

Session 1

Saturday, May 1

TRAMATIC BRAIN INJURY 1

9:00-10:20 am

Room: Kim Lecture Hall Room 1110**Session Co-Chairs:****Thomas McGrath**

Indian Head Division, NSWC – Naval Surface Warfare Center

Balakumar Balachandran

Dept. of Mechanical Engineering, University of Maryland

9:00-9:20 am

Traumatic Brain Injury in Rats Caused by Blast-Induced Hyper-accelerationG. Fiskum¹, J. Hazelton¹, R. Gullapalli², and W.L. Fourney³¹ University of Maryland School of Medicine, Dept. of Anesthesiology and the Shock, Trauma, and Anesthesiology Research Center (STAR)² University of Maryland School of Medicine Dept. of Diagnostic Radiology³ University of Maryland School of Engineering, Dept. of Mechanical Engineering and the Center of Energetics Concepts Development

9:20-9:40 am

Early Metabolic and Structural Changes in the Rat Brain following Trauma In Vivo using MRIS. Xu^{1,3}, J. Zhuo^{1,3}, J. Racz², S. Roys^{1,3}, D. Shi^{1,3}, G. Fiskum^{2,3}, R. Gullapalli^{1,3}¹Department of Diagnostic Radiology and Nuclear Medicine²Department of Anesthesiology and the Center for Shock Trauma and Anesthesiology Research (STAR)³Core for Translational Research in Imaging, Maryland University of Maryland School of Medicine, Baltimore, MD 21201, USA

9:40-10:00 am

Principal Components of Brain Deformation in Response to Skull Acceleration: The Roles of Sliding and Tethering Between the Brain and SkullTeresa M. Abney¹, Y. Aaron Feng¹, Robert Pless², Ruth J. Okamoto¹, Guy M. Genin¹, and Philip V. Bayly^{1,3}¹Dept of Mechanical, Aerospace and Structural Engineering, ²Dept of Computer Science and Engineering, and ³Dept of Biomedical Engineering, Washington University in St. Louis, Saint Louis, USA

10:00-10:20 am

Investigations into Wave Propagation in Soft Tissue

M. F. Valdez and B. Balachandran

Department of Mechanical Engineering, University of Maryland, College Park, MD 20742

*student paper

underline denotes presenting author

Session 2

Saturday, May 1

Auditory Science

9:00-10:20 am

Room: Kay Board Kim Room 1111

Session Co-Chairs:

Didier A Depireux

Institute for Systems Research, University of Maryland, College Park, MD

Monita Chatterjee

Dept. of Hearing and Speech Sciences, University of Maryland, College Park, MD

9:00-9:20 am

Hair Cell Regeneration in the Mammalian Ear, is Gene Therapy the Answer?

Matthew Kelley

Section on Developmental Neuroscience, National Institute on Deafness and other Communication Disorders, National Institutes of Health, Bethesda, Maryland

9:20-9:40 am

Magnetoencephalography and Auditory Neural Representations

J.Z. Simon^{1,2} and N. Ding¹

¹Dept of Electrical & Computer Engineering, University of Maryland, College Park MD 20815, USA

²Dept of Biology, University of Maryland, College Park MD 20815, USA

9:40-10:00 am

Voice Pitch Processing with Cochlear Implants

Monita Chatterjee¹, Shu-Chen Peng², Lauren Wawroski³ and Cherish Oberzut¹

¹Cochlear Implants and Psychophysics Lab, Dept. of Hearing and Speech Sciences, University of Maryland, College Park, MD, USA

²Division of Ophthalmic and Ear, Nose and Throat Devices, Office of Device Evaluation, Center for Devices and Radiologic Health, US Food and Draft Administration, Silver Spring, MD, USA

³Children's National Medical Center, Washington, DC, USA

10:00-10:20 am

Transcranial Magnetic Stimulation as a Tool for Investigating and Treating Tinnitus

G.F Wittenberg^{1,2}

¹Veterans Affairs Maryland Health Care System/Geriatrics Research, Education and Clinical Care, Baltimore, Maryland, USA

²Dept. of Neurology, University of Maryland, Baltimore, Maryland, USA

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Session 3

Saturday, May 1

BIOENGINEERING EDUCATION

9:00-10:20 am

Room: Kay Board Kim Room 1107

Session Co-Chairs:

Arthur T. Johnson

Fischell Department of Bioengineering, Univ. of Maryland

Eileen Haase

Dept. of Biomedical Engineering, Johns Hopkins Univ.

9:00-9:20 am

A Course Guideline for Biomedical Engineering Modeling and Design for Freshmen

W. C. Wong¹ and E. B. Haase¹

¹Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD

9:20-9:40 am

The Basics of Bioengineering Education

Arthur T. Johnson

Fischell Department of Bioengineering, College Park, MD 20742

*9:40-10:00
am

HealthiManage: An Individualized Prediction Algorithm for Type 2 Diabetes Chronic Disease Control

Salim Chemlal¹, Sheri Colberg¹, Marta Satin-Smith², Eric Gyuricsko², Tom Hubbard², Mark W. Scerbo¹, Frederic D. McKenzie¹

¹Old Dominion University, Norfolk, VA, USA

²Eastern Virginia Medical School, Norfolk, VA, USA

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Session 4

Saturday, May 1

CELLULAR ENGINEERING 1

9:00-10:20 am

Room: Pepco Seminar Kim Room 1105**Session Co-Chairs:****Dulciana Chan**

U.S. Food and Drug Administration

Deepa Sritharan

U.S. National Institute of Standards and Technology

*9:00-9:20 am

Myosin II is an Active Stress Sensor at the Core of a Cell Division Control SystemYee Seir Kee, Richard Firtel, Pablo Iglesias, Douglas Robinson

Department of Chemical and Biomolecular Engineering, Johns Hopkins University

9:20-9:40 am

Cooperative Interactions between Myosin II and Corticillin I Mediated by Actin Filaments during Cellular DeformationTianzhi Luo¹ and Douglas N. Robinson^{1,2,3}¹School of Medicine/Department of Cell Biology, Johns Hopkins University, Baltimore, USA²School of Medicine/Department of Pharmacology and Molecular Sciences, Johns Hopkins University, Baltimore, USA³School of Engineering/Department of Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, USA

*9:40-10:00 am

Conduction Properties of Cultured Neonatal Rat Ventricular Cardiac Myocytes in Response to Uniaxial Mechanical StressDulciana Chan, Felipe Aguel

US Food and Drug Administration, White Oak, MD

*10:00-10:20 am

A High-Throughput, Non-invasive Sensor to Measure Cellular Oxygen Consumption RatesDeepa Sritharan, Peter Thomas, Jane Romantseva, Zach Ewart, Samuel Forry

US National Institute of Standards and Technology

*student paper

underline denotes presenting author

Session 5

Saturday, May 1

NANOTECHNOLOGY 1

9:00-10:20 am

Room: Kim Building Room 2111

Session Co-Chairs:

Homer Nazeran

BioMedEng Consulting, El Paso, Texas, USA

A.J. McGoron

Biomedical Engineering Dept., Florida International University, Miami, FL

*9:00-9:20 am

Measuring In Vivo Effects of Chemotherapy Treatment on Cardiac Permeability

A. Fernandez-Fernandez¹, D.A. Carvajal¹ and A.J. McGoron¹

¹Biomedical Engineering Dept., Florida International University, Miami, FL

*9:20-9:40 am

Nanoscale “DNA baskets” for the Delivery of siRNA

A.C. Zirzow¹, M. Skoblov², A. Patanarut³, C. Smith⁴, A. Fisher⁴, V. Chandhoke¹, and A. Baranova^{1,2},

¹Department of Molecular and Microbiology, College of Science, George Mason University, Fairfax, USA, ²Research Center for Medical Genetics, RAMS, Moskvorechie Str., 1, Moscow, Russian Federation, ³Department of Chemistry and Biochemistry, College of Science, George Mason University, Fairfax, USA

⁴U.S. Army Engineer Research and Development Center-Geospatial Research and Engineering Division, Alexandria, USA

9:40-10:00 am

Nanoscale Glutathione Patches Improve Organ Function

Homer Nazeran¹ and Sherry Blake-Greenberg²

¹BioMedEng Consulting, El Paso, Texas, USA

²Health Integration Therapy, Palos Verdes Estates, California, USA

10:00-10:20 am

Nanoscale Carnosine Patches Improve Organ Function

Homer Nazeran¹ and Sherry Blake-Greenberg²

¹BioMedEng Consulting, El Paso, Texas, USA

²Health Integration Therapy, Palos Verdes Estates, California, USA

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Session 6

Saturday, May 2

Tissue Engineering 1

9:00-10:20 am

Room: Animal Sci. Bldg. Room 0408**Session Co-Chairs:****Warren Grayson**

Dept. of Biomedical Engineering, Johns Hopkins University

Kyobum Kim

Fischell Dept. of Bioengineering, Univ. of Maryland

***9:00-9:20 am Engineering Vascularized Human Bone Grafts**W.L. Grayson^{1,2}, M. Park¹, D. Kaplan³ and G. Vunjak-Novakovic¹¹Columbia University/Biomedical Engineering, New York, USA²Johns Hopkins University/Biomedical Engineering, Baltimore, USA³Tufts University/Biomedical Engineering, Medford, USA

9:20-9:40 am

Functional Surfaces to Control Vascular Differentiation and AssemblyLaura Dickinson¹, Matthew Moura¹, Chia Chi Ho¹, Geoffrey Wang¹, Kathleen Stebe², Sharon Gerecht¹¹Johns Hopkins University/Chemical & Biomolecular Engineering, Baltimore, USA²University of Pennsylvania/Chemical & Biomolecular Engineering, Philadelphia, USA

9:40-10:00 am

Cell Sheet Engineering of Small-diameter Blood Vessel from Aligned Human Mesenchymal Stem CellsFeng Zhao, Kam W. Leong

Duke University, Biomedical Engineering, Durham, USA

10:00–10:20am

Gum Arabic-chitosan Composite Biopolymer Scaffolds for Bone Tissue EngineeringR.A. Silva¹, P. Mehl², O. C. Wilson¹¹Biomedical Engineering Department, BONE/CRAB Lab, The Catholic University of America, Washington, DC, USA.²Vitreous State Laboratory, Physics Department, The Catholic University of America, Washington, DC, USA.

*student paper

underline denotes presenting author

Session 7

Saturday, May 1

DEVICES 1

9:00-10:20 am

Room: Animal Sci. Bldg. Room 0412**Session Co-Chairs:****Srilekha Sarkar Das**

Office of the Science and Engineering Laboratories, FDA, USA

Tamás Haidegger

Budapest University of Technology and Economics, Hungary

*

9:00-9:20 am

Non-invasive Estimation of Intracranial Pressure by Means of Retinal Venous PulsatilityS. Mojtaba Golzan, Stuart L Graham and Alberto Avolio

Australian School of Advanced Medicine, Macquarie University, Sydney, Australia

9:20-9:40 am

Apparatus for Quantitative Slit-Lamp Ocular FluorometryJosé P. Domingues^{1,2}, Isa Branco² and António M. Morgado^{1,2}¹IBILI – Biomedical Institute for Research on Light and Imaging, Coimbra Portugal²Physics Department, University of Coimbra, Portugal

9:40-10:00 am

Changes in Viscoelastic Properties of Latex Condoms Due to Personal LubricantsSrilekha Sarkar Das¹, Matthew Schwerin¹, Donna Walsh¹, Charles Tack², D. Coleman Richardson¹¹Office of the Science and Engineering Laboratories, Center for Devices and Radiological Health, Food and Drug Administration, ²Biomedical Engineering, Marquette University

*

10:00-10:20 am

Towards the Objective Evaluation of Hand DisinfectionÁkos Lehotsky, Melinda Nagy and Tamás Haidegger

Budapest University of Technology and Economics, Dept. of Control Engineering and Information Technology, Budapest, Hungary

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underline denotes presenting author

Session 8

Saturday, May 1

NEURAL SYSTEMS ENGINEERING

10:40am-12:00

Room: **Kim Lecture Hall Room 1110**

Session Chair:

N. Peixoto

Electrical and Computer Engineering Dept., George Mason University

* 10:40-11:00 am

In Vitro Models for Measuring Charge Storage Capacity

K.F. Zaidi³, Z.H. Benchekroun¹, S. Minnikanti¹, J. Pancrazio¹, and N. Peixoto^{1,2}

¹Electrical and Computer Engineering Dept. and

²Krasnow Institute for Advanced Study, George Mason University, Fairfax VA, USA

³A.James Clark School of Engineering, University of Maryland, College Park, MD

* 11:00-11:20 am

Discovery of Long-latency Somatosensory Evoked Potentials as a Marker of Cardiac Arrest Induced Brain Injury

Dan Wu, Jai Madhok, Young-Seok Choi, Xiaofeng Jia, Nitish V. Thakor

Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD 21029

* 11:20-11:40 am

Brain Electrical Stimulation Ethical and Safety Issues

Mulugeta Semework

State University of New York, Downstate Medical Center, Brooklyn, USA

* 11:40 am-12:00

In Vivo Characterization of Epileptic Tissue with Time-Dependent, Diffuse Reflectance Spectroscopy

Nitin Yadav¹, Sanghoon Oh^{1,2}, Sanjeev Bhatia², John Ragheb², Prasanna Jayakar², Michael Duchowny², Wei-Chiang Lin^{1,2}

¹Department of Biomedical Engineering, Florida International University, Miami, FL, USA

²The Brain Institute, Miami Children's Hospital, Miami, FL, USA

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10:40 am-12:00

Room: Kay Board Kim Room 1111**Session Co-Chairs:****Didier A Depireux**

Institute for Systems Research, U of Maryland, College Park, MD 21042

Monita Chatterjee

Dept. of Hearing and Speech Sciences, University of Maryland, College Park, MD

* 10:40-11:00 am **Modeling for the Impact of Anesthesia on Neural Activity in the Auditory System**

Z.B. Tan¹, L. Y. Wang¹, H. Wang², X.G. Zhang³, and J.S. Zhang^{3,4}

¹Dept. of Electrical and Computer Engineering, Wayne State University, Detroit, Michigan 48202, USA

²Dept. of Anesthesiology, Wayne State University, Detroit, Michigan 48202, USA

³Dept. of Otolaryngology, School of Medicine, Wayne State University, Detroit, Michigan 48201, USA

⁴Dept. of Communication Sci. and Dis, College of Liberal Arts and Sciences, Wayne State University, Detroit, Michigan 48202, USA

* 11:00-11:20 am **Cortical Excitability Changes after Repetitive Self-Regulated vs. Tracking Movements of the Hand**

S.B. Godfrey¹, P.S. Lum^{1,2}, C.N. Schabowsky¹, and M.L. Harris-Love²

¹The Catholic University of America, Washington, D.C., USA

²National Rehabilitation Hospital, Washington, D.C., USA

11:20-11:40 am

What the ENT wants in the OR: Bioengineering Prospects

D.A. Depireux, Ph.D.¹ and D.J. Eisenman, M.D.²

¹Institute for Systems Research, U of Maryland, College Park, MD 21042

²Department of Otorhinolaryngology-Head & Neck Surgery, U of Maryland, Baltimore, MD 21201

* 11:40 am-12:00

An In Vitro Biomechanical Comparison of Human Dermis to a Silicone Biosimulant Material

I.D. Wing^{1,2}, H.A. Conner¹, P.J. Biermann¹ and S.M. Belkoff^{2,3}

¹Johns Hopkins University / Applied Physics Laboratory, Laurel, MD, USA

²Johns Hopkins University / Dept. of Mechanical Engineering, Baltimore, MD, USA

³Johns Hopkins Medical Institutions / Dept. of Orthopaedic Surgery, Baltimore, MD, USA

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Session 10

Saturday, May 1

IMAGING 1

10:40 am -12:00

Room: Kay Board Kim Room 1107**Session Co-Chairs:****Yu Chen**

Fischell Dept. of Bioengineering, Univ. of Maryland

Raj Shekhar

Dept. of Diagnostic Radiation, University of Maryland at Baltimore

10:40-11:00 am

Targeted Delivery of Molecular Probes for In Vivo Electron**Paramagnetic Resonance Imaging**S.R. Burks^{1,2}, E.D. Barth³, S.S. Martin^{2,4}, G.M. Rosen^{1,5}, H.J. Halpern³, and J.P.Y. Kao^{1,2}¹Center for Biomedical Engineering and Technology, University of Maryland, and Medical Biotechnology Center, University of Maryland Biotechnology Institute, and Center for EPR Imaging In Vivo Physiology, University of Maryland, Baltimore, USA²Department of Physiology, University of Maryland, Baltimore, USA³Department of Radiation Oncology and Center for EPR Imaging In Vivo Physiology, University of Chicago, Chicago, USA⁴Marlene and Stewart Greenebaum Cancer Center, University of Maryland, Baltimore, USA⁵Department of Pharmaceutical Sciences, University of Maryland, Baltimore, USA

11:00-11:20 am

New Tools for Image-based Mesh Generation of 3D Imaging DataP. G. Young¹, D. Raymont¹, V. Bui Xuan², R.T. Cotton²¹School of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, UK²Software Development & Technical Services, Simpleware, Exeter, UK

11:20-11:40 am

Characterization of Speed and Accuracy of a Nonrigid Registration**Accelerator on Pre- and Intraprocedural Images**Raj Shekhar¹, William Plishker¹, Sheng Xu², Jochen Kruecker², Peng Lei¹, Aradhana Venkatesan³, Bradford Wood³¹Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland, Baltimore, Maryland, USA²Philips Research North America, Briarcliff Manor, New York, USA³Center for Interventional Oncology, Clinical Center and National Cancer Institute, National Institutes of Health, Bethesda, Maryland, USA

*11:40-12:00 am

Assessment of Kidney Structure and Function using GRIN Lens Based**Laparoscope with Optical Coherence Tomography**C.W. Chen¹, J. Wierwille², M. L. Onozato³, P. M. Andrews³, M. Phelan⁴, J. Borin⁴ and Y. Chen^{1,2}¹Department of Electrical and Computer Engineering²Fischell Department of Bioengineering, University of Maryland, College Park, MD 20742 USA³Georgetown University School of Medicine, Washington, DC 20007 USA⁴Department of Surgery, University of Maryland School of Medicine, Baltimore, MD 21201 USA

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Session 11

Saturday, May 1

KINEMATICS

10:40 am-12:00

Room: Pepco Seminar Kim Room 1105**Session Co-Chairs:****Elizabeth Brokaw**

National Rehabilitation Hospital, Washington, D.C.

James Borrelli

Dept of Mechanical Engineering, Univ. of Maryland

- * 10:40-11:00 am **Time Independent Functional Training of Inter-joint Arm Coordination Using the ARMin III Robot**
E. B. Brokaw^{1,2}, T. Nef^{1,2}, T. M. Murray^{1,2}, and P. S. Lum^{1,2}
¹Center for Applied Biomechanics and Rehabilitation Research, National Rehabilitation Hospital, Washington, D.C., U.S.A.
²Biomedical Engineering, The Catholic University of America, Washington D.C., U.S.A.
- * 11:00-11:20 am **Kinematic Analysis in Robot Assisted Femur Fracture Reduction: Fuzzy Logic Approach**
Wang Song¹, Chen Yonghua¹, YE Ruihua¹ and Yau WaiPan²
¹Department of Mechanical Engineering, The University of Hong Kong, Hong Kong, China
²Department of Orthopaedics and Traumatology, The University of Hong Kong, Hong Kong, China
- * 11:20-11:40 am **Compensation for Weak Hip Abductors in Gait Assisted by a Novel Crutch-Like Device**
J.R. Borrelli and H.W. Haslach Jr.
University of Maryland/Department of Mechanical Engineering, College Park, USA
- 11:40-12:00 am **A New Electromechanical Device for Minimization of the Knee Shear Joint Load in Leg Extension Equipment**
Giordano Franceschini, Francesco Mastrandrea, Vanessa Carnevali, Andrea Biscarini, Paolo Benvenuti
Industrial Engineering Department University of Perugia, Italy

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underline denotes presenting author

Session 12

Saturday, May 1

NANOTECHNOLOGY 2

10:40am-12:00

Room: Kim Building Room 2111**Session Chair:****Kimihiro Susumu**

U.S. Naval Research Laboratory

10:40-11:00 am

Multiple Lumiphore-Bound Nanoparticles for In Vivo Quantification of Localized Oxygen LevelsJ.L. Van Druff, W. Zhou, E. Asman, and J.B. Leach

University of Maryland, Baltimore County, Department of Chemical and Biochemical Engineering, 1000 Hilltop Circle, Baltimore, MD, USA

11:00-11:20 am

Modular Compact Ligands for Biocompatible Semiconductor Quantum Dots and Gold Nanoparticles with Extended pH and Ionic StabilityKimihiro Susumu, Eunkeu Oh, Michael H Stewart, Kelly Boeneman, Duane E Prasuhn, James B Delehanty, Igor L Medintz, Alan L Huston

U.S. Naval Research Laboratory

11:20-11:40 am

Ion-Mobility Characterization of Functionalized and Aggregated Gold nanoparticles for Drug DeliveryD-H. Tsai^{1,2}, L.F. Pease III^{2,3}, R. A. Zangmeister², S. Guha^{1,2}, M. J. Tarlov², and M.R. Zachariah^{1,2}¹University of Maryland, College Park, Maryland, U.S.²National Institute of Standards and Technology, Gaithersburg, Maryland, U.S.³University of Utah, Salt Lake City, Utah, U.S.

*11:40 am-12:00

Cell Specific Targeting of Lipid-based Nanoparticles for Enhanced Delivery of Therapeutic AgentsBrandon Smith, Kristin Loomis, Amichai Yavlovich, Alex Haber, Danielle Needle, Ilya Lyakhov, Jacek Capala, Yang Feng, Xiaodong Xiao, Dimiter Dimitrov, Robert Blumenthal, Anu Puri
NCI-Frederick, NIH

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Session 13

Saturday, May 1

BIOMATERIALS 2

10:40 am-12:00

Room: Animal Sci. Bldg. Room 0408**Session Co-Chairs:****Otto C. Wilson, Jr.**

Catholic University of America, Washington, DC

10:40-11:00 am

Mechanism and Direct Visualization of Electrodeposition of the Polysaccharide ChitosanYi Cheng¹, Xiaolong Luo², Jordan Betz^{1,3}, Omar Bekdash^{1,3}, and Gary W. Rubloff^{1,4}¹Institute for Systems Research (ISR), University of Maryland, College Park, MD²Center for Biosystems Research, Univ. of Maryland Biotechnology Institute, College Park,³Fischell Department of Bioengineering, University of Maryland, College Park, MD⁴Department of Materials Science and Engineering, University of Maryland, College Park, MD

* 11:00-11:20 am

Chito-Cotton: Chitosan Coated Cotton-Based ScaffoldO. Agubuzo¹, P. Mehl², O.C. Wilson¹ and R. Silva¹¹Department of Biomedical Engineering, Catholic University of America, Washington, DC²Department of Physics, Catholic University of America, Washington, DC

* 11:20-11:40 am

Effects of Temperature on the Performance of Footwear Foams: Review of Developments

M.R. Shariatmadari, R. English and G. Rothwell

Liverpool John Moores University, School of Engineering, Liverpool, UK

11:40 am-12:00

A Tissue Equivalent Phantom of the Human Torso for In Vivo Biocompatible CommunicationsDavid M. Peterson^{1, 2}, Walker Turner¹, Kevin Pham¹, Hong Yu¹, Rizwan Bashirullah¹, Neil Euliano² and Jeffery R. Fitzsimmons¹¹University of Florida, Gainesville, FL, USA²Convergent Engineering, Gainesville FL, USA

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Session 14

Saturday, May 1

IMPLANTS

10:40 am-12:00

Room: Animal Sci. Bldg. Room 0412**Session Co-Chairs:****Subrata Saha**

SUNY Downstate Medical Center, Brooklyn, New York

Geriel Ettienne-Modeste

University of Maryland – Baltimore County

10:40-11:00 am

Nano-Wear-Particulates Elicit a Size and Dose Dependent Response by RAW 264.7 Murine Monocyte/Macrophage CellsMrinal K. Musib, Subrata Saha

Department of Orthopedic Surgery and Rehabilitation Medicine, SUNY Downstate Medical Center, Brooklyn, New York 11203

*11:00-11:20 am

Viscous Behavior of Different Concentrations of Bovine Calf Serum Before and after Wear TestingGeriel Ettienne-Modeste

University of Maryland – Baltimore County

*11:20-11:40 am

Progressive Wear Damage Analysis on Retrieved UHMWPE Tibial ImplantsN. Camacho, S.W. Stafford, and L. Trueba Jr.

Univ. of Texas at El Paso/Metallurgical and Materials Engineering Department, El Paso, TX

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Session 16

Saturday, May 1

TRAMATIC BRAIN INJURY 2

1:30-3:30 pm

Room: Kim Lecture Hall Room 1110**Session Co-Chairs:****Thomas McGrath**

Indian Head Division, NSWC – Naval Surface Warfare Center

Andrew Merkle

Johns Hopkins University APL

1:30-1:50 pm

Correlating Tissue Response with Anatomical Location of mTBI using a Human Head Finite Element Model under Simulated Blast ConditionsT.P. Harrigan¹, J.C. Roberts^{1,2}, E.E. Ward¹, and A.C. Merkle¹¹The Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland, USA²The Johns Hopkins University Department of Mechanical Engineering, Baltimore, MD, USA

1:50-2:10 pm

Human Surrogate Head Response to Dynamic Overpressure Loading in Protected and Unprotected ConditionsA.C. Merkle¹, I.D. Wing¹ and J.C. Roberts^{1,2}¹The Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland, USA²The Johns Hopkins University Department of Mechanical Engineering, Baltimore, MD, USA

*2:10-2:30 pm

Blast-induced Traumatic Brain Injury: Using a Shock Tube to Recreate a Battlefield Injury in the LaboratoryJ.B. Long¹, L. Tong¹, R.A. Bauman¹, J.L. Atkins¹, A.J. Januszkiewicz¹, C. Riccio¹, R. Gharavi¹, R. Shoge¹, S. Parks², D.V. Ritzel³, and T.B. Bentley¹¹Division of Brain Dysfunction and Blast Injury, Walter Reed Army Institute of Research,²Operations Research and Applications, Fredericksburg, VA 22408, USA³Dyn-FX Consulting Ltd., Amherstburg, Ontario, N9V 2T5 Canada

2:30-2:50 pm

Wave Propagation in the Human Brain and Skull Imaged In Vivo by MR ElastographyE.H. Clayton¹, G.M. Genin¹ and P.V. Bayly^{1,2}¹Washington University in St. Louis/Department of Mechanical, Aerospace and Structural Engineering, Saint Louis, USA²Washington University in St. Louis/Department of Biomedical Engineering, Saint Louis, USA

2:50-3:10 pm

Cavitation as a Possible Traumatic Brain Injury (TBI) Damage MechanismAndrew Wardlaw and Jack Goeller

Advanced Technology and Research Corporation, Columbia, MD., 21046, USA

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Session 17

Saturday, May 1

TISSUE ENGINEERING 2

1:30-3:30

Room: **Kay Board Kim Room 1111**

Session Co-Chairs:

Otto Wilson, Jr.

Catholic University of America

Sidney Sit

Biomedical Engineering Program, Louisiana Tech University, Ruston, Louisiana

* 1:30-1:50

Modification of Hydrogel Scaffolds for the Modulation of Corneal Epithelial Cell Responses

L.G. Reis, P. Pattekari and P.S. Sit

Biomedical Engineering Program, Louisiana Tech University, Ruston, Louisiana 71272, USA

* 1:50-2:10

Making of Functional Tissue Engineered Heart Valve

S.S. Patel and Y.S. Morsi

Biomechanics and Tissue Engineering Group, Faculty of Engineering and Industrial Sciences, Swinburne University of Technology, Hawthorn, Australia

2:10-2:30

Quantification of Adenine using Chitosan-mediated SERS Substrates

Xiaolong Luo, Gary Rubloff, William Bentley

Fischell Department of Bioengineering, University of Maryland, College Park, MD

* 2:30-2:50

Ties that Bind: Evaluation of Collagen I and α -chitin

Tiffany Omokanwaye and Otto Wilson, Jr.

Catholic University of America/Biomedical Engineering Department, Washington, D.C., USA

* 2:50-3:10

Chitosan/Poly (ϵ -caprolactone) Composite Hydrogel for Tissue Engineering Applications

Xia Zhong¹, Chengdong Ji¹, Sergei G. Kazarian², Andrew Ruys³, Fariba Dehghani¹

¹School of Chemical and Biomolecular Engineering, The University of Sydney, Sydney, Australia

²School of Chemical Engineering, Imperial College London, London, UK

³School of Aerospace, Mechanical & Mechatronic Engineering, The University of Sydney, Sydney, Australia

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Session 18

Saturday, May 1

DISEASE MODELING

1:30-3:30 pm

Room: Kay Board Kim Room 1107**Session Co-Chairs:****Binh Q. Tran**

The Catholic University of America, Washington, DC

Doron Levy

Dept. of Mathematics, University of Maryland

***1:30-1:50 pm Mathematical Modeling of Ebola Virus Dynamics as a Step towards Rational Vaccine Design**Sophia Banton, Zvi Roth and Mirjana Pavlovic

Florida Atlantic University/Electrical Engineering (Bioengineering), Boca Raton, USA

1:50-2:10 pm Respiratory Impedance Values in Adults are Relatively Insensitive to Mead Model Lung Compliance and Chest Wall Compliance ParametersBill Diong¹, Michael D. Goldman² and Homer Nazeran²¹Engineering, Texas Christian University, Fort Worth, TX, TX, U.S.A.²Electrical and Computer Engineering, University of Texas at El Paso, El Paso, TX, U.S.A.***2:10-2:30 pm A Systems Biology Model of Alzheimer's Disease incorporating Spatial-Temporal Distribution of Beta Amyloid**CR Kyrtos^{1,2} and JS Baras^{1,2,3}¹Fischell Department of Bioengineering, University of Maryland, College Park, MD, US²Institute for Systems Research, University of Maryland, College Park, MD, US³Department of Electrical Engineering, University of Maryland, College Park, MD, US***2:30-2:50 pm A Mathematical Model of the Primary T Cell Response with Contraction Governed by Adaptive Regulatory T Cells**S.N. Wilson¹, P. Lee² and D. Levy¹¹Mathematics Department and Center for Scientific Computing and Mathematical Modeling (CSCAMM),

University of Maryland, College Park, MD, USA

²Division of Hematology, Department of Medicine, Stanford University, Stanford, CA, USA***2:50-3:10 pm A Mathematical Model for Microenvironmental Control of Tumor Growth**A.R. Galante, D. Levy and C. Tomasetti

Department of Mathematics and Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD, USA

3:10-3:30 pm Assessing the Usability of Web-based Personal Health RecordsPedro Gonzales¹, Binh Q. Tran²¹Department of Electrical Engineering & Computer Science, ²Department of Biomedical Engineering

The Catholic University of America, Washington DC, USA

*student paper

underline denotes presenting author

Session 19

Saturday, May 1

DRUG DELIVERY

1:30-3:30 pm

Room: Pepco Seminar Kim Room 1105**Session Co-Chairs:****Anthony J. McGoron**

Florida International University, Miami, FL

Silvia Muro

Fischell Dept. of Bioengineering, Univ. of Maryland

*** 1:30-1:50 pm Targeted Delivery of Doxorubicin by PLGA Nanoparticles Increases Drug Uptake in Cancer Cell Lines**Tingjun Lei, Supriya Srinivasan, Yuan Tang, Romila Manchanda, Alicia Fernandez-Fernandez, Anthony J. McGoron

Biomedical Engineering Department, Florida International University, Miami, FL, United States

1:50-2:10 pm Cellular Uptake and Cytotoxicity of a Novel ICG-DOX-PLGA Dual Agent Polymer Nanoparticle Delivery SystemRomila Manchanda, Tingjun Lei, Yuan Tang, Alicia Fernandez-Fernandez, Anthony J. McGoron
Department of Biomedical Engineering, Florida International University, 10555 West Flagler Street, Miami FL 33174 USA*** 2:10-2:30 pm Electro spray – Differential Mobility Analysis (ES-DMA) for Characterization of Heat Induced Antibody Aggregates**Suvajyoti Guha^{1,2}, Joshua Wayment², Michael J. Tarlov², Michael R. Zachariah^{1,2}¹Mechanical Engineering Department, University of Maryland, College Park, Maryland, U.S.A²National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, U.S.A*** 2:30-2:50 pm Mechanisms of Poly(amido amine) Dendrimer Transepithelial Transport and Tight Junction Modulation in Caco-2 Cells**D.S. Goldberg¹, P.W. Swaan^{1,2} and H. Ghandehari^{1,3}¹Fischell Department of Bioengineering, University of Maryland, College Park, MD, USA²Center for Nanomedicine and Cellular Delivery, Department of Pharmaceutical Sciences, University of Maryland, Baltimore, MD, USA³Departments of Pharmaceutics and Pharmaceutical Chemistry & Bioengineering, Center for Nanomedicine, Salt Lake City, UT, USA**2:50-3:10 pm Absorbable Coatings: Structure and Drug Elution**S. Sarkar Das, M.K. McDermott, A.D. Lucas, T.E. Cargal, L. Patel, D.M. Saylor, D.V. Patwardhan

Food and Drug Administration, Center for Devices and Radiological Health, Office of Science and Engineering Laboratories, Silver Spring, Maryland, USA

Session 20

Saturday, May 1

SPECIAL TOPICS

1:30-3:30 pm

Room: Kim Building Room 2111**Session Chair:****Adam Hsieh**

Fischell Dept. of Bioengineering, University of Maryland

- *1:30-1:50 pm **Telemetric Epilepsy Monitoring and Seizures Aid**
K. Hameed, F. Azhar, I. Shahrukh, M. Muzammil, M. Aamair and D. Mujeeb
Sir Syed University of Engineering and Technology Dept of Biomedical Engineering, Karachi, Pakistan
- 1:50-2:10 pm **Biosensing with Semiconductor Quantum Dots**
Kelly Boeneman, James B. Delehanty, Duane E. Prasuhn, Kimihiro Susumu, Michael H. Stewart, Eunkeu Oh, Alan L. Huston, Igor L. Medintz
U.S. Naval Research Laboratory
- 2:10-2:30 pm **Relative Risk of Whiplash in Low-Velocity Collisions Due to Direction of Impact**
S. Kumar, R. Ferrari, and Y. Narayan
UNT-Health Science Center/PMI-OMM Dept., Ft. Worth, Texas
- *2:30-2:50 pm **Spike Detection for Integrated Circuits: Comparative Study**
A. Sarje and P. Abshire
ISR/Dept. of E & C.E., Univ. of Maryland, College Park, USA
- 2:50-3:10 pm **Effect of Ambient Humidity on the Electrical Conductance of a Titanium Oxide Coating being investigated for Potential use in Biosensors**
Jorge Torres, James Sweeney, Jose Barreto
Dept. of Bioengineering, Florida Gulf Coast University
- *3:10-3:30 pm **Brain Computer Interface in Cerebellar Ataxia**
G.I. Newman¹, S.H. Ying^{2,3}, Y.-S. Choi¹, H.-N. Kim⁵, A. Presacco¹, M.V. Kothare⁴, N.V. Thakor^{1,2}
¹Department of Biomedical Engineering, ²Department of Neurology, ³Ophthalmology, The Johns Hopkins University School of Medicine, USA, ⁴Chemical Engineering, Lehigh University, USA, ⁵Electronics and Electrical Engineering, Pusan National University, Korea

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Session 21

Saturday, May 1

IMAGING 2

1:30-3:30 pm

Room: Animal Sci. Bldg. Room 0408**Session Co-Chairs:****Jerry Wierwille**

Fishell Dept. of Bioengineering, Univ. of Maryland

Iacovos Kyprianou

U.S. Food and Drug Administration

- *1:30-1:50 pm **Reliability of Structural Equation Modeling of the Motor Cortex in Resting State Functional MRI**
T. Kavallappa¹, S. Roys¹, A. Roy², J. Greenspan¹, R. Gullapalli¹, and A. McMillan¹
¹University of Maryland School of Medicine, Department of Diagnostic Radiology & Nuclear Medicine, Baltimore, MD
²University of Maryland, Baltimore County, Department of Mathematics and Statistics, Catonsville, MD
- *1:50-2:10 pm **Quantitative Characterization of Radiofrequency Ablation Lesions in Tissue Using Optical Coherence Tomography**
J. Wierwille¹, A. McMillan³, R. Gullapalli³, J. Desai², and Y. Chen¹
¹Department of Bioengineering, ²Department of Mechanical Engineering; University of Maryland, College Park, USA
³Department of Radiology, University of Maryland, Baltimore, USA
- 2:10-2:30 pm **Clinically Relevant Hand Held Two Lead EEG Device**
E. M. O'Brien¹ and R. L. Elliott²
¹School of Engineering, Mercer University, Macon, GA, U.S.A.
²School of Medicine, Mercer University, Macon, GA, U.S.A.
- *2:30-2:50 pm **A Simple Structural Magnetic Resonance Imaging (MRI) method for 3D Mapping between Head Skin Tattoos and Brain Landmarks**
Mulugeta Semework
State University of New York, Downstate Medical Center, Brooklyn, USA
- 2:50-3:10 pm **Frame potential classification algorithm for retinal data**
John J. Benedetto¹, Wojciech Czaja¹, Martin Ehler^{1,2}
¹Norbert Wiener Center for Harmonic Analysis and Applications
Department of Mathematics, University of Maryland, College Park, MD 20742
²National Institutes of Health, Eunice Kennedy Shriver National Institute of Child Health and Human Development PPB/LIMB/SMB, Bethesda, MD, 20892, USA

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3:50-5:50 pm

Room: Kim Lecture Hall Room 1110

Session Co-Chairs:

Ian White

University of Maryland, College Park, MD

Yordan Kostov

University of Maryland, Baltimore County

***3:50-4:10 pm Electrostatic Purification of Nucleic Acids for Micro Total Analysis Systems**E. Hoppmann and I.M. White

Fischell Department of Bioengineering, University of Maryland, College Park, MD

4:10-4:30 pm Applicability of Surface Enhanced Raman Spectroscopy for Determining the Concentration of Adenine and S-Adenosyl Homocysteine in a Microfluidic System**Omar Bekdash¹, Jordan Betz¹, Yi Cheng² and Gary W. Rubloff^{2,3}¹Department of Bioengineering, University of Maryland, College Park, MD, USA²Institute for Systems Research, University of Maryland, College Park, MD, USA³Department of Materials Science and Engineering, University of Maryland, College Park, MD, USA4:30-4:50 pm Integration of Capillary Ring Resonator Biosensor with PDMS Microfluidics for Label-free Biosensing**Farnoosh Farahi and Ian White

University of Maryland, Fischell Department of Bioengineering

4:50-5:10 pm Surface Plasmon-coupled Emission from Rhodamine- 6G Aggregates for Ratiometric Detection of Ethanol VaporsR. Sai Sathish, Y. Kostov and G. Rao

University of Maryland Baltimore County / Center for Advanced Sensor Technology and

Department of Chemical and Biochemical Engineering, Technology Research Center, Baltimore, USA

***5:10-5:30 pm Formation of Dendritic Silver Substrates by Galvanic Displacement for Surface Enhanced Raman Spectroscopy**Jordan Betz¹, Yi Cheng², Omar Bekdash¹, Susan Buckhout-White³ and Gary W. Rubloff^{2,3}¹Fischell Department of Bioengineering, University of Maryland, College Park, MD, USA²Institute for Systems Research, University of Maryland, College Park, MD, USA³Dept of Materials Science and Engineering, University of Maryland, College Park, MD, USA**5:30-5:50 pm High Specificity Binding of Lectins to Carbohydrate Functionalized Etched Fiber Bragg Grating Optical Sensors**Geunmin Ryu¹, Mario Dagenais¹, Matthew T. Hurley² and Philip DeShong²¹Dept of Electrical and Computer Engineering, University of Maryland, College Park, MD 20742²Department of Chemistry and Biochemistry, University of Maryland, College Park, MD 20742

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Session 23

Saturday, May 1

CANCER

3:50-5:50 pm

Room: Kay Board Kim Room 1111**Session Co-Chairs:****Anu Puri**

Center for Cancer Research, NCI-Frederick, MD

Kshitij Gupta

Center for Cancer Research, NCI-Frederick, MD

***3:50-4:10 pm Drug Resistance Always Depends on the Turnover Rate**C. Tomasetti and D. Levy

Department of Mathematics and Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD, USA

4:10-4:30 pm Design and Ex Vivo Evaluation of a 3D High Intensity Focused Ultrasound System for Tumor Treatment with Tissue AblationK. Lweesy, L. Fraiwan, M. Al-Shalabi, L. Mohammad, and R. Al-Oglah

Jordan University of Science and Technology, Faculty of Engineering, Biomedical Engineering Department, Irbid 22110, Jordan

4:30-4:50 pm Nanoparticle Mediated Targeting of Alpha4Beta1 Integrin Expressing Cells for Lymphoma TreatmentKshitij Gupta, Xue Zhi Zhao, Joshua D Thomas, Anu Puri, Terrence R Burke, Robert Blumenthal

Membrane Structure and Function Section, Nanobiology Program, Center for Cancer Research, NCI-Frederick, Frederick, MD, USA

4:50-5:10 pm Design and Development of a Novel Class of Light-Sensitive Liposomes for Sustained and Triggered (Localized) Delivery of Cancer TherapeuticsAnu Puri, Amichai Yavlovich, Alok Singh, Robert Blumenthal

Membrane Structure and Function Section, Nanobiology Program, Center for Cancer Research, NCI-Frederick, Frederick, MD, USA

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3:50-5:50 pm

Room: **Kay Board Kim Room 1107****Session Co-Chairs:****Jessica C. Ramella-Roman**

The Catholic University of America, Washington DC

Ganesh Sriram

Dept. of Chem. and Biomolecular Engineering, Univ. of Maryland

3:50-4:10 pm Monitoring and Controlling Oxygen Levels in Microfluidic Devices**Peter C. Thomas^{1, 2}, Srinivasa R. Raghavan³ and Samuel P. Forry¹¹National Institute of Standard and Technology/Biochemical Science Division, Gaithersburg, MD²University of Maryland/Fischell Department of Bioengineering, College Park, MD³University of Maryland/Dept of Chemical and Biomolecular Engineering, College Park, MD4:10-4:30 pm An Imaging Pulse Oximeter Based on a Multi-Aperture Camera**Ali Basiri¹, Jessica C. Ramella-Roman¹¹The Catholic University of America, 620 Michigan Ave., N.E., Washington DC, USA***4:30-4:50 pm Fluorescent Microparticles for Sensing Cell Microenvironment Oxygen Levels within 3D Scaffolds**Miguel A. Acosta and Jennie B. LeachUniversity of Maryland Baltimore County, Department of Chemical and Biochemical Engineering;
1000 Hilltop Circle, ECS #314, Baltimore, MD 21250***4:50-5:10 pm Determination of In Vivo Blood Oxygen Saturation and Blood Volume Fraction using Diffuse Reflectance Spectroscopy**P. Chen and W. Lin

Department of Biomedical Engineering, Florida International University, Miami, USA

*student paper

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Session 25

Saturday, May 1

Image Analysis

3:50-5:50 pm

Room: Pepco Seminar Kim Room 1105**Session Co-Chairs:****John J. Benedetto**

Norbert Wiener Center, Department of Mathematics, University of Maryland

Wojciech Czaja

Norbert Wiener Center, Department of Mathematics, University of Maryland

3:50-4:10 pm

Fredholm Integral Equations in Biophysical Data AnalysisP. Schuck

Dynamics of Macromolecular Assembly, LBPS, NIBIB, NIH, Bethesda, MD USA

4:10-4:30 pm

High-Resolution Autofluorescence Imaging for Mapping**Molecular Processes within the Human Retina**Martin Ehler^{1,2}, Zigurts Majumdar¹, Emily King^{1,2}, Julia Dobrosotskaya², Emily Chew³, Wai Wong³, Denise Cunningham³, Wojciech Czaja², Robert F. Bonner¹¹National Institutes of Health, Eunice Kennedy Shriver National Institute of Child Health and Human Development, PPB/LIMB/SMB, Bethesda, USA²University of Maryland, Mathematics Department, College Park, USA³National Institutes of Health, National Eye Institute, Bethesda, USA

4:30-4:50 pm

Local Histograms for Classifying H&E Stained TissuesM.L. Massar¹, R. Bhagavatula², M. Fickus¹ and J. Kovačević^{2,3}¹Dept of Mathematics and Statistics, Air Force Inst of Tech, Wright Patterson Air Force Base, USA²Dept of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, USA³Department of Biomedical Engineering, Carnegie Mellon University, Pittsburgh, USA

4:50-5:10 pm

Detecting and Classifying Cancers from Image Data using**Optimal Transportation**G.K. Rohde¹, W. Wang¹, D. Slepcev², A.B. Lee³, C. Chen¹, and J.A. Ozolek⁴¹Center for Bioimage Informatics, Biomedical Engineering Department, Carnegie Mellon University, Pittsburgh, USA²Dept of Mathematical Sciences, ³Dept of Statistics, Carnegie Mellon University, Pittsburgh, USA⁴Department of Pathology, Children's Hospital of Pittsburgh, Pittsburgh, USA

5:10-5:30 pm

Nanoscale Imaging of Chemical Elements in BiomedicineMaria A. Aronova¹, Youngchan Kim², Alioscka A. Sousa¹, Guofeng Zhang¹, Richard D. Leapman¹¹National Institutes of Health, NIBIB, Bethesda, USA²Center for Computational Materials Science, Naval Research Laboratory, Washington DC, USA

5:30-5:50 pm

Sparse Representation and Variational Methods in Retinal Image ProcessingJ. Dobrosotskaya¹, M. Ehler^{1,2}, E. King^{1,2}, R. Bonner², W. Czaja¹¹Norbert Wiener Center for Harmonic Analysis and Applications

Department of Mathematics, University of Maryland, College Park, USA

²National Institutes of Health, Eunice Kennedy Shriver National Institute of Child Health and Human Development, PPB/LIMB/SMB, Bethesda, USA

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Session 26

Saturday, May 2

Neuromechanics & Rehabilitation

3:50-5:30 pm

Room: Kim Building Room 2111

Session Co-Chairs:

Jae Kun Shim

Department of Kinesiology, University of Maryland

Brian Baum

Department of Kinesiology, Univ. of Maryland

*3:50-4:10 pm **Stabilizing Effects of Visual Feedback during Locomotion**

Jason Green, Russell Rosenberg, Henry Fleming, Eric Anson, John Jeka

Department of Kinesiology, University of Maryland, College Park, MD

*4:10-4:30 pm **Posture-Locomotor Interactions are not Equivalent in the AP and ML Directions**

Eric Anson¹, Peter Agada¹, Tim Kiemel¹, Yuri Ivanenko², Francesco Lacquaniti², John Jeka¹

¹Department of Kinesiology, University of Maryland, College Park, MD

²Laboratory of Human Physiology, Fondazione Santa Lucia, Rome, Italy

*4:30-4:50 pm **Optimization and Validation of a Biomechanical Model for Analyzing Running-Specific Prostheses**

Brian S. Baum¹, Roozbeh Borjani¹, You-Sin Kim¹, Alison Linberg¹, and Jae Kun Shim^{1,2,3}

¹Department of Kinesiology, University of Maryland, College Park, MD USA

²Department of Bioengineering, University of Maryland, College Park, MD USA

³Neuroscience and Cognitive Science (NACS) Graduate Program, University of Maryland, College Park, MD USA

*4:50-5:10 pm **Multi-Finger Synergies during Isometric Force Production Task in Index Finger Amputees**

Sohit Karol, Jae Kun Shim

Department of Kinesiology, University of Maryland, College Park, MD

*5:10-5:30 pm **Prehension Synergy: Use of Mechanical Advantage during Multi-Finger Torque Production on Mechanically Fixed- and Free-Object**

Jaebum Park^{1,2}, You-Sin Kim², Brian S. Baum², Yoon Hyuk Kim⁵ and Jae Kun Shim^{2,3,4,5}

¹Department of Kinesiology, The Pennsylvania State University, University Park, USA

²Department of Kinesiology, University of Maryland, College Park, USA

³Department of Bioengineering, University of Maryland, College Park, MD 20742

⁴Neuroscience and Cognitive Science (NACS) Graduate Program, University of Maryland, College Park, MD 20742

⁵Department of Mechanical Engineering, Kyung Hee University, Global Campus, Korea 130-701

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Session 27

Saturday, May 2

MODELING, OPTIMIZING AND MONITORING

3:50-5:30 pm

Room: Animal Sci. Bldg. Room 0408**Session Chair:****Kurosh Darvish**

Temple University, Philadelphia, PA

***3:50-4:10 pm Modeling the Traumatic Aortic Rupture**Mehdi Shafieian, Kurosh Darvish

Temple University, Philadelphia, PA

4:10-4:30 pm Oscillating Pressure Experiments on Porcine AortaVasily Romanov, Soroush Assari, Kurosh Darvish

Temple University, Philadelphia, PA

4:30-4:50 pm Quasi-Static Analysis of Electric Field Distributions by Disc Electrodes in a Rabbit Eye ModelS. Minnikanti¹, E. Cohen² and N. Peixoto¹¹Electrical and Computer Engineering, George Mason University, Fairfax, VA, USA²Division of Physics, Food and Drug Administration, Silver Spring, MD, USA***4:50-5:10 pm Optimizing the Geometry of Deep Brain Stimulating Electrodes**J.Y. Zhang and W.M. Grill

Department of Biomedical Engineering, Duke University, Durham, NC, USA

***5:10-5:30 pm Exploratory Parcellation of fMRI Data Based on Finite Mixture Models and Self-Annealing Expectation Maximization**S. Maleki Balajoo¹, G.A. Hossein-Zadeh¹ and H. Soltanian-Zadeh^{1,2}¹Control and Intelligent Processing Center of Excellence, School of Electrical and Computer Engineering, University of Tehran, Tehran 14395-515, Iran.²Image Analysis Laboratory, Radiology Department, Henry Ford Health System, Detroit, MI 48202, USA.

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Session 28

Sunday, May 2

BIOMATERIALS 2

9:00-11:00 am

Room: Kay Board Room, Kim Rm 1111**Session Co-Chairs:****Joonil Seog**

Fischell Dept. of Bioengineering, Univ. of Maryland

Mariana Meyer

Fischell Dept. of Bioengineering, Univ. of Maryland

*9:00-9:20 am

Identification of Bacteria and Sterilization of Crustacean Exoskeleton used as a BiomaterialTiffany Omokanwaye¹, Donae Owens², and Otto Wilson, Jr.¹¹Catholic University of America/Biomedical Engineering Department, Washington, D.C., USA²Benjamin Banneker Academic High School, Washington, D.C., USA

*9:20-9:40 am

Neural Stem Cell Differentiation in 2D and 3D MicroenvironmentsA.S. Ribeiro¹, E.M. Powell² and J.B. Leach¹¹University of Maryland Baltimore County/Chemical & Biochemical Engineering, Baltimore, USA²University of Maryland School of Medicine/Anatomy and Neurobiology, Baltimore, USA

*9:40-10:00 am

A Microfluidic Platform for Optical Monitoring of Bacterial BiofilmsM.T. Meyer^{1,2}, V. Roy^{1,3}, W.E. Bentley¹, and R. Ghodssi^{1,2,4}¹Fischell Department of Bioengineering, ²Institute for Systems Research, ³Department of Molecular and Cell Biology, ⁴Department of Electrical and Computer Engineering, University of Maryland College Park, College Park MD, USA

10:00-10:20 am

Conduction Properties of Decellularized Nerve BiomaterialsM.G. Urbanchek¹, B.S. Shim², Z. Baghmanli¹, B. Wei¹, K. Schroeder³, N.B. Langhals¹, R.M. Miriani¹, B.M. Egeland¹, D.R. Kipke¹, D.C. Martin², P.S. Cederna¹¹University of Michigan/Surgery, Plastic Surgery, Ann Arbor, USA²University of Delaware/Materials Science & Engineering, Newark, USA³Hope College/Literature, Science, and the Arts, Holland, USA

10:20-10:40 am

Radio-opacification of Calcium Phosphate (CaP) Cement for Spinal Augmentation: Cadaveric and Biomechanical StudyMichael Gerling, Nasim Chowdhury, Neel Shah, David Ross, Alexandra Carrer, Nael Shanti, Sabet Hajeer, Daniel Levin, Srinivas Kolla, Scott Lehto, Edward Chay, Subrata Saha
SUNY Downstate Medical Center

10:40-11:00 am

Reverse Cholesterol Transport (RCT) Modeling with Integrated Software ConfiguratorS. Adhikari

Sysoft Center for Systems Biology and Bioengineering, Whitehouse Station, NJ

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Session 29

Sunday, May 2

BIOMECHANICS

9:00-11:00 am

Room: **Kay Board Room, Kim Rm 1107**

Session Co-Chairs:

Kurosh Darvish

Temple University, Philadelphia, PA

Ali Sadegh

City College of New York, New York, NY

9:00-9:20 am

Evaluating Brain Strain and Stress in Linear Head Impact

Kaveh Laksari, Soroush Assari, Kurosh Darvish

Temple University

9:20-9:40 am

Mechanics of CSF Flow through Trabecular Architecture in the Brain

Parisa Saboori, Catherine Germanier and Ali Sadegh

Dept of Mechanical Engineering, The City College of The City University of New York

9:40-10:00 am

Impact of Mechanical Loading to Normal and Aneurysmal Cerebral Arteries

M. Zoghi-Moghadam, P. Saboori and A. Sadegh

Department of Mechanical Engineering, City College of New York, New York, NY

10:00-10:20 am

Identification of Material Properties of Human Brain under Large Shear Deformation: Analytical Versus Finite Element Approach

C.D. Untaroiu¹, Q. Zhang¹, A.M. Damon¹, J.R. Crandall¹, K. Darvish², G. Paskoff³ and B.S. Shender³

¹Center for Applied Biomechanics/Department of Mechanical & Aerospace Engineering, University of Virginia, Charlottesville, VA, USA

²Department of Mechanical Engineering, Temple University, Philadelphia, PA, USA

³Naval Air Warfare Center Aircraft Division, Patuxent River, MD, USA

10:20-10:40 am

Mechanisms of Traumatic Rupture of the Aorta: Recent Multiscale Investigations

Nicholas A. White¹, Chirag S. Shah², Warren N. Hardy¹

¹Virginia Tech – Wake Forest University, Center for Injury Biomechanics, Blacksburg, USA

²First Technology Safety Systems, Inc., CAE, Plymouth, USA

10:40-11:00 am

Head Impact Response: Pressure Analysis Simulation

R.T. Cotton¹, P. G. Young², C. W. Pearce², L. Beldie³, B. Walker³

¹Technical Services, Simpleware, Exeter, UK

²School of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, UK

³Vehicle Design, ARUP, Solihull, UK

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Session 30

Sunday, May 2

IMAGING 3

9:00-11:00 am

Room: Pepco Seminar Room, Kim Rm 1105**Session Co-Chairs:****Bruce Yu**

Fischell Dept. of Bioengineering, University of Maryland

A.J. Jin

National Institute of Biomedical Imaging and Bioengineering, NIH, USA

9:00-9:20 am

Raman-AFM Instrumentation and Characterization of SERS Substrates and Carbon NanotubesQ. Vu¹, M.H. Zhao^{1,2}, E. Wellner¹, X. Truong¹, P.D. Smith¹, A.J. Jin¹,*¹Laboratory of Bioengineering and Physical Science, National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health, Bethesda, MD 20892, USA²Building & Fire Research Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899, USA

*9:20-9:40 am

A Novel Model of Skin Electrical InjuryThu T.A. Nguyen¹, Ali Basiri¹, J.W. Shupp², A.R. Pavlovich², M.H. Jordan², Z. Sanford², and J.C. Ramella-Roman¹¹The Catholic University of America, 620 Michigan Ave., N.E., Washington DC, USA.²The Burn Center, Washington Hospital Center, Washington DC, USA

9:40-10:00 am

Design, Construction, and Evaluation of an Electrical Impedance MyographK. Lweesy, L. Fraiwan, D. Hadarees, A. Jamil, and E. Ramadan

Jordan University of Science and Technology, Faculty of Engineering, Biomedical Engineering Department, Irbid 22110, Jordan

10:00-10:20 am

19FIT: A class of Imaging Imagents for 19F MRIZhong-xing Jiang, Xin Liu, Eun-Kee Jeong, Yihua Bruce YU

Pharmacy School, University of Maryland at Baltimore

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Session 31

Sunday, May 2

HARD TISSUE AND POSTURE

9:00-11:00 am

Room: Kim Building Room 2111**Session Co-Chairs:****Subrata Saha**

SUNY Downstate Medical Center, Brooklyn, New York

Shervin Majd

ESRA, Olney, Maryland

9:00-9:20 am

Optimization of Screw Positioning in Mandible during Bilateral Sagittal Split Osteotomy Using Finite Element MethodA. Raeisi Najafi¹, A. Pashaei², S. Majd³, I. Zoljanahi Oskui⁴, B. Bohluli⁵¹Department of Industrial and Enterprise Systems Engineering, University of Illinois at Urbana - Champaign, IL²CISTIB, Department of Technology, University of Pompeu Fabra, Barcelona, Spain³Engineering and Scientific Research Associates, 3616 Martins Dairy Circle, 20832, Olney, MD⁴Department of Biomedical Engineering, Amirkabir University of Technology, Tehran, Iran⁵Department of Oral and Maxillofacial Surgery, Azad School of Dentistry, Tehran, Iran

*9:20-9:40 am

Extraction and Characterization of a Soluble Chicken Bone CollagenTiffany Omokanwaye, Otto Wilson, Jr., Hoda Iravani and Pramodh Kariyawasam

Catholic University of America/Biomedical Engineering Department, Washington, D.C., USA

*9:40-10:00 am

Effect of Deformation Rate on the Flexural Fracture Behavior of Human RibsSubrata Saha, Gavriel Feuer

Department of Orthopedic Surgery and Rehabilitation Medicine, SUNY Downstate Medical Center, Brooklyn, New York 11203

10:00-10:20 am

A Model for Human Postural RegulationYao Li and William S. Levine

Department of Electrical and Computer Engineering, University of Maryland, College Park, USA

10:20-10:40 am

Development of an Average Chest Shape for Objective Evaluation of the Aesthetic Outcome in the Nuss Procedure Planning ProcessK.J. Rechowicz¹, R. Kelly², M. Goretsky², F. Frantz², S. Knisley³, D. Nuss² and F.D. McKenzie¹¹Department of Modeling and Simulation, Old Dominion University, Norfolk, VA 23529, USA²Department of Surgery, Eastern Virginia Medical School, Norfolk, VA 23507, USA³Department of Mechanical Engineering, Old Dominion University, Norfolk, VA 23529, USA

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Session 32

Sunday, May 2

SICKLE CELL AND BLOOD CELL

9:00-11:00 am

Room: Animal Science Building, Rm. 0408**Session Co-Chairs:****Lewis Hsu**

Pediatric Hematology, Children's National Medical Center, Washington DC

Frank Ferrone

Department of Physics, Drexel University, Philadelphia, PA

9:00-9:20 am*Sickle Hemoglobin Fiber Growth Rates Revealed by Optical Pattern Generation**Z. Liu, A. Aprelev, M. Zakharov, and F. A. Ferrone

Drexel University, Department of Physics, Philadelphia, PA, USA

9:20-9:40 am*Sickle Cell Occlusion in Microchannels**A. Aprelev¹, W. Stephenson¹, H. Noh², M. Meier³, M. MacDermott³, N. Lerner³, and F. A. Ferrone¹¹Drexel University, Department of Physics, Philadelphia, PA, USA²Drexel University, Department of Mechanical Engineering and Mechanics, Philadelphia, PA, USA³Marian Anderson Sickle Cell Center, St. Christopher's Hospital for Children, Philadelphia, PA, USA***9:40-10:00 am****Engineering Microfluidics based Technologies for Rapid Sorting of White Blood Cells**Vinay Raj¹, Kranthi Kumar Bhavanam², Vahidreza Parichehreh² and Palaniappan Sethu²¹DuPont Manual High School, Louisville, KY 40208, USA²Department of Bioengineering, University of Louisville, Louisville, KY 40208, USA

10:00-10:20 am

Peripheral Arterial Tonometry in assessing Endothelial Dysfunction in Pediatric Sickle Cell DiseaseK.M. Sivamurthy¹, C. Dampier², M. MacDermott¹, M. Meier¹, M. Cahill¹, and L.L. Hsu³¹Hematology, St. Christopher's Hospital for Children, Philadelphia, PA, USA²Emory University, Atlanta, GA, USA.³Hematology, Children's National Medical Center, Washington, DC USA

10:20-10:40 am

Dynamics of Capsules and Erythrocytes in Microfluidic Channels and Vascular MicrovesselsPanagiotis Dimitrakopoulos, Shugi Kuriakose, Walter R. Dodson III

Dept. of Chemical and Biomolecular Engineering, Univ. of Maryland

10:40-11:00 am

Comparison of Shear Stress, Residence Time and Lagrangian Estimates of Hemolysis in Different Ventricular Assist DevicesK.H. Fraser, M.E. Taskin, T. Zhang, B.P. Griffith and Z.J. Wu

Artificial Organs Laboratory, Dept. of Surgery, University of Maryland Medical School, Baltimore, USA

*student paper

underline denotes presenting author

Session 33

Sunday, May 2

The Dr. James W. Jacobson Symposium on Technologies for Cancer Diagnostics

9:00-12:45 pm **Room: Kim Lecture Hall, Kim Building Rm. 1110**

Session Co-Chairs: **John Jessup**
National Cancer Institute, Rockville, MD
Avraham Rasooly
National Cancer Institute, Rockville, MD

9:00-9:30 am **Challenges for cancer diagnostics**

John Jessup
National Cancer Institute, Rockville, MD

9:30-9:50 am **Clinical Applications of Multispectral Imaging Flow Cytometry**

H. Minderman¹, T.C. George², K.L. O'Loughlin¹ and P.K. Wallace¹
¹Roswell Park Cancer Institute, Flow and Image Cytometry Facility, Buffalo, USA
²Amnis Corporation, Seattle, USA

9:50-10:10 am **Multispectral Imaging, Image Analysis, and Pathology**

Richard M. Levenson
Brighton Consulting Group, Principal, Brighton, MA, USA

10:10-10:30 am **Sensitive Characterization of Circulating Tumor Cells for Improving Therapy Selection**

H. Ben Hsieh¹, George Somlo², Robyn Bennis¹, Paul Frankel², Robert T. Krivacic¹, Sean Lau², Janey Ly¹, Erich Schwartz³, and Richard H. Bruce¹
¹Palo Alto Research Center/Biomedical Engineering, Palo Alto, CA
²City of Hope Cancer Center/Medical Oncology, Duarte, CA
³Stanford University/Department of Medicine, Stanford, CA

10:30-10:45 am **Coffee Break**

10:45-11:05 am **Immunoassays on the BioCD for Cancer Biomarkers: Sensitivity and Scalability**

David Nolte
Purdue University, Department of Physics, West Lafayette, IN

11:05-11:25 am **Nanohole Array Sensor Technology: Multiplexed Label-Free Protein Binding Assays**

J. Cuiffi¹, R. Soong², S. Manolagos¹, S. Mohapatra³, and D. Larson²
¹Draper Laboratory – Bioengineering Center at USF, Tampa
²Draper Laboratory, Cambridge
³University of South Florida, Department of Molecular Medicine, Tampa

11:25-11:45 am **Molecular Profiling of Rare Circulating Tumor Cells in Peripheral Blood Using Microfluidics**

Steven Soper

Louisiana State University, Department of Chemistry, Baton Rouge, LA,

11:45am-12:05 **Integrated Biochip Sensors for Detection of Cancer**

Rashid Bashir

Purdue University, Birck Nanotechnology Center, West Lafayette, IN

12:05-12:25 **Clinical Microfluidics for CTC analysis**

Mehmet Toner

Surgical Services and BioMEMS Resource Center, Massachusetts General Hospital, Harvard Medical School, and Shriners Hospital for Children, Boston, MA

12:25-12:45 **NCI funding opportunities for technology development**

Avraham Rasooly

National Cancer Institute, Rockville, MD