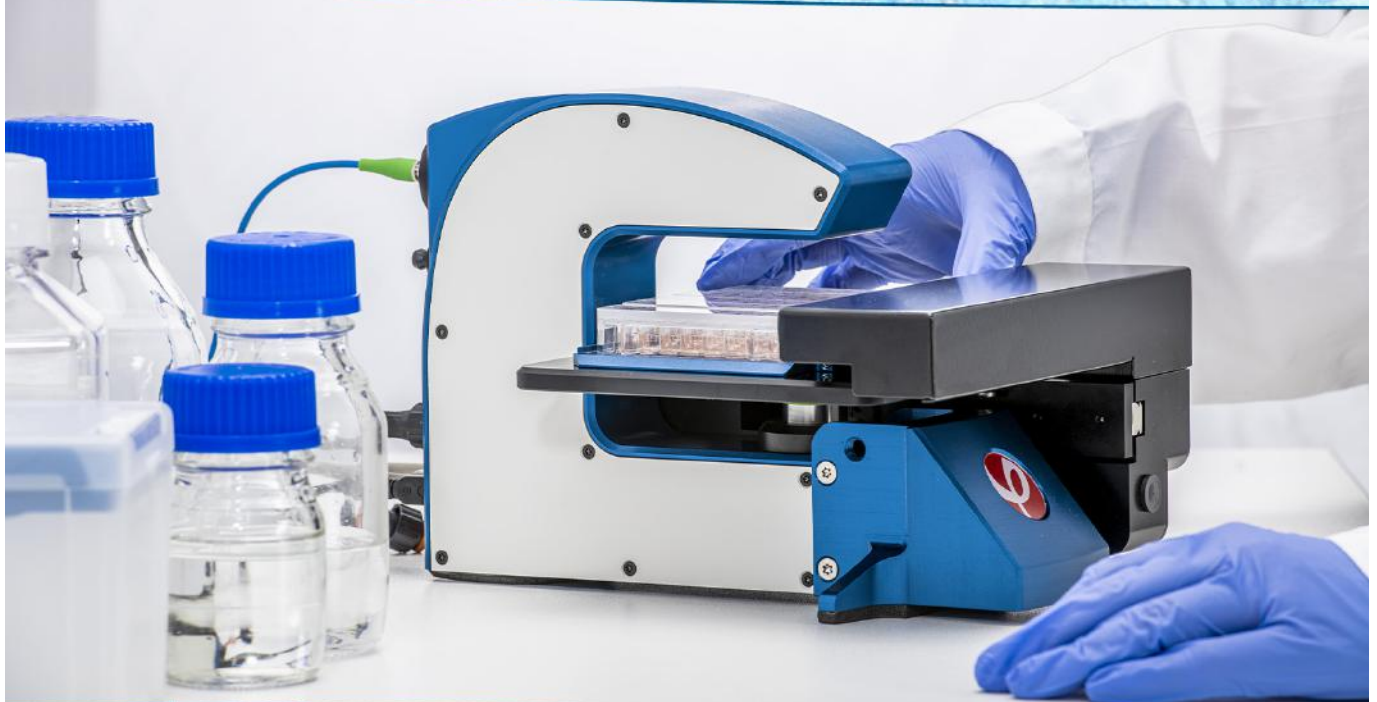


phi

PHASE
HOLOGRAPHIC
IMAGING

holo
monitor®

Non-invasive imaging in your incubator
&
Quantitative results on every single cell!



Advance your stem cell research!

Learn more at phiab.com



AR³T is supported
by NICHD, NIBIB,
and NINDS of the
NIH under award
number
P2CHD086843



AR³T

Alliance for
Regenerative Rehabilitation
Research and Training

RESEARCH SUPPORT & EDUCATION

- Technology Development grants up to \$100,000 each to support the development of novel technologies
- Pilot Grants: up to \$150,000 is distributed each year
- Annual International Symposium on Regenerative Rehabilitation
- Webinar series
- List of publications and resources
- Advanced Training Course

WHAT IS AR³T

A multi-institutional network of laboratories supporting state-of-the-art research in the domains of tissue plasticity and regeneration, mechanobiology, and physical therapeutics

NIH-FUNDED RESOURCE CENTER

Supporting the development of Regenerative Rehabilitation by providing research collaborations and educational opportunities, and supporting technology development

RESEARCH AREAS

Biomaterials, Bioengineering, Stem Cells, Cellular Therapeutics, Mechanotransduction, Mechanosensitive, Biomarkers, Microtissue Systems, Animal Models, Gene Therapy, Imaging

AR³T REGENERATIVE REHABILITATION SESSION TUE. JUN 7



3:00 pm to 3:10 pm: Amrita Sahu, PhD, University of Pittsburgh

Regenerative Rehabilitation: An Introduction

3:10 pm to 3:30 pm: Spencer Szczesny, PhD, Pennsylvania State University

Explant Model for Studying Tendon Degeneration and (Hopefully) Regeneration



3:30 pm to 3:50 pm: Marian Hettiaratchi, PhD, University of Oregon

Development of Multifunctional Biomaterials Musculoskeletal Tissue Repair

3:50 pm to 4:10 pm: Franklin West, PhD, University of Georgia

Neural Stem Cell Function in a Motor Cortex TBI



4:10 pm to 4:20 pm: Eda Yildirim-Ayan, PhD, University of Toledo

Mechanome-Guided Regenerative Rehabilitation

4:20 pm to 4:35 pm: Moderated Panel

NOW AVAILABLE
CELLBOX 2.0

THE
SAFEST
TRANSPORT OF
LIVE BIOMATERIALS



OOO
OOO
OOO
CELLBOX

Important Information

The RME/WSCS 2022 virtual conference is hosted on <http://rmecoursewscs.com>. Registered attendees can schedule virtual meetings, network, and interact including LIVE coffee breaks and moderated panels. All registrants received login credentials via e-mail. To request this information, e-mail Emily Gregg at egregg@wakehealth.edu.

All virtual postings will be offered for 90 days post-event.

We're Social!

Like, follow, and connect with us on social media. Follow along, post pictures, and ask questions.



@WFIRMnews



@RegenerativeMedicineFoundation



@WFIRMnews



@WSCSummit

epredia
Enhancing precision
cancer diagnostics

Take your work from
one week to one day.





We are Students.

We are Educators.



aces
International

Committed to developing international, intercultural,
and interdisciplinary competencies for students and
educators.

We are a Global Community.



With Special Thanks to our Sponsors:

Platinum Sponsors



Gold Sponsors



Contributing Sponsor

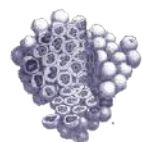


Young Scientist Sponsor



NC Biotech Meeting Grant

**North Carolina
Biotechnology Center**



STEM CELLS TRANSLATIONAL MEDICINE®

Submit, search, share, and shape the future



STEM CELLS TRANSLATIONAL MEDICINE, the official journal partner of the Regenerative Medicine Foundation, publishes high impact articles and concise reviews related to the clinical translation of all types of stem cells, tissue engineering, and regenerative medicine manufacturing and therapies.



www.StemCellsTM.com

DAY 1

JUNE 6



Anthony Atala MD

Director, Wake Forest Institute for Regenerative Medicine



Joan Schanck MPA

Chief Education Program Officer, Wake Forest Institute for Regenerative Medicine



Mahendra Rao MD, PhD

CEO, Implants Therapeutics



Joseph Wu MD, PhD

Director, Stanford Cardiovascular Institute; Professor, Medicine & Radiology, Stanford



Graca Almeida-Porada MD, PhD

Professor, Wake Forest Institute for Regenerative Medicine



Victoria Weis PhD

Instructor, Wake Forest Institute for Regenerative Medicine



David Williams PhD

Professor, Wake Forest Institute for Regenerative Medicine



Buddy Ratner PhD

Professor, Bioengineering and Chemical Engineering, University of Washington



Elizabeth Cosgriff-Hernandez PhD

Professor, Biomedical Engineering; The University of Texas at Austin



Bryan Brown PhD

Associate Professor, Department of Bioengineering, MIRM and CTO, Renerva



Simon Young DDS, MD, PhD

Associate Professor, Director of Research, UTHHealth, School of Dentistry



John Jackson PhD

Associate Professor, Wake Forest Institute for Regenerative Medicine



Rashid Bashir PhD

Professor, Bioengineering; Dean, Grainger College of Engineering, University of Illinois at Urbana-Champaign



John Fisher PhD

Professor; Department Chair, Fischell Department of Bioengineering, University of Maryland



Frank Marini PhD

Professor, Wake Forest Institute for Regenerative Medicine



Christopher Porada PhD

Professor, Wake Forest Institute for Regenerative Medicine



Robert Newman PhD

Associate Professor, Biology, NC A&T University

DAY 1

JUNE 6

WELCOME AND OPENING

8:15—8:25am	Welcome and Introduction	Joan Schanck, MPA
8:25—9:00am	Overview/Plenary: Current Concepts and Changing Trends	Anthony Atala, MD

Break

SESSION 1: PLURIPOTENT STEM CELLS AND PROGENITORS

9:10—9:30am	Regen-MED 2.0	Mahendra Rao, MD, PhD
9:30—9:50am	IPSCs for Disease Modeling, Drug Discovery, and Precision Medicine	Joseph Wu, MD, PhD
9:50—10:10am	Defining Stem and Progenitor Cell Populations for Prenatal Treatment of Genetic Disorders	Graca Almeida-Porada, MD, PhD
10:10—10:30am	Moderated Panel with Victoria Weis, PhD	

Break Sponsored By



SESSION 2: BIOMATERIALS

10:40—11:00am	The Plasticity of Biocompatibility	David Williams, PhD
11:00—11:20am	Engineering Biomaterials Surfaces for Biocompatibility and Blood Compatibility	Buddy Ratner, PhD
11:20—11:40am	Polymer Strategies to Enhance Bone Regeneration	Elizabeth Cosgriff-Hernandez, PhD
11:40—11:50am	Break	
11:50am—12:10pm	Immunomodulatory Biomaterials for Pelvic Floor Reconstruction	Bryan Brown, PhD
12:10—12:30pm	Biomaterials for Craniomaxillofacial Bone Regeneration	Simon Young, DDS, MD, PhD
12:30—12:45pm	Moderated Panel with David Williams, PhD	

Break

SESSION 3: ENABLING TECHNOLOGIES

1:30—1:40pm	Enabling Technologies in Regenerative Medicine Overview	John Jackson, PhD
1:40—2:00pm	Nanotechnology for Regenerative Medicine	Rashid Bashir, PhD
2:00—2:20pm	3D Printing Strategies for Engineering Complex Tissues	John P. Fisher, PhD
2:20—2:30pm	Break	
2:30—2:50pm	Imaging and Regenerative Medicine	Frank Marini, PhD
2:50—3:10pm	Gene Therapy: Getting to the Root of the Disease for a Permanent Cure	Christopher Porada, PhD
3:10—3:30pm	An Integrated Microengineered Organ Equivalent-Based Microfluidics System for Real-Time Detection of Signaling Dynamics and Metabolomics Profiles	Robert Newman, PhD
3:30—3:45pm	Moderated Panel with John Jackson, PhD	

Break Sponsored By



CAREER PERSPECTIVES I

4:00—5:15pm	<i>Beyond Academia and Big Pharma: Career Opportunities Outside the Role of Primary Investigator</i> with Breanna Deutsch, Jana Stoudemire, Peter Marks, and Jeanne Loring	Leaders: Damian Hutchins, Jao Ruiz Lucio de Lima Parra, Dariya Lizanet, Tim Dobroski, Bradford Kuhlman, Nicholas Edenhoffer, Tracy Criswell
-------------	--	---

Sponsored By



DAY 2

JUNE 7



Sean Murphy PhD

Associate Professor,
Wake Forest Institute
for Regenerative
Medicine



Shahin Rafii MD

Professor Chief and
Director, Ansary Stem Cell
Institute, Weill Cornell
Medicine Graduate School
of Medical Sciences



Farshid Guilak MD

Professor and Co-
Director, Washington
University Center of
Regenerative Medicine



Matthew Porteus MD, PhD

Professor, Pediatrics; Institute
of Stem Cell Biology and
Regenerative Medicine,
Stanford



James Yoo MD, PhD

Professor, Wake
Forest Institute
for Regenerative
Medicine



Karen Christman PhD

Professor, Department
of Bioengineering,
Sanford Consortium
for Regenerative
Medicine



Molly Shoichet PhD

Professor and
Chair, Chemical
Engineering,
Donnelly Centre,
University of Toronto



Pamela Yelick PhD

Professor and Director,
Craniofacial and
Molecular Genetics,
Tufts Graduate School of
Biomedical Sciences



Gail Naughton PhD

Founder, Histogen, Inc.



Peter Marks MD, PhD

Director, Center for
Biologics Evaluation
and Research, FDA



Wilson Bryan MD

Director, Office of
Tissues and Adv
Therapies, Center for
Biologics Evaluation
and Research (CBER)



Sheng Lin-Gibson PhD

Chief, Biosystems and
Biomaterials Divison,
National Institute
of Standards and
Technology



Amrita Sahu PhD

Scientific Coordinator,
AR3T, University of
Pittsburgh



Spencer Szczesny PhD

Assistant Professor,
Biomedical
Engineering,
Pennsylvania State
University



**Marian
Hettiaratchi PhD**

Assistant Professor,
Bioengineering,
University of Oregon



Franklin West PhD


Associate Professor,
Regenerative
Bioscience Center,
University of Georgia



Eda Yildirim-Ayan PhD


Associate Professor,
Department of
Bioengineering,
University of Toledo

DAY 2**JUNE 7****SESSION 4: CELL THERAPIES**

8:00—8:15am	Opening Comments	Joan Schanck, MPA
8:15—8:35am	Wound Healing Applications of Perinatal Stem Cells and Tissues	Sean Murphy, PhD
8:35—8:55am	HSC's for Inherited Blood Disorders	Shahin Rafii, PhD
8:55—9:15am	Metacells: Re-engineering Living Cells as Therapeutic Delivery Systems	Farshid Guilak, PhD
9:15—9:35am	Genome Editing of Hematopoietic Stem Cells	Matthew Porteus, MD, PhD
9:35—9:40am	Break Sponsored By 	
9:40—10:00am	Moderated Panel with Sean Murphy, PhD	

Break**SESSION 5: TISSUE ENGINEERING MEDICAL PRODUCTS**

10:10—10:30am	Considerations for Developing TEMPs	James Yoo, MD, PhD
10:30—10:50am	Injectible Biomaterials for Translational Regenerative Engineering	Karen Christman, PhD
10:50—11:10am	Overcoming Blindness with Regenerative Medicine	Molly Shoichet, PhD
11:10—11:20am	Break	
11:20—11:40am	New Animal Models and Strategies for Craniomaxillofacial Defect Repair	Pamela Yelick, PhD
11:40am—12:00pm	From Concept to Market: The Path, Pitfalls and Progress	Gail Naughton, PhD
12:00—12:20pm	Moderated Panel with James Yoo, MD, PhD	

Break Sponsored By **SESSION 6: REGULATORY, PROCESS DEVELOPMENT & MANUFACTURING**

1:15—1:45pm	Future Directions in Cell and Gene Therapy	Peter Marks, MD, PhD
1:45—2:10pm	Regenerative Medicine Advanced Therapy (RMAT) Designation	Wilson Bryan, MD
2:10—2:30pm	Standards to Support Product Development, Manufacturing and Testing	Sheng Lin-Gibson, PhD
2:30—2:45pm	Moderated Panel with Beth E. Roxland, JD, M.Bioethics	

Break**SESSION 7: AR3T**

3:00—3:10pm	Regenerative Rehabilitation: An Introduction	Amrita Sahu, PhD
3:10—3:30pm	Explant Model for Studying Tendon Degeneration and (Hopefully) Regeneration	Spencer Szczesny, PhD
3:30—3:50pm	Development of Multifunctional Biomaterials for Musculoskeletal Tissue Repair	Marian Hettiaratchi, PhD
3:50—4:10pm	Neural Stem Cell Function in a Motor Cortex TBI	Franklin West, PhD
4:10—4:20pm	Mechanome-Guided Regenerative Rehabilitation	Eda Yildirim-Ayan, PhD
4:20—4:35pm	Moderated Panel with Amrita Sahu, PhD	

Break**CAREER PERSPECTIVES II**

4:45—6:00pm	<i>International Careers in Regenerative Medicine: Legal, Regulatory, and Ethical Perspectives on the World-Wide Job Market</i> with David Williams, Kacey Marra, Steve Lynum, Preveen Ramamoorthy	Leaders: Damian Hutchins, Jao Ruiz Lucio de Lima Parra, Dariya Lizanet, Tim Dobroski, Bradford Kuhlman, Nicholas Edenhoffer, Tracey Criswell
-------------	--	--

Sponsored By

DAY 3

JUNE 8



Nancy King JD

Co-Director, Center for Bioethics, Health and Society, Wake Forest University



Abba Creasey PhD

Vice President, Therapeutics Development, CIRM



Jan Nolte PhD

Stem Cell Program Director, UC Davis School of Medicine; Director, Institute for Regenerative Cures



Kacey Marra PhD

Professor, Bioengineering; Vice Chair of Research, University of Pittsburgh



Tracy Criswell PhD

Associate Professor, Wake Forest Institute for Regenerative Medicine



Milica Radisic PhD

Professor, Research Chair, Cardiovascular Tissue Engineering, University of Toronto



Jana Stoudemire

Commercial Innovation Strategy Lead, Axiom Space



Aletta Schnitzler PhD

Chief Scientific Officer, TurtleTree Labs



B.J. Scheessele

Chief Commercial Officer, Humacyte



Shay Soker PhD

Professor, Wake Forest Institute for Regenerative Medicine



Gary Green EdD

Chief Workforce Development Officer, ReMDO



Joshua Hunsberger PhD

Chief Technology Officer, ReMDO; Executive Director, RMMS



Randy Yerden

CEO, BioSpherix Medical



Peter Egelberg PhD

CEO and Founder, Phase Holographic Imaging



Nabaruna Karmakar PhD

Sr. Operations Research, SAS Institute



Jane Scott

Head of Global Engagement and Growth, Oracle for Startups



Mark Owens

President and CEO, Greater Winston-Salem



Jason Kaplan

Associate Vice President, Innovation Quarter



Carrie DiMarzio

CEO, BioMedInnovations



Heather Bara PhD

Director, Research & Bioanalytics, MIMEDX



Joan Schanck MPA

Chief Education Program Officer, Wake Forest Institute for Regenerative Medicine



Russ Read

Executive Director, National Center for the Biotechnology Workforce



Terry Howerton

Biotechnology Instructor, Atkins Academic & Technology High School



Manju Bhat PhD

Associate Professor and Associate Dean, Winston-Salem State University

DAY 3**JUNE 8****SESSION 8: CLINICAL TRIALS AND BIOETHICS**

8:00—8:15am	Opening Comments	Joan Schanck, MPA
8:15—8:30am	Bioethics and Regenerative Medicine: Fundamentals for the Future	Nancy King, JD
8:30—8:50am	Advancing the Regenerative Medicine Ecosystem in California and Worldwide	Abla Creasey, PhD
8:50—9:10am	Cell & Gene Therapy Clinical Trials	Jan Nolta, PhD
9:10—9:40am	Clinical Translation of a Tissue-Engineered Nerve Guide	Kacey Marra, PhD
9:40—9:45am	Break	
9:45—10:05am	Moderated Panel with Tracy Criswell, PhD	

Break**SESSION 9: COMMERCIALIZATION**

10:15—10:35am	Advances in Organ on-a-Chip Engineering	Milia Radisic, PhD
10:35—10:55am	Commercializing Products for Emerging Markets on Earth and in Space	Jana Stoudemire
10:55—11:15am	Moving Toward Commercialization: Product and Process Development Considerations	Aletta Schnitzler, PhD
11:15—11:35am	Commercializing our HAV	B.J. Scheessele
11:35—11:40am	Break	
11:40am—12:00pm	Moderated Panel with Shay Soker, PhD	

Break Sponsored By**SESSION 10: REG MED NEXUS FOR ECONOMIC DEVELOPMENT**

12:45—1:00pm	Building a Cytocentric Testing Facility	Randy Yerden
1:00—1:15pm	Advanced Quality Control for Regenerative Medicine	Peter Egelberg, PhD
1:15—1:30pm	Data-Driven Optimization of Biomanufacturing Processes	Nabaruna Karmakar, PhD
1:35—2:05pm	Moderated Panel - Meet Our Test Bed Companies - with Gary Green, EdD	

Break Sponsored By**SESSION 11: REG MED NEXUS FOR ECONOMIC DEVELOPMENT****RegeneratOR Innovation Accelerator****Co-Chairs: Gary Green and Joshua Hunsberger**

2:15—2:25pm	Oracle for Startups: Supporting Innovation in Healthtech	Jane Scott
2:25—2:35pm	Greater Winston Salem, Inc. Supporting Innovation	Mark Owens
2:35—2:45pm	Planning for a RegenMed Hub: Short and Long-Term Approaches	Jason Kaplan

RegeneratOR Innovation Accelerator Companies**Co-Chairs: Gary Green and Joshua Hunsberger**

2:45—3:00pm	BioMedInnovations: Breaking Barriers in Organ and Tissue Preservation	Carrie DiMarzio
3:00—3:15pm	Accelerating MIMEDX R&D to Expand the Reach of Placental Biologics	Heather Bara, PhD
3:15—3:30pm	Axiom Space - Developing the Commercial Space Economy	Jana Stoudemire

Break**SESSION 12: REG MED NEXUS FOR WORKFORCE DEVELOPMENT****Co-Chairs: Gary Green and Joan Schanck**

3:40—3:50pm	WFIRM's Training Ecosystem - Past, Present and Future Gaps	Joan Schanck, MPA
3:50—4:00pm	Addressing the Gap - Gap 1: Skilled Technicians for Biomanufacturing	Gary Green, EdD
4:00—4:30pm	NSF ATE Panel: Terry Howerton and Ed Ebert, PhD	
4:30—4:45pm	Addressing the Gap - Gap 2: New WFIRM Masters in Science Degree for Translational Biotechnology	Tracy Criswell, PhD
4:45—5:00pm	Employers' Perspectives Round Table Discussion	John Moore, President Scientific Bioprocessing, Inc.

