TEXAS BIOMATERIALS DAY UTSA

JUNE 3, 2016
9:00 AM – 7:00 PM
UTSA MAIN CAMPUS
H-E-B UNIVERSITY CENTER
(HUC) BALLROOM

Texas Biomaterials Day UTSA is a one-day symposium, supported by the Society For Biomaterials (SFB). The event is designed to enhance networking between academic, industrial, military and government sectors and increase student exposure to exciting biomaterials research. Students throughout the area, SFB industry members as well as non-SFB members interested in the biomaterials field should attend the event.

Keynote Speaker

Christopher Bowman, Ph.D.
University of Colorado, Boulder

Invited Speakers

Mark Appleford, Ph.D.
University of Texas at San Antonio
Benjamin Corona, Ph.D.
US Army Institute of Surgical Research
Sy Griffey, Ph.D.
Stembiosys, Inc.
F. Kurtis Kasper, Ph.D.
UT Health Science Center at Houston
Kris Kieswetter, Ph.D., MBA
Acelity, Inc.
Ravi Kumar, Ph.D.
Texas A&M Health Science Center
Jian Ling, Ph.D.
Southwest Research Institute
Amita Shah, M.D., Ph.D.
University of North Carolina at Chapel Hill
Jeanne Stachowiak, Ph.D.
University of Texas at Austin

PROGRAM & REGISTRATION:
Program: http://research.utsa.edu/event/biomaterialsday/
Registration: HTTPS://WWW.REGONLINE.COM/BIOMATERIALSDAY2016

<Logos>
Large: <UTSA> <SALSI> <Society for Biomaterials>
Small: <Malvern> <SwRI> <TA Instruments>

PROGRAM

09:00 am – 10:00 am	Breakfast/Registration
10:00 am – 10:10 am	Opening Remarks
10:10 am – 11:00 am	**Keynote Speaker: Dr. Christopher Bowman**
11:00 am – 11:40 am	**Session I: Invited Speakers**
	Dr. Benjamin Corona
	Dr. Jeanne Stachowiak
11:40 am – 12:00 pm	**Session II: Student Rapid Fires**
	David Spencer, Manish Jaiswal,
	Sarah Stagg, Chelsea Kraynak
12:00 pm – 01:40 pm	Lunch and Poster Viewing
01:40 pm – 02:40 pm	**Session III: Invited Speakers**
	Dr. Kris Kieswetter
	Dr. Ravi Kumar
	Dr. Sy Griffey
02:40 pm – 03:00 pm	**Session IV: Student Rapid Fires**
	Avinash Gadok, Solaleh Miar
	Ian Kinstlinger, Sarita Shah
03:00 pm – 03:40 pm	Coffee Break and Poster Viewing
03:40 pm – 05:00 pm	**Session V: Invited Speakers**
	Dr. Amita Shah
	Dr. Mark Appleford
	Dr. Jian Ling
	Dr. F. Kurtis Kasper
05:00 pm – 07:00 pm	Awards Reception

KEYNOTE SPEAKER

Christopher N. Bowman, Ph.D.

Biography. Professor Christopher N. Bowman is currently the Patten Endowed Chair of the Department of Chemical and Biological Engineering, the Director of the Materials Science and Engineering Program, and a Distinguished Professor at the University of Colorado. He received his B.S. and Ph.D. in Chemical Engineering from Purdue University in1988 and 1991, respectively. After receiving his Ph.D., he began his academic career at the University of Colorado in January of 1992. Since that time Professor Bowman has built a program focused on the fundamentals and applications of crosslinked polymers formed via photo-polymerizations and click reactions. Professor Bowman has published nearly 350 refereed papers and been recognized with awards from the American Chemical Society, the American Institute of Chemical Engineers, the Materials Research Society, and the Society for Biomaterials. His research involves the synthesis of novel monomers and the implementation of various photo-initiated polymerization reactions in a range of applications including adhesives, coatings, dental materials, photolithography, nanotechnology and biomaterials.

Clicking Polymers Together:
Assembly of Complex, Biologically Useful Polymer Structures from Efficient Chemistries

A new paradigm encompassing several distinct chemical reactions and, more importantly, a generalized approach to molecular design and synthesis has been rapidly adopted in the fields of chemical synthesis, biotechnology, materials science, drug discovery, surface science, and polymer synthesis and modification. The Click Chemistry paradigm focuses on implementation of highly efficient reactions that achieve quantitative conversion under mild conditions. As such, these reactions represent ideal candidates for further development, understanding and implementation. In particular, the synergistic combination of these click chemistries with photochemical initiation and polymer formation has been used to afford 4D control of polymer formation, structure and patterned assembly, particularly as useful in the development of biomaterials by design. Here, we will focus on three distinct vignettes related to our implementation of photo-clickable polymer systems. The first of these areas focuses on the combination of chemistry and bio-specificity to develop polymerization-based bio-detection approaches that enable ultrahigh sensitive detection of target compounds. The second focuses on the development of smart, responsive materials based on covalent adaptable networks (CANs) where the ability to controllably alter the network structure is used to alter topography and other material properties. This behavior is achieved by forming materials which can be switched reversibly from elastic to plastic simply by exposure to light. Finally, the development and implementation of click nucleic acids (CNAs) based on the thiolene click reaction will be presented. This distinct class of oligonucleotides combines the vast advantages of synthetic oligonucleotides such as peptide nucleic acids with the power of click reaction chemistry to form materials that hybridize with both natural and synthetic oligonucleotides via Watson-Crick base pairing while being simple to produce in large scales appropriate for directed assembly and other high value materials applications.

INVITED SPEAKERS

Mark Appleford, Ph.D.

Dr. Appleford currently serves the University of Texas at San Antonio (UTSA) College of Engineering as the Associate Dean for Undergraduate Programs. His research laboratory works on the large scale reconstruction of musculoskeletal tissues using natural and synthetic scaffolds. Basic research in this laboratory focusses on understanding the molecular, cell and tissue level repair mechanisms in cranial facial, orthopedic and periodontal environments. Translational research has focused on cell to biomaterial interactions with emphasis on regenerative pathways of soft and hard tissue wounds. Dr. Appleford helps mentor and train biomedical engineering students at the undergraduate and graduate level at UTSA, and at the University of Texas Health Science Center at San Antonio as a core faculty member of the Joint Graduate Program.

Email: mark.appleford@utsa.edu

Website: http://engineering.utsa.edu/bme/faculty/appleford.html

Benjamin Corona, Ph.D.

Dr. Corona is a Research Physiologist in the Extremity Trauma and Regenerative Medicine task area at the United States Army Institute of Surgical Research. The primary emphasis of Dr. Corona's work is the restoration of skeletal muscle strength and limb function following orthopaedic trauma. His laboratory performs basic and translational research aimed at elucidating the pathophysiology of severe musculoskeletal trauma and identifying promising therapeutics to improve functional outcomes. His work is characterized by a multi-disciplinary approach that integrates skeletal muscle physiology with regenerative and rehabilitative medicine.

Email: benjamin.t.corona.civ@mail.mil

Website: http://www.usaisr.amedd.army.mil/

Sy Griffey, Ph.D.

Dr. Griffey's primary area of emphasis over 25+ years in research and product development has been in assessing new ideas and technologies and evaluating the feasibility of turning these ideas into medical devices and products. His research background includes programs and projects involving stem cells, tissue regeneration and biologic transplant materials for orthopedic, reconstructive, sports medicine and wound healing applications. Dr. Griffey received his bachelor's and master's degrees at Southwest Texas State University and his doctorate from Baylor College of Medicine in Houston with a joint appointment in cell biology and biotechnology.

Email: sy.griffey@stembiosys.com

Website: http://www.stembiosys.com/

F. Kurtis Kasper, Ph.D.

Dr. F. Kurtis Kasper holds an appointment as Assistant Professor in the Department of Orthodontics at The University of Texas Health Science Center at Houston. His research applies fundamentals of engineering, materials science, and the biosciences toward the development and evaluation of biomaterial-based technologies to meet clinical needs. He has been recognized with a variety of honors,

including the Young Investigator Award of the Society For Biomaterials and the Young Investigator Award of the North American Chapter of the Tissue Engineering and Regenerative Medicine International Society.
Email: Fred.K.Kasper@uth.tmc.edu
Website: https://dentistry.uth.edu/directory/profile.htm?id=7dfc9c4e-966a-4f55-a230-e01ba98487f6

Kris Kieswetter, Ph.D., MBA
Dr. Kieswetter currently serves as Senior Director, Research & Technology at Acelity, Inc. The Device Sciences organization she leads provides technical and scientific support to product development teams, develops novel concepts and performs technology scouting and assessments. Kieswetter is a member of the Society for Biomaterials, Orthopaedic Research Society, Tissue Engineering Society International and the Wound Healing Society and was recently inducted into the College of Fellows of the American Institute for Medical and Biological Engineering. Her community and professional service include serving on the board of directors of the Antioch Community Transformation Network, Texas Public Radio, The Health Cell and the Wound Healing Society. She has received several patents, published in the fields of biomaterials, orthopaedics and wound healing and mentored two first place teams in the Free Trade Alliance's International Business Plan competition.
Email: Kris.kieswetter@Acelity.com
Website: http://www.acelity.com/home

Ravi Kumar, Ph.D.
Dr. Ravi Kumar is the Professor in the Department of Pharmaceutical Sciences, Texas A&M Health Science Center in College Station. His research in drug delivery has won him numerous awards including the British Pharmaceutical Conference Science Medal , UK (2009), Tom Gibson Memorial Award by British Society of Plastic Surgeons & the Royal College of Physicians and Surgeons, UK (2008), Indian National Science Academy (INSA) Medal for Young Scientist, India (2007). He was awarded Alexander von Humboldt Research Fellowship, Germany (2002).
Email: mnvrkumar@tamhsc.edu
Website: http://www.research.tamhsc.edu/drugdeliverylab

Jian Ling, Ph.D.
Dr. Jian Ling is a Staff Engineer and Acting Manager of Materials and Bioengineering Section in the Department of Pharmaceuticals and Bioengineering at Southwest Research Institute. He is also an adjunct faculty of the joint UTST/UTHSCSA biomedical engineering program. He has over 20 years of experience in biomedical research and medical device development. His research interests in tissue engineering include the development of stem cell expansion technology, composite biomaterial scaffolds, and tissue and organ perfusion bioreactor.
Email: Jian.Ling@swri.org
Website: http://www.swri.org/4org/d01/appchem/polyorg/home.htm

Amita Shah, M.D., Ph.D.

Amita Shah received an Engineering Science degree from Trinity University and then completed medical school at the University of Texas Health Science Center at San Antonio (UTHSCSA). She went on to residency training in General Surgery at UTHSCSA and is board certified in General Surgery. She completed a PhD in Biomedical Engineering from the joint graduate program between the University of Texas at San Antonio and UTHSCSA in 2010. Currently, she is completing a plastic surgery residency at the University of North Carolina at Chapel Hill and will be joining the plastic surgery faculty at UTHSCSA in the fall of 2016.

Email: amitarshah@gmail.com
Website: https://www.med.unc.edu/plastic (until July 7)
http://surgery.uthscsa.edu/plastic/ (starting September 1)

Jeanne Stachowiak, Ph.D.

Dr. Jeanne Stachowiak received her bachelor's degree from the University of Texas at Austin, followed by doctoral work at the University of California Berkeley. After finishing her doctoral studies she served as a Staff Scientist at Sandia National Laboratories in Livermore, CA for several years before starting her laboratory in the Department of Biomedical Engineering at the University of Texas at Austin in 2012, where she is currently an Assistant Professor. Her group is focused on addressing fundamental questions and applications at the interface of membrane biophysics, biomaterials, and medicine.

Email: jcstach@austin.utexas.edu
Website: http://research.bme.utexas.edu/stachowiak/index.html

ORGANIZERS

Teja Guda, Ph.D.

Dr. Teja Guda is an Assistant Professor in the Department of Biomedical Engineering and Assistant Director of the Center for Innovation, Technology and Entrepreneurship at the University of Texas at San Antonio. He received his B.Tech. in mechanical engineering from the Indian Institute of Technology, Bombay and his Ph.D. in biomedical engineering from the joint graduate program between the University of Texas at San Antonio and the University of Texas Health Science Center at San Antonio. Dr. Guda's research focuses on developing biomaterials based synthetic grafts for orthopedic tissues, cell encapsulation platforms and biophysical conditioning for tissue regeneration. He teaches courses in medical device design and development, biomaterials characterization and tissue biomechanics.
Email: teja.guda@utsa.edu
Website: http://engineering.utsa.edu/bme/faculty/guda.html

Elizabeth Cosgriff-Hernández, Ph.D.

Dr. Elizabeth Cosgriff-Hernandez is associate professor in the Department of Biomedical Engineering at Texas A&M University. She received her B.S. in biomedical engineering and Ph.D. in macromolecular science and engineering from Case Western Reserve University in Cleveland, Ohio. Dr. Cosgriff-Hernandez is the recipient of the Society for Biomaterials Student Award for Outstanding Research. She also has been awarded the UT-TORCH Postdoctoral Fellowship and conducted bone tissue engineering research with Professor Tony Mikos at Rice University. Her research interests include biomaterial synthesis, structure-property relationships, cell-material interactions, musculoskeletal tissue engineering and biodegradation characterization.
Email: cosgriff.hernandez@tamu.edu
Website: http://chlab.tamu.edu/

Melissa Grunlan, Ph.D.

Melissa Grunlan, Ph.D., is an Associate Professor of Biomedical Engineering at Texas A&M University. She is also a faculty member of the Department of Materials Science & Engineering. Prof. Grunlan obtained her B.S. in Chemistry and M.S. in Polymers in Coatings from North Dakota State University (Fargo, ND). After spending four years at the H.B. Fuller Company (St. Paul, MN), she received her Ph.D. in Chemistry from the University of Southern California (Los Angeles, CA). She is the director of the "Silicon-Containing Polymeric Biomaterials Group". Her research is broadly focused on developing new materials to improve the performance of medical devices. Several specific research areas include: self-cleaning membranes for implanted biosensors, anti-fouling coatings for blood-contacting devices and marine applications and scaffolds for osteochondral and bone tissue healing.
Email: mgrunlan@tamu.edu
Website: http://grunlanlab.tamu.edu/

Jeffrey Jacot, Ph.D.

Jeffrey Jacot, Ph.D., in conjunction with his collaborators, engineer reparative heart tissue using stem cells found in amniotic fluid grown on novel multilayered biomaterials. These tissues are designed to fix

heart defects in infants, eliminating the need for heart transplants or multiple and complex surgeries. As associate professor of bioengineering at the University of Colorado at Denver, Dr. Jacot works alongside surgeons, clinicians, radiologists and biologists to understand the clinical needs in congenital heart defect management and repair, analyze the mechanical and biological processes in heart tissue development, and develop novel biomaterials for tissue-engineered heart muscle.
Dr. Jacot received a B.S. in Chemical Engineering from the University of Colorado at Boulder in 1994, followed by six years of industry experience in the design and development of devices for heart surgeries. He received a Ph.D. in Biomedical Engineering from Boston University in 2005. Following postdoctoral work in the Cardiac Mechanics Research Group at the University of California, San Diego, he joined Rice University in 2008 and the University of Colorado at Denver in 2016. Dr. Jacot has received one of the National Science Foundation's prestigious CAREER awards, an NIH R01, the Rice Institute for Biosciences and Bioengineering Medical Innovations Award, the Young Innovators in Biomedical Engineering Award from Emory/Georgia Tech, and grants from the National Science Foundation, the National Institutes of Health, the American Heart Association, the Virginia and L.E. Simmons Family Foundation, and the John S. Dunn foundation.
Email: Jeff.Jacot@rice.edu
Website: http://jacotlab.rice.edu/

Laura Suggs, Ph.D.
Dr. Laura Suggs is associate professor in the Department of Biomedical Engineering at The University of Texas at Austin. She received her B.S. in chemical engineering from The University of Texas at Austin and her Ph.D. in chemical engineering with a concentration in biomaterials/tissue engineering from Rice University. She obtained her Ph.D. under the guidance of Professor Tony Mikos, specializing in cardiovascular tissue engineering. Prior to teaching at The University of Texas at Austin, Dr. Suggs worked on developing a tissue-engineered vascular graft from multipotent adult progenitor cells at the University of Minnesota. Her research focuses on physiologically responsive biomaterials and their use and behavior for applications in cardiovascular tissue engineering.
Email: laura.suggs@mail.utexas.edu
Website: http://research.bme.utexas.edu/suggs/Suggs_lab_website/The_Suggs_Lab.html

RAPID FIRE STUDENT TALKS

- *Connectosomes for Direct Cytoplasmic Drug Delivery*
  Avinash K. Gadok, David J. Busch, Brian Li, Silvia Ferrati, Hugh D. C. Smyth and Jeanne C. Stachowiak

- *Mechanically Stiff Nanocomposite Hydrogels at Ultralow Nanoparticle Content*
  Manish K. Jaiswal, Janet Xavier, James K. Carrow, Prachi Desai, Daniel Alge and Akhilesh K. Gaharwar

- *A Gold Nanoparticle-Based Transfection Agent to Direct Macrophage Polarization*
  Chelsea A Kraynak and Laura Suggs

- *Engineered tissues with perfusable vascular networks created by sacrificial templating of laser sintered carbohydrates*
  Ian S. Kinstlinger, David R. Yalacki, and Jordan S. Miller

- *Polypyrrole coated Polyvinylidene fluoride aligned electrospun fibers for biomedical applications*
  Solaleh Miar and Teja Guda

- *Effects of Antimicrobial Treatment on the Induction of an Osteogenic Membrane in an Infected Bone Defect*
  Sarita R. Shah, Brandon T. Smith, Alexander M. Tatara, Eric R. Molina, Esther J. Lee, Robert E. Guldberg, George N. Bennett, Joseph C. Wenke, and Antonios G. Mikos

- *Co-delivery of multiple therapeutic agents to liver cancer*
  David Spencer, D. Beckman, B. Luu and Nicholas A. Peppas

- *Mechanical Stimulation of Collagen-Fibrin Hydrogels for Skeletal Muscle Regeneration*
  Sarah J. Stagg, Joo Ong, Christopher Rathbone and Teja Guda

ABSTRACTS

1. **Biodegradable Polymer-Based Theranostic Nanoparticles: Synthesis, Characterization, and *In Vitro* Studies**
Tugba Ozel[1], *Gabriela Herrera*[2], *and Tania Betancourt*[1,2]
[1]Materials Science, Engineering and Commercialization Program, Texas State University, San Marcos, TX
[2]Department of Chemistry and Biochemistry, Texas State University, San Marcos, TX

2. **Toward Protein Recognition with Oligopeptide-Containing Imprinted Hydrogels**
John R. Clegg[1], *Matthew Harger*[1], *Afshan S. Irani*[1], *Pengyu Ren*[1] *and Nicholas A. Peppas*[1]
[1]The University of Texas at Austin, Austin, TX

3. **3D Printing Vascularized Tissues: Closing the Loop between Computational and Experimental Models**
Samantha Paulsen[1], *Bagrat Grigoryan*[1], *and Jordan Miller*[1]
[1]Rice University, Houston, TX

4. **Using 3D Hydroxyapatite-Collagen Composite Scaffolds and Spatial-Temporal Variation to Promote Vascularized Bone Tissue Regeneration**
Rebekah Rodriguez[1], *U-Ter Aondo Jia*[2], *Sarah Stagg*[1], *Laura Gaviria*[1], *Joo L. Ong*[1,2], *and Teja Guda*[1,2]
[1]Joint Graduate Program in Biomedical Engineering, University of Texas at San Antonio/ University of Texas Health Science Center at San Antonio, San Antonio, TX
[2]Department of Biomedical Engineering, The University of Texas at San Antonio, San Antonio, TX

5. **Connectosomes for Direct Cytoplasmic Drug Delivery**
Avinash K. Gadok[1], David J. Busch[1], Brian Li, Silvia Ferrati[1], Hugh D. C. Smyth[1], Jeanne C. Stachowiak[1]
[1]The University of Texas at Austin, Austin, TX

6. **Multi-Functional Transmembrane Protein Ligands for Cell-Specific Targeting of Plasma Membrane-Derived Vesicles**
Chi Zhao[1], *David J. Busch*[1], *Connor P. Vershel*[1] *and Jeanne C. Stachowiak*[1]
[1]University of Texas at Austin, Austin, TX

7. **Tethered Microparticles for BMP-2 Delivery from Collagen Coated Hydroxyapatite**

Scaffolds

Laura Gaviria[1], *Teja Guda*[1] *and Joo L. Ong*[1]

[1]Department of Biomedical Engineering, The University of Texas at San Antonio, San Antonio, TX

8. **Bioorthogonal Conjugation of Bioactive Proteins to Thiol-Ene Click Microgels**

Faraz Jivan[1] *and Daniel L. Alge*[1]

[1]Texas A&M University, College Station, TX

9. **Cardiac Differentiation of Reprogramed Amniotic Fluid Derived Stem Cells within a Multifunctional Fibrin/PEG Hydrogel for Congenital Heart Repair**

Christopher J.M. Tsao[1], *Laura Pandolfi*[2], *Ennio Tasciotti*[2] *and Jeffrey G. Jacot*[1,3]

[1]Rice University, Houston, TX

[2]Houston Methodist Research Institute, Houston, TX

[3]Texas Children's Hospital, Houston, TX

10. **Novel Nanocomposite to Detect Viability of Mesenchymal Stem Cells**

Kabir S. Dhada[1] *and Laura J. Suggs*[1]

[1]University of Texas at Austin, Austin, TX

11. **Engineered Tissues with Perfusable Vascular Networks Created by Sacrificial Tempting of Laser Sintered Carbohydrates**

Ian S. Kinstlinger[1], *David R. Yalacki*[1], *and Jordan S. Miller*[1]

[1]Department of Bioengineering, Rice University, Houston, TX

12. **Time-course of Matrix Stiffening Drives hMSC Differentiation *in vitro***

Shane C. Allen[1], *Alexis C. Antequera*[2], *and Laura J. Suggs*[1]

[1]Department of Biomedical Engineering, The University of Texas at Austin, Austin, TX

[2]Department of Chemical Engineering, The University of Texas at Austin, Austin, TX

13. **Photopolymerization of Microparticles into Porous Scaffolds for Tissue Engineering**

Shangjing Xin[1], *Omar M. Wyman*[1] *and Daniel L. Alge*[1]

[1]Texas A&M University, College Station, TX

14. **Effects of Antimicrobial Treatment on the Induction of an Osteogenic Membrane in an Infected Bone Defect**

Sarita R. Shah[1], *Brandon T. Smith*[1], *Alexander M. Tatara*[1], *Eric R. Molina*[1], *Esther J. Lee*[1], *Robert E. Guldberg*[2], *George N. Bennett*[3], *Joseph C. Wenke*[4], *and Antonios G. Mikos*[1]

[1]Department of Bioengineering, Rice University, Houston, TX
[2]Parker H. Petit Institute for Bioengineering and Bioscience, Georgia Institute of Technology, Atlanta, GA
[3]Department of BioSciences, Rice University, Houston, TX
[4]Extremity Trauma & Regenerative Medicine, U.S. Army Institute of Surgical Research, San Antonio, TX

15. **Bioactive Hydrogel Coatings to Promote Endothelialization of Vascular Grafts**
A. Post[1], *S. Cereceres[1], A. Kishan[1], M. Moczygemba[2], B. Russell[2], J. Rivera[2], M. Höök[2] and E. Cosgriff- Hernandez[1]*
[1]Biomedical Engineering, Texas A&M University, College Station, TX
[2]Institute of Biosciences and Technology, Texas A&M Health Science Center, Houston, TX

16. **Dynamic whole blood study of silicone modified with PEO-silane amphiphiles**
Mikayla E. Barry[1], *Marc A. Rufin[1] and Melissa A. Grunlan[1]*
[1]Department of Biomedical Engineering, Texas A&M University, College Station,TX

17. **Co-delivery of multiple therapeutic agents to liver cancer**
David Spencer[1], *D. Beckman[1], B. Luu[1] and Nicholas A. Peppas[1]*
[1]The University of Texas at Austin, Austin, TX

18. **Doxorubicin-Loaded Conductive Polymer Nanoparticles Designed for Laser-Induced Photothermal Therapy and Drug Delivery**
Janet K. Vela Ross[1], *Kyle Walsh[1], and Tania Betancourt[1]*
[1]Texas State University, San Marcos, TX

19. **Comparing Mechanical Properties of Silk-Coated and Collagen-Coated Hydroxyapatite Scaffolds for Subchondral Regeneration**
Diana Castillo[1], ***Victoria Vega[1]***, *Sergio Montelongo[1], Joseph Pearson[1], Joo L. Ong[1] and Teja Guda[1]*
[1]Joint Graduate Program in Biomedical Engineering, University of Texas at San Antonio/ University of Texas Health Science Center, San Antonio, TX

20. **Differential Protein Sensing Using Ionic Polymer Coated Gold Nanoshells**
Heidi R. Culver[1] *and Nicholas A. Peppas[1]*
[1]The University of Texas at Austin, Austin, TX

A Gold Nanoparticle-Based Transfection Agent to Direct Macrophage Polarization

Chelsea A Kraynak[1] *and Laura Suggs*[1]

[1]Department of Biomedical Engineering, The University of Texas at Austin, Austin, TX

21. **Ultrahigh-throughput generation and characterization of cellular aggregates in laser-ablated microwells of poly(dimethylsiloxane)**

Jacob L. Albritton[1]*, Jonathon D. Roybal*[2]*, Samantha J. Paulsen*[1]*, Nicholas J. Calafat*[1]*, Jose A. Flores-Zaher*[1]*, Mary C. Farach-Carson*[1,3]*, Don L. Gibbons*[2,4] *and Jordan S. Miller*[1]

[1]Department of Bioengineering, Rice University, Houston, TX

[2]Department of Thoracic/Head and Neck Medical Oncology, The University of Texas M. D. Anderson Cancer Center, Houston, TX

[3]Department of BioSciences, Rice University, Houston, TX

[4]Department of Molecular and Cellular Oncology, The University of Texas, MD Anderson Cancer Center, Houston, TX

22. **Study of characteristics of Fmoc-FRGD peptide hydrogel and its depsipeptide derivatives**

Kiheon Baek[1]*, Alexander David Noblett*[1] *and Laura J. Suggs*[1]

[1]Department of Biomedical Engineering, The University of Texas at Austin, Austin, TX

23. **Ultra-Strong, Thermoresponsive Double Network Membranes for Implanted Glucose Biosensors**

A. Kristen Means[1]*, Ruochong Fei*[1]*, Alexander A. Abraham*[1]*, Andrea K. Locke*[1]*, Gerard L. Coté*[1] *and Melissa A. Grunlan*[1]

[1]Texas A&M University, College Station, TX

24. **Mechanical Stimulation of Collagen-Fibrin Hydrogels for Skeletal Muscle Regeneration**

Sarah J. Stagg[1]*; Joo Ong*[1]*; Christopher Rathbone*[2] *and Teja Guda*[1]

[1]The University of Texas at San Antonio, TX

[2]Arteriocyte, Inc., Cleveland, OH

25. **Ligand Size Regulates Membrane Receptor Uptake within Cathrin-Coated Pits**

David J. Busch[1]*, Andre C.M. DeGroot*[1]*, Carl C. Hayden*[1,2] *and Jeanne C. Stachowiak*[1]

[1]The University of Texas at Austin, Austin, TX

[2]Sandia National Laboratories, Livermore, CA

26. **Protein Resistance of Silicones Modified with PEO-Silane Amphiphiles: The Role of PEO-Segment Length and Concentration**

Bryan Khai D. Ngo[1], *Marc A. Rufin*[1], *Mikayla E. Barry*[1], *Paige A. Adair*[1], *Melissa L. Hawkins*[1], *Shane J. Stafslien*[2], *and Melissa A. Grunlan*[1]
[1]Texas A&M University, College Station, TX
[2]North Dakota State University

27. **Tunable, "Self-fitting" Shape Memory Polymer Scaffolds for Cranial Bone Defect Repair**
Lindsay N. Woodard[1], *Vanessa M. Page*[1], *Kevin T. Kmetz*[1], *David Zhang*[1] *and Melissa A. Grunlan*[1]
[1]Texas A&M University, College Station, TX

28. **The 2 for 1 Silk Enthesis**
Joseph J. Pearson[1], *Paul Dowell*[1], *Joo L. Ong*[1] *and Teja Guda*[1]
[1]Department of Biomedical Engineering, The University of Texas at San Antonio, San Antonio, TX

29. **Development of a Tissue Engineered Periosteum for Bone Regeneration**
T. Walker[1], *A. Kishan*[1], *and Elizabeth Cosgriff-Hernandez*[1]
[1]Texas A&M University, College Station, TX

30. **3D Printing of Emulsion Inks with Thiol-ene Chemistry**
P. Dhavalikar[1], *N. Sears*[1], *and Elizabeth Cosgriff-Hernandez*[1]
[1]Texas A&M University, College Station, TX

31. **3D Printed Haversian Scaffolds for Critical Bone Trauma**
Brian Ruliffson[1] *and Mark R. Appleford*[1]
[1]Department of Biomedical Engineering, The University of Texas at San Antonio, San Antonio, TX

32. **Influence of Molecular Architecture in the Design and Development of a pH-Responsive Nanoscale Hydrogel Platform for Tumor-Targeted Drug Delivery**
Angela M. Wagner[1,2], *Alina Schroeder*[1], *and Nicholas A. Peppas*[1,2,3]
[1]The University of Texas at Austin, Austin, TX
[2]Institute for Biomaterials, Drug Delivery, and Regenerative Medicine, Austin, TX
[3]Dell Medical School, Austin, TX

33. **Optimizing the Surface Properties of Hydrogel Nanoparticles to Enable the Delivery of Therapeutic Agents for the Treatment of Ovarian Cancer**

Noor Al-Sayyad[1], *Angela Wagner*[1,2], *and Nicholas A. Peppas*[1,2,3]
[1]The University of Texas at Austin, Austin, TX
[2]Institute for Biomaterials, Drug Delivery, and Regenerative Medicine, Austin, TX
[3]Dell Medical School, Austin, TX

34. **Mechanically Stiff Nanocomposite Hydrogels at Ultralow Nanoparticle Content**
Manish K. Jaiswal[1], *Janet Xavier*[1], *James K. Carrow*[1], *Prachi Desai*[1], *Daniel Alge*[1] *and Akhilesh K. Gaharwar*[1]
[1]Department of Biomedical Engineering, Texas A&M University, College Station, TX

35. **Multicomponent Nanocomposite-Interpenetrating Network Hydrogel Bio-inks for 3D Bio-printing**
D Chimene[1], *N Sears*[1], *G Cardoso*[1], *J Carrow*[1], *C Peak*[1], *R Kaunas*[1] *and Akhilesh K. Gaharwar*[1]
[1]Department of Biomedical Engineering, Texas A&M University, College Station, TX

36. **Gelation of Bio-polymers by Active-Center Rich Hierarchical Nano-assemblies (ACRiHN) of 2D-Transition Metal Dichalcogenides**
James Gentry[1], ***Manish K. Jaiswal***[1], *Nara Altangerel*[2], *Marlan Scully*[2] *and Akhilesh Gaharwar*[1]
[1]Department of Biomedical Engineering, Texas A&M University, College Station, TX
[2]Department of Physics, Texas A&M University, College Station, TX

37. ***In vivo*** **regenerative response enhanced in critical size bone defects using High Performance Micro Environments**
Sergio Montelongo[1], *Joseph Pearson*[1], *Sarah Jennings*[1], *Laura Gaviria*[1], *Rogelio Zamilpa*[2], *Sy Griffey*[2] *and Teja Guda*[1]
[1]The University of Texas at San Antonio, San Antonio, TX
[2]StemBioSys Inc., San Antonio, TX

38. **Polypyrrole coated Polyvinylidene fluoride aligned electrospun fibers for biomedical applications**
Solaleh Miar[1] *and Teja Guda*[1]
[1]Graduate Program in Biomedical Engineering, University of Texas Health Science Center at San Antonio, San Antonio, TX

39. **PNIPMAAm Copolymer Hydrogels for Externally Triggered Drug Delivery**
Jinna Chu[1], *Jonathan Peters*[1] *and Nicholas A. Peppas*[1]

[1]The University of Texas at Austin, Austin, TX

SPONSORS

Society for Biomaterials

Mission - The Society For Biomaterials is a multidisciplinary society of academic, healthcare, governmental and business professionals dedicated to promoting advancements in all aspects of biomaterial science, education and professional standards to enhance human health and quality of life. Vision - The Vision of the Society for Biomaterials is to serve as the world's preeminent interactive global community committed to advancing excellence in all aspects of biomaterial science, engineering and technology for promoting human health and well-being.

Malvern

Malvern's materials and biophysical characterization technology and expertise enables scientists and engineers to investigate, understand and control the properties of dispersed systems. Used in research, development and manufacturing, Malvern's instruments provide critical information that helps accelerate research and product development, enhance and maintain product quality and optimize process efficiency.

SouthWest Research Institute

Southwest Research Institute® (SwRI®) is one of the oldest and largest independent, nonprofit, applied R&D organizations in the United States. SwRI provides industry and government with a variety of technical services tailored to meet customer needs. SwRI's technical services include advanced material development and characterization, nanomaterial and pharmaceutical synthesis, surface coating and modification, biomaterial and tissue regeneration, microencapsulation for controlled release, and medical device design, prototyping, and testing under a certified medical quality system.

TA Instruments

TA Instruments, the world leader in thermal analysis, rheology, and microcalorimetry instruments, offers TA ElectroForce materials test instruments which are ideally suited for characterizing the mechanical properties of biomaterials, tissues, and medical devices. ElectroForce test instruments are available in a range of force capacities and can be configured with a variety of accessories including environmental chambers, an assortment of grips and fixtures, as well as secondary actuators such as torsion or extended stroke. Our BioDynamic bioreactor series combines mechanical stimulation with a sterile environment to support tissue engineering of three-dimensional tissue constructs.