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Texas Children's Hospital, a not-for-profit health care organization, is committed to creating a healthier future for children and women throughout the global community by leading in patient care, education and research. Consistently ranked as the best children's hospital in Texas, and among the top in the nation, Texas Children's has garnered widespread recognition for its expertise and breakthroughs in pediatric and women's health. The organization created the nation's first HMO for children, has the largest pediatric primary care network in the country and a global health program that's channeling care to children and women all over the world. Texas Children's Hospital is affiliated with Baylor College of Medicine. For more information, go to www.texaschildrens.org.

The Society for Biomaterials Presents

Biomaterials Day Rice University

Monday, June 1, 2015
9:00 am - 7:00 pm

Rice University
BioScience Research Collaborative
Auditorium



Biomaterials Day Program

Morning Session

9:00-10:00 am **Breakfast and Symposium Registration**
Prefunction Space

10:00-10:15 **Opening Remarks, Jeffrey Jacot**
Rice University

10:15-11:00 **Keynote Speaker, Kristi Anseth**
University of Colorado, Boulder

Engineering hydrogel matrices: from tissue engineering to 4-D cell biology

11:00-11:40 **Invited Speakers**

11:00-11:20 **William Cohn, Texas Heart Institute**
The evolving role of additive manufacturing in the prototyping of complex medical devices

11:20-11:40 **Gang Bao, Rice University**
Engineering imaging probes and molecular machines for nanomedicine

11:40-12:00 pm **Student Rapid Fires I**

Charles Peak, Abstract No. 37
Joseph Pearson, Abstract No. 38
Sarah Stagg, Abstract No. 49
John Clegg, Abstract No. 16
Yang Gao, Abstract No. 19

Afternoon Session

12:00-1:00 **Luncheon**

1:00-1:40 **Student Poster Competition I, Prefunction Space**

1:40-2:40 **Invited Speakers**

1:40-2:00 **Tania Betancourt, Texas State University**
Polymer-enabled nanomedicine: engineering nanostructures for diagnostic and therapeutic applications

Rice University

A top-ranked bioengineering program

The Rice University Department of Bioengineering is a top-tier teaching and research program with a faculty committed to excellence in education and interdisciplinary, basic and translational research. Both our graduate and undergraduate programs are consistently ranked among the nation's top 10 bioengineering programs.

Key to our success as an international leader in bioengineering is capitalizing on Rice's location, which promotes the development of long-term strategic partnerships with experts in industry and academic and government institutions.

Rice is situated in the midst of one of the largest, most diverse cities in the nation. Our neighbors include the Texas Medical Center (TMC) and its member institutions. The TMC, which is the largest medical center in the world, is where much of Houston's biotechnology industry is focused, and provides unlimited opportunities to expand our global reach and build unparalleled teaching and research programs that solve a broad spectrum of complex problems in science and medicine.

The BioScience Research Collaborative

The BioScience Research Collaborative (BRC) is an innovative space where scientists and educators from Rice University and other Texas Medical Center institutions work together to perform leading research that benefits human medicine and health. More than just a building, it is an interdisciplinary, interinstitutional catalyst for new and better ways to collaborate, explore, learn and lead.



Student volunteers

Coordinator

Yang Gao, Ph.D. Candidate

Pediatric Cardiovascular Bioengineering Lab
Jeffrey Jacot, Adviser

Volunteers

Bagrat Grigoryan, Ph.D. Candidate

Miller Lab
Jordan Miller, Adviser

Samantha Paulsen, Ph.D. Candidate

Miller Lab
Jordan Miller, Adviser

Chris Tsao, Ph.D. Candidate

Pediatric Cardiovascular Bioengineering Lab
Jeffrey Jacot, Adviser

Biomaterials Day Program

Afternoon Session

2:00-2:20

Matteo Pasquali, Rice University

Biomedical applications of carbon nanotube fibers

2:20-2:40

Ennio Tasciotti, Houston Methodist Hospital

Biomimetic nanomaterials to overcome biological barriers in drug delivery and tissue engineering

2:40-3:00

Student Rapid Fires II

Johnny Lam, Abstract No. 28
Anna Means, Abstract No. 30
Ramanathan Yegappan, Abstract No. 7
Hojin Kim, Abstract No. 3
Rebekah Rodriguez, Abstract No. 8

3:00-3:40

Coffee Break and Student Poster Competition II

3:40-5:00

Invited Speakers

3:40-4:00

Kytai Nguyen, University of Texas at Arlington

Nanoscaffolds for drug delivery and vascular tissue engineering applications

4:00-4:20

Stefanie Biechler, Bose Corporation

Design of an MRI-compatible bioreactor for mechanical stimulation and non-invasive imaging

4:20-4:40

Chong Xie, University of Texas at Austin

Towards minimally invasive neural probes

4:40-5:00

Sergey Shevkopyas, University of Houston

Rapid, low-cost, paper-based assay for diagnosis of sickle cell disease

5:00-7:00

Awards Reception

Society for Biomaterials

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.



In 1969, a number of researchers in the biomaterials field initiated a series of International Biomaterials Symposia concentrating predominantly on materials for reconstructive surgery. As these symposia became increasingly popular, the idea to establish a dedicated biomaterials organization germinated. The Society For Biomaterials (SFB) was formally established in April, 1974.

About Biomaterials Day

Biomaterials Day, funded by the Society for Biomaterials (SFB), is a one day symposium at six different locations throughout the United States.

Biomaterials Day at Rice University will enhance networking between academic, industrial and government sectors and will increase student exposure to exciting biomaterials research.

SFB members and non-members as well as students throughout the area interested in the biomaterials field attend the event.

The Rice symposium will include keynote and invited lectures by leading engineers, physicians, and scientists in the field. Oral presentations from both academic and industrial researchers will showcase ongoing research in the region and promote collaboration and knowledge exchange between institutions and industry. Finally, abstracts will be solicited for a poster session that will provide a venue for student research presentations and networking. Awards will be given for best poster.

SFB officially initiated the Biomaterials Day program in 2008 to highlight cutting-edge research and increase student interest in biomaterials careers.

Event Organizers

Jeffrey Jacot, Ph.D., is the director of the Pediatric Cardiac Bioengineering Laboratory at Texas Children's Hospital and is an associate professor of bioengineering at Rice University. He works conjunction with collaborators to 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.



Elizabeth Cosgriff-Hernandez, Ph.D., is an 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. Her research interests include biomaterial synthesis, structure-property relationships, cell-material interactions, musculoskeletal tissue engineering and biodegradation characterization.



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. Her research is focused on developing new materials for medical devices and regenerative therapies, including: self-cleaning membranes for implanted biosensors, anti-fouling coatings and scaffolds for osteochondral and bone tissue healing.



Teja Guda, Ph.D., 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. His research focuses on developing biomaterials based synthetic grafts for orthopedic tissues, cell encapsulation platforms and biophysical conditioning for tissue regeneration.



Laura Suggs, Ph.D., is an associate professor at the University of Texas, Austin. Her research program is in the area of biologically active materials and their use and behavior in cardiovascular tissue engineering and cancer research. She works to better understand molecular and cellular mechanisms during processes such as vasculogenesis and tumor cell invasion as well as the structure of both natural and synthetic polymers and their effect on living tissues.



Graduate Abstracts

57. Long-Term Safety and Stability of Carbon Nanotube Fiber as Active Interfaces with Excitable Tissues

Jiayi Stephen Yan^{1,2}, Flavia Vitale², and Matteo Pasquali^{2,3}

¹Department of Bioengineering, Rice University; ²Department of Chemical and Biomolecular Engineering, Rice University; ³Department of Chemistry, Department of Material Science & NanoEngineering, The Smalley Institute for Nanoscale Science & Technology, Rice University, Houston, TX

58. Antifouling Silicones Prepared with PEO-Silane Amphiphiles

Melissa L. Hawkins¹, Samantha M. Schott¹, Bagrat Grigoryan¹, Marc A. Rufin¹, Elizabeth S. Raymond², Jeffery E. Raymond³, Melissa A. Grunlan^{1,4}
Texas A&M University, ¹Department of Biomedical Engineering, ²Department of Neuroscience and Experimental Therapeutics, ³Department of Chemistry, Laboratory for Synthetic-Biologic Interactions, ⁴Department of Materials Science and Engineering, College Station, TX

59. Peptide Stereochemistry as an Emerging Design Tool for Self-Assembling Biomaterials

Alexey Y. Koyfman¹, Rajagopal Appavu¹, Samantha M. Sheller², Joshua D. Snook¹, Mark A. White², and Jai S. Rudra¹

¹Department of Pharmacology and Toxicology, ²Department of Biochemistry and Molecular Biology, University of Texas Medical Branch, Galveston, TX

60. Engineered RNA Nanorings for Efficient Delivery of siRNA

Alexey Koyfman¹, Kirill Afonin², Angelica Martins², Eric Freed², Wah Chiu³, Jai Rudra¹, and Bruce Shapiro²

¹Department of Pharmacology and Toxicology, University of Texas Medical Branch, Galveston TX; ²National Cancer Institute, Frederick, MD; ³Department of Biochemistry and Molecular Biology, Baylor College of Medicine, Houston, TX

61. Mimicking the Human Trabecular Bone Niche for Bone Augmentation and Spinal Fusion

Silvia Minardi^{1,2}, Bruna Corradetti¹, Francesca Taraballi¹, Fernando J. Cabrera¹, Jeffrey Van Eps¹, Anna Tampieri², Bradley K. Weiner¹, Ennio Tasciotti¹

¹Center for Regenerative Medicine, Houston Methodist Research Institute, Houston, TX; ²Department of Life and Environmental Sciences, Università Politecnica delle Marche, Ancona, Italy

62. Solvent-free Fabrication of Polyhipe Microspheres for Controlled Release of Growth Factors

Michael Whitely; Robert Moglia; Megan Brooks; Jennifer Robinson; Michael Pishko and Elizabeth Cosgriff-Hernandez*

*Texas A&M University, College Station, TX

63. Degradation of Thermoset Shape Memory Polyurethanes and Foams

Andrew C Weems, Duncan J Maitland

Dept. Biomedical Engineering, Texas A&M University, College Station, USA

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Keynote Speaker

Kristi S. Anseth, Ph.D.

Distinguished Professor,
Tisone Professor,
Associate Professor of Surgery,
HHMI Investigator
University of Colorado, Boulder



Kristi Anseth earned her B.S. degree from Purdue University in 1992 and her Ph.D. degree from the University of Colorado in 1994. She then conducted post-doctoral research at MIT as an NIH fellow and subsequently joined the Department of Chemical and Biological Engineering at the University of Colorado at Boulder as an assistant professor in 1996.

Anseth is presently a Howard Hughes Medical Institute Investigator and distinguished professor of chemical and biological engineering. Her research interests lie at the interface between biology and engineering where she designs new biomaterials for applications in drug delivery and regenerative medicine.

Anseth's research group has published more than 200 publications in peer-reviewed journals and presented over 180 invited lectures in the fields of biomaterials and tissue engineering. She was the first engineer to be named a Howard Hughes Medical Institute investigator and received the Alan T. Waterman Award, the highest award of the National Science Foundation for demonstrated exceptional individual achievement in scientific or engineering research.

In 2009, she was elected a member of the National Academy of Engineering and the Institute of Medicine. Anseth is also a dedicated teacher, who has received four university awards related to her teaching, as well as the American Society for Engineering Education's Curtis W. McGraw Award.

Anseth is a fellow of the American Association for the Advancement of Science and the American Institute for Medical and Biological Engineering. She serves on the editorial boards or as associate editor of Biomacromolecules; Journal of Biomedical Materials Research, Part A; Acta Biomaterialia; Progress in Materials Science; and Biotechnology & Bioengineering.

Invited Speakers



Gang Bao, Ph.D. is the Foyt Family Professor of Bioengineering at Rice University. The nanoscale structures and devices engineered in his lab have applications in basic biological research toward the understanding of underlying causes of disease, as well as in the translation of nano-scale tools for disease diagnostics and treatment, such as targeted drug/gene and cell-based therapies. He has a B.S. in mechanical engineering from Shandong University and a Ph.D. applied mathematics from Lehigh University.



Tania Betancourt, Ph.D. is an assistant professor of chemistry and biochemistry at Texas State University. She has a B.S. in chemical engineering from Texas A&M University, and an M.S. and Ph.D. in biomedical engineering from the University of Texas, Austin. Her research focuses on the development of functional polymeric nanostructures that can act as contrast agents for bioimaging, targeted and intracellular drug delivery systems, and externally controlled therapeutics.



Stefanie Biechler, Ph.D., is a senior applications engineer in the ElectroForce Systems Group at Bose Corporation. She works in the design of bioreactors for regenerative medicine applications as well as in improving methods for the characterization of tissues and biomaterials. She has a B.S. in chemical engineering and a Ph.D. in biomedical engineering from the University of South Carolina.



William E. Cohn, M.D., FACS, FACCP, FAHA, is a cardiovascular surgeon and director of Minimally Invasive Surgical Technology at the Texas Heart Institute at St. Luke's Episcopal Hospital. He is co-director of the Cullen Cardiovascular Research Laboratory, associate professor of surgery at Baylor College of Medicine and adjunct professor of bioengineering at the University of Houston. Dr. Cohn is one of the leaders of the team of experts developing a total artificial heart that will deliver blood by means of continuous flow rather than pulsation. He has a B.S. from Oberlin College and an M.D. from Baylor.

Graduate Abstracts

50. Design and development of pH-responsive hydrogel systems for the oral delivery of therapeutic proteins

Stephanie Steichen¹, Colleen O'Connor¹, and Nicholas A. Peppas^{1,2,3}

¹Department of Biomedical Engineering, ²McKetta Department of Chemical Engineering and ³College of Pharmacy, The University of TX at Austin, Austin, TX

51. Elastomer/Gelatin Composite Membranes for Treatment of Cutaneous Mold Infection

Alexander M. Tatar¹, Nathaniel D. Albert², Sarita R. Shah¹, Dimitrios P. Kontoyannis², and Antonios G. Mikos¹.

¹Department of Bioengineering, Rice University, Houston, TX

²Department of Infectious Diseases, the University of TX MD Anderson Cancer Center, Houston, TX

52. Synthesis and Characterization of Biodegradable Polyurethane-ureas as Biomaterials for Soft Tissue Applications

Tyler Touchet, Alysha Kishan, Renee Calderon, and Elizabeth Cosgriff-Hernandez, PhD

Department of Biomedical Engineering, TX A&M University, College Station, TX

53. Reprogramming and Cardiac Differentiation of Amniotic Fluid Derived Stem Cells for the Repair of Congenital Heart Defects

Christopher J.M. Tsao¹, Aaron J. Velasquez-Mao¹, Jeffrey G. Jacot^{1,2}

¹Department of Bioengineering, Rice University, ²Congenital Heart Surgery Service, TX Children's Hospital

54. In Vitro and In Vivo Mineralization and Osteogenesis of Injectable Stem Cell Laden Hydrogels

Vo, Tiffany N¹, Roh, Terrence T¹, Shah, Sarita R¹, Lu, Steven¹, Lee, Esther J¹, Tatar, Alexander M¹, Mikos, Antonios G¹

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

55. Intravascular Canine Patent Ductus Arteriosus Closure Device

M.A. Wierzbicki¹, J. Bryant¹, M.W. Miller², and D.J. Maitland¹

¹Dept. Biomedical Engineering, TX A&M University

²Texas Institute for Preclinical Studies, TX A&M University, College Station, TX

56. Nanoparticle Delivery via Angioplasty Balloons for Treatment of Atherosclerosis

Roshni Iyer^{1,3}, Serkan Yaman^{1,3}, Aneetta E. Kuriakose^{1,3}, Lee-Chun Su¹, Hao Xu², Subhash Banerjee^{2,3}, Jian Yang⁴, Kytai T. Nguyen^{1,3}

¹University of TX at Arlington, Arlington TX; ²VA North TX Health Care System at Dallas, Dallas TX; ³University of TX Southwestern Medical Center at Dallas, Dallas TX; ⁴Pennsylvania State University, State College PA

Graduate Abstracts

43. Effect of Flow Conditions in a 3D Tumor Model Generated Using a Flow Perfusion Bioreactor

Marco Santoro^{1,2}, Salah-Eddine Lamhamedi-Cherradi², Brian A. Menegaz², Joseph A. Ludwig² and Antonios G. Mikos^{1,3}

¹Department of Chemical and Biomolecular Engineering, Rice University, Houston, TX; ²Department of Sarcoma Medical Oncology, The University of TX MD Anderson Cancer Center, Houston, TX; ³Department of Bioengineering, Rice University, Houston, TX

44. Solid Freeform Fabrication of High Porosity Foams

Nick Sears, M.S., Dhruv Seshadri, Michael Whitely, and Elizabeth Cosgriff-Hernandez, Ph.D.

Department of Biomedical Engineering, TX A&M University, College Station, TX

45. Cure-On-Dispense Printing of High Porosity Foams using Redox Initiation

Dhruv Seshadri, Nick Sears, and Elizabeth Cosgriff-Hernandez

Department of Biomedical Engineering, TX A&M University, College Station, TX

46. Clindamycin-releasing Porous Poly(methylmethacrylate) space maintainers for Prevention of Mandibular Infection

Shah SR¹, Tatara AM¹, Lam J¹, S. Lu¹, G. N. Bennett¹, van den Beucken JJJP², Jansen JA², Wong ME³, Mikos AG¹

¹Department of Bioengineering, Rice University, Houston, TX; ²Department of Biomaterials, Radboud University Medical Center, Nijmegen, The Netherlands;

³Department of Oral and Maxillofacial Surgery, University of TX Health Science Center at Houston, Houston, TX,

47. Encapsulation of Polyanhydride Nanoadjuvants in Biodegradable Microgels for Oral Delivery

Lindsey Sharpe¹, Olivia Mutaz-Haddadin², Jeyvikram Thirumavalavan¹, Yasmine Khairandish¹ and Nicholas A. Peppas^{1,2,3}

¹Department of Biomedical Engineering, ²Department of Chemical Engineering, and; ³Division of Pharmaceutics, University of TX at Austin, Austin, TX-78712-1062

48. Synthesis and Characterization of Cationic Nanogels for Enhanced Cancer Therapy

David S. Spencer¹, Bryan C. Luu¹, Nicholas A. Peppas¹⁻⁴

¹McKetta Department of Chemical Engineering, The University of TX at Austin;

²Department of Biomedical Engineering, The University of TX at Austin; ³Institute for Biomaterials, Drug Delivery and Regenerative Medicine, The University of TX at Austin; ⁴College of Pharmacy, The University of TX at Austin, Austin, TX

49. Interpenetrating Collagen-Fibrin Hydrogels for Skeletal Muscle Regeneration

Sarah J. Stagg¹; Beth E. Pollot^{1,2}; Christopher R Rathbone²; Anson Ong¹; Teja Guda^{1,2}

¹The University of TX at San Antonio, San Antonio, TX, ²US Army Institute of 14Surgical Research, Ft. Sam Houston, TX

Invited Speakers

Kytai T. Nguyen, Ph.D., is an associate professor of bioengineering and graduate advisor of bioengineering at the University of Texas at Arlington. She has a B.S. in chemical engineering from the University of Minnesota and a Ph.D. degree in chemical engineering from Rice University. Her research interests include biomaterials, drug delivery systems, cellular and tissue engineering.



Matteo Pasquali, Ph.D., is professor of chemical and biomolecular engineering, professor of chemistry, and chair of the Department of Chemistry at Rice. He has an M.Sci. in chemical engineering from the University of Bologna, Italy, and a Ph.D. in chemical engineering from the University of Minnesota. His research revolves around understanding the interaction of flow and liquid micro/nano-structure in complex fluids, with application to the processing of multifunctional materials, particularly those based on single-walled carbon nanotubes.



Sergey Shevkoplyas, Ph.D., is associate professor of biomedical engineering at the University of Houston. He has a B.S. and M.S. in applied mathematics and physics from the Moscow Institute of Physics & Technology, Russia, and a Ph.D. in biomedical engineering from Boston University. He develops high-throughput microfluidic devices and single-cell analysis tools for blood storage and transfusion of medicine. He is developing novel technologies for improved safety and efficacy of blood transfusions, particularly for resource-limited settings.



Ennio Tasciotti, Ph.D., is co-chair of the Department of Nano-medicine; scientist, Tissue Engineering & Regenerative Medicine Program; and director, Surgical Advanced Technology Laboratory at Houston Methodist Hospital Research Institute. He has an M.Sc. in biological sciences and an M.S. in molecular biology from the Scuola Normale Superiore Pisa, Italy, and a Ph.D. in molecular medicine from the Scuola Normale Superiore Pisa and the International Center for Biotechnology and Genetic Engineering in New Delhi, India.



Chong Xie, Ph.D., is an assistant professor of bioengineering at the University of Texas, Austin. He has a B.S. in applied physics from the University of Science and Technology of China, and a Ph.D. in materials science and engineering from Stanford University. His Ph.D. research with Professor Yi Cui and Professor Bianxiao Cui focused on nanostructured cellular probes. He did his postdoctoral work at Harvard University, with Professor Charles Lieber on nanoelectronic devices and brain probes.



Undergraduate Abstracts

1. Architectural Gradient Scaffolds for Subchondral Restoration

Diana Castillo¹, Sergio Montelongo¹, Teja Guda¹, Joo Ong¹
The University of TX at San Antonio, ¹Department of Biomedical Engineering

2. Select Choroidal Endothelial Cell Functions under Elevated Pressure and High Glucose Concentrations

K. A. Hamalainen, M. E. Wechsler, R. Bizios and M. A. Reilly
Department of Biomedical Engineering, The University of TX at San Antonio, San Antonio, TX

3. Liquid Crystal Elastomers as Active Substrates for Dynamic Cell Culture

Aditya Agrawal¹, Oluwatomiya Adetiba², Hojin Kim¹, Huiying Chen², Jeffrey G. Jacot^{2,3}, and Rafael Verduzco¹

¹Department of Chemical and Biomolecular Engineering, Rice University, Houston, TX; ²Department of Bioengineering, Rice University, Houston, TX; ³Division of Congenital Heart Surgery, TX Children's Hospital, Congenital Heart Surgery Services, Houston, TX

4. Characteristics and Properties of Silk Scaffolds

Joseph J. Pearson¹, Solaleh Miar¹, Teja Guda¹, PhD, and Joo L. Ong¹, PhD
¹Department of Biomedical Engineering, The University of TX at San Antonio, San Antonio, TX.

5. Achieving Tunable Degradation of PolyHIPE Bone Grafts

Hannah Pearce¹, Jenny Robinson¹, Tyler Touchet¹, Madison McEnergy¹, and E. Cosgriff-Hernandez¹
¹Biomedical Engineering, TX A&M University, College Station, TX

6. Electrochemically-Pre-adsorbed Collagen Promotes Adult Human Mesenchymal Stem Cell Adhesion on Optically Transparent Nanostructured Carbon Substrates

M. E. Wechsler¹, T. E. Benavidez², M. M. F. Farrer¹, R. Bizios¹, and C. D. Garcia²
Departments of ¹Biomedical Engineering and ²Chemistry, The University of TX at San Antonio, San Antonio, TX

7. Sequential Click Reactions for the Polymerization and Functionalization of Poly(ethylene glycol) Based Hydrogel Microparticles

Ramanathan Yegappan¹, Faraz Jivan¹, Akhilesh K. Gaharwar^{1,2}, Daniel L. Alge^{1,2}
¹Department of Biomedical Engineering, TX A&M University, College Station, TX
²Department of Materials Science and Engineering, TX A&M University, College Station, TX

8. Promoting Vascularized Bone Tissue Regeneration on Composite Scaffolds Using Spatial and Temporal Control

Rebekah Rodriguez¹; Laura Gaviria¹; Joo Ong, PhD¹; Teja Guda, PhD¹
¹Department of Biomedical Engineering, University of Texas at San Antonio

Graduate Abstracts

Elizabeth Hernandez³, Jer-Tsong Hsieh³, Liping Tang^{1,2}, Jiang Yang⁴, Kytai T. Nguyen^{1,2}

¹ Department of Bioengineering, University of TX at Arlington, Arlington, TX 76019; ²Department of Biomedical Engineering, ³Department of Urology, The University of TX Southwestern Medical Center, Dallas, TX, 75390; ⁴Bioengineering Department, The Pennsylvania State University, University Park, PA 16802

37. Microfiber Fabrication from Nanoparticle Polymeric Solutions for Cellular Encapsulation

C.W. Peak¹, J. Carrow¹, A. Thakur¹, A.K. Gaharwar¹
¹Texas A&M University, College Station, TX;

38. Torsional Evaluation of Collagen Coated Hydroxyapatite with Varying rhBMP-2 Dosages in an In Vivo Critical Sized Rabbit Radius Model

Joseph J. Pearson¹, Suyash Karajgar¹, Stephanie Shiels², Joseph Wenke², Teja Guda¹, PhD, and Joo L. Ong¹, PhD
¹The University of TX at San Antonio, San Antonio, TX
²US Army Institute of Surgical Research, Ft. Sam Houston, TX.

39. Surface Hydrolysis Mediated PEGylation of PNIPAAm Nanogels

Jonathan T. Peters^{1,4}, Nicholas A. Peppas^{1,2,3,4}
¹Department of Chemical Engineering, ²Department of Biomedical Engineering, ³College of Pharmacy, ⁴Institute of Biomaterials, Drug Delivery, and Regenerative Medicine, The University of TX at Austin, Austin, TX

40. Development of Suturable and Bioactive Hydrogels to Promote Endothelialization of Vascular Grafts

A.D. Post, S. Cereceres, A. Kishan, M.B. Browning, B. Russell, J. Rivera, M. Höök, E. Cosgriff-Hernandez
Biomedical Engineering, TX A&M University, College Station, TX
Institute for Biotechnology, Houston, TX

41. Hyaluronan Hydrogels as Biomimetic Spongiosa Layer for Tissue Engineered Heart Valves

Dan Puperi¹, Zoe Punske¹, Ronan O'Connell², Yan Wu³, Jennifer West³, Jane Grande-Allen¹
¹Rice University, Department of Bioengineering, Houston, TX
²Glasgow University, Department of Biomedical Engineering, Glasgow, UK
³Duke University, Department of Biomedical Engineering, Durham, NC

42. PEO-silane amphiphiles to prevent protein adsorption on silicone: Dependence on PEO-segment length and concentration

Marc A. Rufin,^a Mikayla E. Barry,^a Paige A. Adair,^a Melissa L. Hawkins,^a Jeffery E. Raymond,^b and Melissa A. Grunlana,^c
^aDepartment of Biomedical Engineering, ^bDepartment of Chemistry, ^cDepartment of Materials Science and Engineering, TX A&M University, College Station, TX

Graduate Abstracts

29. Osteochondral tissue repair using a bilayered hydrogel composite delivering spatially-guided dual growth factors

Lu S¹, Lam J1, Mikos AG1,

¹Department of Bioengineering, Rice University, Houston,

30. Self-cleaning, Mechanically Robust Membranes for Implanted Glucose Biosensors

Means, A. K.¹; Fei, R.²; Abraham, A. A.²; Coté, G. L.²; and Grunlan, M. A.^{1,2}

Department of Materials Science & Engineering¹, Department of Biomedical Engineering², TX A&M University, College Station, TX

31. Hydroxyapatite-Carbon nanotube (HA-CNT) composite scaffolds for bone tissue engineering

Sergio Montelongo¹, Alice Hsieh¹, and T. Guda¹, Anson Ong¹

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

32. Self-Fitting Shape Memory Polymer Scaffolds for Bone Defect Repair

Lindsay N. Nail¹, Dawei Zhang², Keri M. Peterson¹, Olivia J. George¹, Jessica L. Reinhard¹, Hanna R. Glidewell¹, Melissa A. Grunlan^{1,2}

Dept. of Biomedical Engineering¹, Dept. of Materials Science and Engineering², TX A&M University, College Station, TX

33. Synthesis and Applications of Antioxidant Carbon Nanomaterials

Lizanne G. Nilewski, William K. A. Sikkema, Dr. James M. Tour^{*}

Department of Chemistry, Rice University

34. Nanoparticles for gene therapy: an alternative treatment for hindlimb ischemia

Linda Noukeu^{1,2}, Subhash Banerjee^{2,3}, Liping Tang^{1,2}, Kytai T. Nguyen^{1,2}

¹Department of Bioengineering, University of TX at Arlington, Arlington, TX;

²Department of Biomedical Engineering, The University of TX Southwestern Medical Center, Dallas, TX; ³Division of Cardiology, VA North TX Health Care System at Dallas, Dallas, TX

35. Polymeric Nanoparticle-Based Enzymatically Activatable Near-Infrared Nanoprobes for Optical Detection of Cancer

Tugba Ozel¹, Sean White², Elaine Nguyen², Austin Moy², Nicholas Brenes³, Bernard Choi², and Tania Betancourt^{1,3,4}

¹Materials Science, Engineering and Commercialization Program, TX State University, TX; ²Beckman Laser Institute and Department of Biomedical Engineering, University of California-Irvine, CA; ³InnoSense LLC, Torrance, CA; ⁴Department of Chemistry and Biochemistry, TX State University, TX

36. Thermo-responsive, multimodal imaging enabled nanoparticles towards cancer therapy

Nikhil Pandey^{1,2}, Aniket S. Wadajkar^{1,2}, Jyothi U. Menon^{1,2}, Varsha Sundaresan^{1,2},

Graduate Abstracts

9. Dynamic increase in matrix stiffness promotes invasive tumor phenotype in vivo

Shane C. Allen¹, Nancy D. Ebel², Ryan S. Stowers³, Carla Van Den Berg⁴, and Laura J. Suggs¹

¹Department of Biomedical Engineering, The University of TX at Austin

²Institute of Cellular & Molecular Biology, College of Pharmacy, The University of TX at Austin, ³Department of Mechanical Engineering, Stanford University

⁴College of Pharmacy, The University of TX at Austin

10. A Versatile, Automated, Optical Cell Counting Approach for the Quantification of Multiple Adherent Cell Types

Vishwaratn Asthana¹, Adam Ferguson¹, Anantratn Asthana², Yuqi Tang¹, Pallavi Bugga¹, Allen Chen¹, Rebekah Drezek¹

¹Rice University, Houston, TX;

²University of California, Berkeley, Berkeley, California

11. Mechanical Characterization and DNA Quantification of Porcine SIS-ECM Scaffolds

Oluwadamilola Ayanlakin¹; Laura Gaviria¹; Anson Ong¹; Teja Guda¹

¹The University of TX at San Antonio, San Antonio, TX

12. Biodegradable DNA-Enabled Poly(ethylene glycol) Hydrogels Prepared by Copper-Free Click Chemistry

Karolyn Barker,¹ Shiva K. Rastogi,¹ William Brittain,¹ Tania Betancourt^{1,2,*}

¹Department of Chemistry and Biochemistry, TX State University

²Materials Science, Engineering, and Commercialization Program, TX State University

13. Conductive Polymer-Based Nanoparticles As Photothermal Therapy Agents: Synthesis and Characterization

Travis Cantu,¹ Kyle Walsh,² Sumeet Mishra,³ Joseph Tracy,³ Varun Pattani,⁴ James Tunnell,⁴ Jennifer Irvin,^{1,2} Tania Betancourt,^{1,2}

¹Materials Science, Engineering, and Commercialization Program, TX State University;

²Department of Chemistry and Biochemistry, TX State University;

³Department of Materials Science and Engineering, North Carolina State University;

⁴Department of Biomedical Engineering, The University of TX at Austin

14. Synthesis of Cobalt Crosslinked Albumin Nanoparticles and In Vitro Evaluation of Macropinocytic Uptake in Gastric Carcinoma Cells

Ronaldo J. Cavazos Jr., Clifford S. Morrison, Jana B. Lampe, Duong T. Nguyen, Alesha N. Harris, Brian K. McFarlin, and Robby A. Petros

University of North TX

Graduate Abstracts

15. Development of Chronic Wound Dressing Based on Collagen-Mimetic Proteins

Stacy Cereceres¹, Tyler Touchet¹, Mary Beth Browning², Clayton Smith¹, Jose Rivera², Magnus Höök², Canaan Whitfield-Cargile³, Brooke Russell², and Elizabeth Cosgriff-Hernandez¹
¹Department of Biomedical Engineering, TX A&M University, College Station, TX
²Institute for Bioscience and Technology, TX A&M Health Science Center, Houston, TX
³Department of Large Animal Clinical Sciences, TX A&M University, College Station, TX

16. Synthesis and Characterization of Smart Molecularly Imprinted Polymers, Using Structural Analogue Templates, for the Capture and Detection of Biomolecules

John R. Clegg^{1,4}, Heidi R. Culver^{1,4}, Justin Zhong², Afshan S. Irani¹ and Nicholas A. Peppas^{1,2,3,4}.
¹Department of Biomedical Engineering, ²McKetta Department of Chemical Engineering, ³College of Pharmacy ⁴Institute for Biomaterials, Drug Delivery, and Regenerative Medicine. University of TX at Austin, Austin TX

17. Understanding the importance of backbone hydrogen bonding in small peptide selfassembly and the RGD-integrin interaction: consequences for engineering degradable cell-adhesive biomaterials

Kevin M. Eckes, Kiheon Baek, Laura J. Suggs
Department of Biomedical Engineering, The University of TX at Austin, Austin, TX

18. Gap Junction Liposomes for Direct Therapeutic Delivery to the Cytoplasm

Avinash Gadok, Jeanne Stachowiak
Department of Biomedical Engineering, The University of TX at Austin, Austin, TX

19. Human pediatric cardiac cells exhibited high viability in 3D culture and limited expression of SSEA-4 and Isl1

Yang Gao¹, Jeffrey G. Jacot^{1,2}
¹Department of Bioengineering, Rice University, Houston, TX,
²Division of Congenital Heart Surgery, TX Children's Hospital, Houston, TX

20. Single growth factor release from PLA-based microparticles for recruitment and differentiation of osteoprogenitor cells

Laura Gaviria; Teja Guda, PhD; Joo L. Ong, PhD
The University of TX at San Antonio

21. Healing osteochondral defects of the knee: regenerative osteochondral plugs

Glidewell, H; Gacasan, E; Sehnert, R; Grunlan MA
Texas A&M University, Department of Biomedical Engineering, College Station, TX

Graduate Abstracts

22. Enhancing Bone Regeneration with Composite Microspheres that Reflect the Osteogenic Niche

Candice Haase¹, Colin Dodson¹, Chi-Heng Wu¹, Allison Rice-Ficht, Ph.D.², Carl Gregory, Ph.D.³, and Roland Kaunas, Ph.D.¹
¹Texas A&M University, College Station, TX, ²Texas A&M Health Science Center, College Station, TX, ³Texas A&M Health Science Center, Temple, TX

23. Opacification of shape memory polymer foams using tungsten nanoparticles for neurovascular embolic applications

Sayyeda M. Hasan¹, Garrett Harmon¹, Fang Zhou³, Jeffery E. Raymond², Tiffany P. Gustafson², Thomas S. Wilson⁴, Duncan J. Maitland¹
¹Texas A&M University Department of Biomedical Engineering, College Station, TX; ²Texas A&M University Laboratory for Synthetic-Biologic Interactions, Department of Chemistry, College Station, TX; ³University of Minnesota College of Science and Engineering, Minneapolis, MN; ⁴Lawrence Livermore National Laboratory, Livermore, CA

24. Optimizing Microcarrier Loading for Oral Durg Delivery Systems

Horava, S D¹; Liou, J²; Peppas, N A^{1, 2, 3}
¹Department of Chemical Engineering, ²Department of Biomedical Engineering, ³College of Pharmacy, The University of TX at Austin, Austin, TX

25. Multi-Drug Core-Shell Nanoparticles for Targeted Lung Cancer Dual Therapy

Jyothi U. Menon^{1,2}, Aneetta E. Kuriakose^{1,2}, Roshni Iyer^{1,2}, Elizabeth Hernandez², Leah Gandee², Shanrong Zhang², Masaya Takahashi², Zhang Zhang², Debabrata Saha², Kytai T. Nguyen^{1,2}
¹University of TX at Arlington, Arlington, TX 76019
²The University of TX Southwestern Medical Center, Dallas, TX

26. Skeletal Fracture Risk Following Local Bone Injury

Suyash Karajgar¹; Marcello Pilia²; Christopher Rathbone²; Teja Guda¹
¹University of TX at San Antonio, San Antonio, TX, ²US Army Institute of Surgical Research, Ft. Sam Houston, TX.

27. Multi-functional Meshes to Prevent Intestinal Anastomotic Leakage and Surgical Adhesions

A. Kishan¹, T. Touchet¹, C. Whitfield², N. Cohen², E. Cosgriff-Hernandez¹
¹ Biomedical Engineering, ² College of Veterinary Medicine, TX A&M University, College Station, TX

28. Evaluation Of Polyelectrolyte Hydrogels Incorporating Poly(L-Lysine) as a Stimulant Of Chondrogenic Differentiation For Cartilage Tissue Engineering

Johnny Lam, Elisa Clark, Esther J. Lee, Eliza L.S. Fong, Steven Lu, and Antonios G. Mikos
Department of Bioengineering, Rice University, Houston, TX