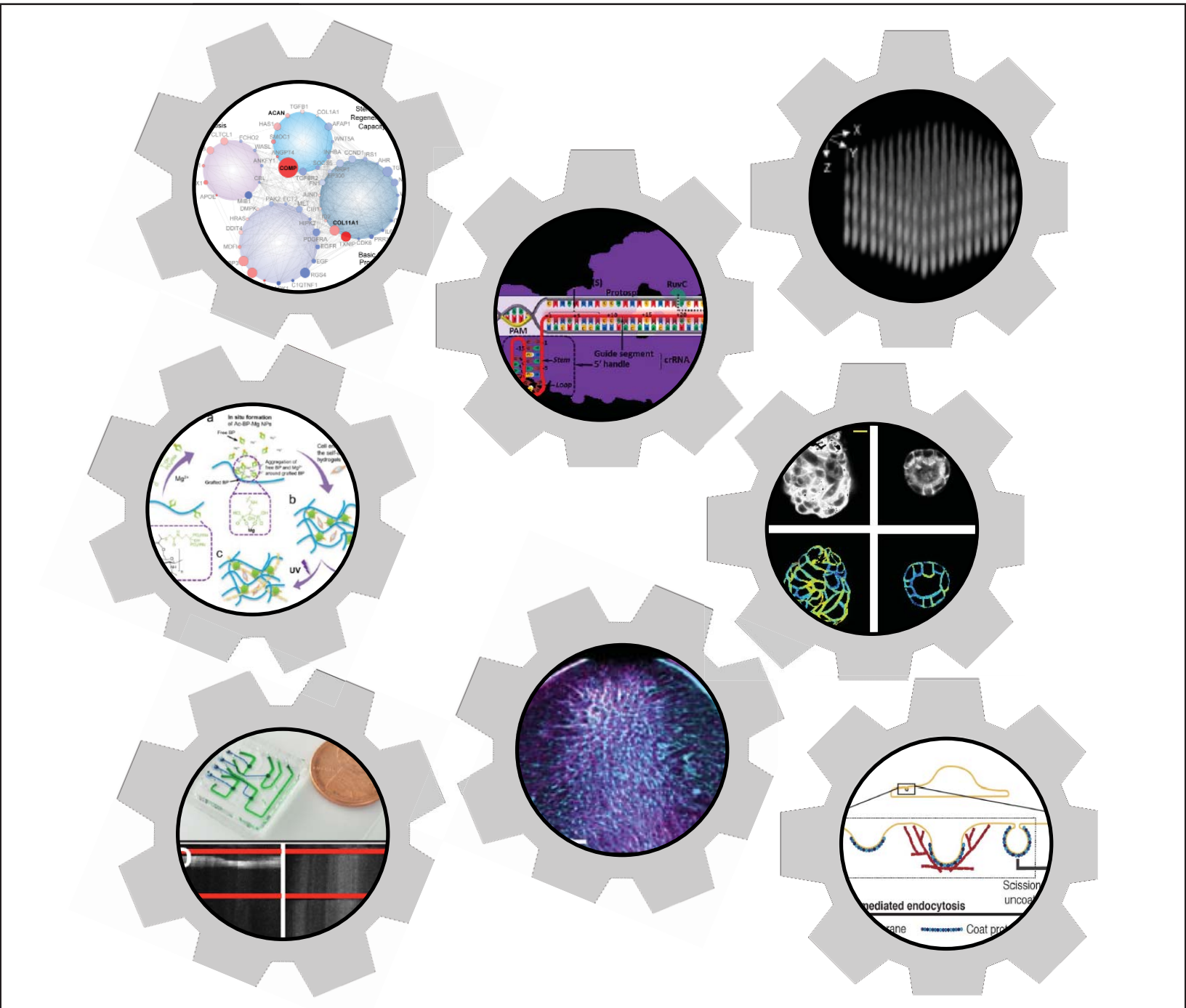
BMES BIOMEDICAL ENGINEERING SOCIETY
ADVANCING HUMAN HEALTH AND WELL BEING

CMBE
Cellular and Molecular Bioengineering
Special Interest Group

2018 Cellular and Molecular Bioengineering Conference

Ocean Reef Club, Key Largo, Florida | January 2-6, 2018

Discovering the Keys: Transformative and Translational Mechanobiology



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2019 Cellular and Molecular Bioengineering Conference

Loews Coronado Bay, Coronado "San Diego", California

January 1 - 5, 2019

BMES CMBE SPECIAL INTEREST GROUP

BIOMEDICAL ENGINEERING SOCIETY (BMES)

The Biomedical Engineering Society (BMES) is the professional society for biomedical engineering and bioengineering. Founded in early 1968, the Society now boasts more than 7,500 members and is growing.

MISSION
The Mission of the BMES is to build and support the biomedical engineering community, locally, nationally and internationally, with activities designed to communicate recent advances, discoveries, and inventions; promote education and professional development; and integrate the perspectives of the academic, medical, governmental, and business sectors.

VISION
The Vision of the Biomedical Engineering Society (BMES) is to serve as the world's leading society of professionals devoted to developing and using engineering and technology to advance human health and wellbeing.

BMES CELLULAR AND MOLECULAR BIOENGINEERING (CMBE) SPECIAL INTEREST GROUP

To maintain its multidisciplinary character and central research focus, the Cellular and Molecular Bioengineering Special Interest Group is committed to recruiting new people with fresh ideas and activities.

The CMBE SIG brings together researchers with diverse scientific and clinical interests with a common goal of understanding and engineering molecules, cells, their interactions and microenvironments in the pursuit of controlling biological processes and improving the practice of medicine. Our goal is to facilitate networking, sharing of knowledge, and recognition of individuals who has demonstrated meritorious contributions to the field of cellular and molecular bioengineering through multiple mechanisms.

All BMES members are welcome to join the CMBE SIG. For more information visit **www.bmes.org/cmbesig**.

BMES CMBE SHU CHIEN ACHIEVEMENT AWARD
The Shu Chien Achievement Award is bestowed upon an individual who has demonstrated meritorious contributions to the field of cellular and molecular bioengineering as a dedicated BMES Cellular and Molecular Bioengineering (CMBE) Special Interest Group (SIG) award. This Award will be evaluated annually and presented to an individual at the CMBE Annual Conference. Previous awardees include Douglas Lauffenburger (2015), Donald Ingber (2016), and Antonios Mikos (2017).

For more information visit **www.bmes.org/2018bmescmbeshuchienaward**.

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CONFERENCE WELCOME

Welcome to the 2018 BMES CMBE Annual Conference, **Discovering the Keys: Transformative and Translational Mechanobiology.**

The conference theme was selected to address key challenges in how mechanobiology can advance the study of pathophysiology and improve human health. To date, isolated groups of investigators from diverse fields have explored mechanobiology research but without widespread communication across disciplinary boundaries, much less a common vision for how to encourage clinical translation. We saw a need for a unique and dedicated platform to bring these complementary groups of investigators together. As conference organizers, we study mechanobiology in different physiological systems (orthopedics, development, cardiovascular) and at different length scales (molecular, cellular, tissue). We organized this conference to employ 'creative destruction' of the barriers that separate mechanobiology research in disparate physiological systems and length scales. Integrated thinking in this area can then be harnessed and applied to further drive the integration of mechanobiology into the fields of cell biology, drug discovery, and regenerative medicine.

The conference sub-themes will highlight emerging mechanobiology research areas. Engineers and biologists will present alongside those with clinical and/or entrepreneurial experience that have begun to bridge the gap between fundamental research and translation. Our aim is for speakers to describe how their mechanobiology research can transition from bench to bedside. A goal of the conference is increased technology sharing amongst mechanobiology researchers, as well as a new vision and strategic plan for overcoming clinical translation gaps in this important field.

We hope you find the 2018 CMBE conference intellectually stimulating, with opportunities to highlight your current research, forge new collaborations, and develop pathways to translate mechanobiology research into the clinic. Enjoy the meeting as well as this lovely site in Key Largo.

Nadeen Chahine, Eric M. Darling, & Alisa Morss Clyne

Nadeen Chahine
CONFERENCE CO-CHAIR
Associate Professor
Columbia University

Eric M. Darling
CONFERENCE CO-CHAIR
Associate Professor
Brown University

Alisa Morss Clyne
CONFERENCE CO-CHAIR
Associate Professor
Drexel University

IMPORTANT INFORMATION

ATTIRE

The dress code is a long standing and cherished tradition of the members of the Ocean Reef Club, based on good taste and respect for the Club and its members. The Club's standards of dress are required for guests over 12 years of age.

CMBE Conference Dress Code: Business or smart business casual. Please remove your conference badge when outside the conference area (North Ballroom and South Ballroom).

Dining Dress Code: When dining in any of the Club's restaurants, the dress code for men is collared shirts and dress trousers and equally appropriate attire for women. If worn, shorts must be of walking length. Please note that smart blue denim (jeans) is only allowed in the bar areas.

Headware: Men are expected to remove their hats whenever entering the Club.

Recreation Attire: Each recreational area has dress requirements.

- Appropriate tennis clothing and footwear are required on the tennis courts and all-white attire must be worn on the croquet courts.
- Bathing suit cover-ups as well as footwear must be worn in all areas away from the Buccaneer Island beach and pool. Thong-style bathing suits are not allowed.
- Shirts must be worn for jogging, walking and other forms of exercise within the community. All shirts worn by gentlemen within the community must have sleeves.
- Golf and Practice Range require collared shirts for men (no mock turtlenecks) and appropriate golfing shorts or trousers (no cargo or athletic shorts). Sleeveless golf blouses with collars are permissible for ladies, as well as other appropriate golfing attire.

Unacceptable Attire: Tank tops, tank-style undershirts and jogging tops for men, crop and jogging tops for women, frayed cut-offs and tattered jeans are not acceptable attire. Shirts with sleeves are required at all times in all public areas other than the pool.

HOTEL

Ocean Reef Club
201 Ocean Reef Drive
Key Largo, FL 33037
Phone: 800-741-7333

The Ocean Reef Club is nestled on the northernmost tip of the Florida Keys, offering championship golf, stunning subtropical weather, and some of the best fishing and boating in North America. An abundant natural beauty and an array of recreation choices create wonderful opportunities for you to relax and have fun. See the Club's concierge for more information.

HOTEL ACTIVITES

The Ocean Reef Club has an array of recreation choices, to include water sports, tennis, board games, croquet, golf, basketball, etc. For more information stop by the concierge desk or call (305) 367-2611 x7385.

INTERNET

The Ocean Reef Club has complimentary Wi-Fi throughout the Club. You do not need a passcode to access the Club's Internet.

CELL PHONE USAGE

Out of consideration for your conference colleagues and to ensure a quiet environment in sessions, all cellular phones should be turned off or set to vibrate. Please leave the general session area to conduct calls. *Use of cell phones in any of the Club's restaurants is not permitted.* Thank you for your cooperation.

IMPORTANT INFORMATION

FAMILY POLICIES

Note that if family members attend any portion of the conference (e.g., sessions, meals, or activities), they must be paid registrants of the conference and wear a conference badge.

Meals: Anyone entering the conference meal areas must be registered and show a 2018 CMBE Conference badge.

Sessions: The presence of young children at the sessions is discouraged because this may distract conference attendees.

EVENING EVENTS

The **Welcome Reception** is Wed, Jan 3, 6 - 8pm, Lagoon/Beach.

The **Gala Dinner** is Thurs, Jan 4, 6-9pm, at the Palm Court.

IMPORTANT: Drink tickets are issued to full registrants as well as guest Gala ticket holders. Please do not lose your drink tickets, as they cannot be replaced. GALA DINNER TICKETS MUST BE PURCHASED BY 1PM THURS, JAN 4. DINNER TICKETS CANNOT BE PURCHASED AT THE DINNER.

GETTING AROUND

The best way to get around the Keys is to rent a car. The Club is an official Enterprise sub-station. Cars can be rented from or returned to the Club, Miami or Ft. Lauderdale International Airports, or another Enterprise branch. For more information, please contact the Club's Transportation Department at (302) 367-5952.

POSTER SESSIONS & VIEWINGS

Posters are available for viewing throughout the conference period in the North Ballroom next to the General Session room. Poster setup is Wed, Jan 3, from 7 - 8am. Presentation hours are as follows:

	Poster Teasers	Poster Session
Wed, Jan 3	10am - 10:45pm	
Thurs, Jan 4		11am - 10:00am
Fri, Jan 5		11am - 10:00am

REGISTRATION

Registration and Information is located in Town Hall. Hours are as follows:

Day	Times
Tues, Jan 2	3pm - 7pm
Wed, Jan 3	7am - 1:30pm 6pm - 7pm
Thurs, Jan 4	7am - 2pm
Fri, Jan 5	7am - 1pm
Sat, Jan 6	7am - 11am

BADGES

Attendees must wear their 2018 CMBE Conference name badge to all conference functions. Full registration name badges permit access to all sessions, and conference meals. Guest gala badges can be purchased at the registration desk by 1pm Thurs, Jan 4. Guest gala badge permits access to the gala dinner only.

WEATHER

The average January weather in Key Largo maintains at around 75-80°F during the day and around 65°F during the evening and night hours.

PROGRAM

Tuesday, January 2, 2018

3:00 PM	Arrival and registration
6:00	CMBE council meeting

Wednesday, January 3, 2018

7:00 AM	Continental breakfast and poster setup
7:45	Welcome/introduction
8:00-10:00	**Session I - Bioinspired engineering: Mechanobiology of morphogenesis and development (Session chair, Roland Kaunas)**
8:00-8:40	**KEYNOTE SPEAKER: CATO LAURENCIN, MD, PhD**, University of Connecticut *Regenerative engineering: A new convergence field*
8:40-9:00	**Celeste Nelson, PhD**, Princeton University *Forced understanding of tissue morphogenesis*
9:00-9:20	**Guy Genin, PhD**, Washington University in St. Louis *Mechanobiology of proteoglycan-like molecules at the plant cell periphery*
9:20-9:40	**Leo Wan, PhD**, Rensselaer Polytechnic Institute *Cellular left-right asymmetry in development and disease*
9:40-9:50	**Student/Fellow Award: Yue Shao, PhD**, University of Michigan *Bioengineered in vitro model for post-implantation human embryogenesis*
9:50-10:00	**Student/Fellow Award: Rachel Gilbert,** University of Delaware *Developmental mechanotransduction: The role of epithelial stretch on local growth factor secretion during lung airway morphogenesis*
10:00-10:45	**Poster teaser session with coffee break (Session chair, Deborah Leckband)**
10:45-1:25	**Session II - Rising Stars (Session chair, Leo Wan)**
10:45-11:05	**Padmini Rangamani, PhD**, University of California, San Diego *Membrane tension as an organizing principle for vesicle trafficking*
11:05-11:25	**Daniel Conway, PhD**, Virginia Commonwealth University *Mechanical force across E-Cadherin regulates epithelial acini homeostasis*
11:25-11:45	**Jeremiah J. Zartman, PhD**, University of Notre Dame *Mechanical stress dissipation during organ growth through calcium signaling*

PROGRAM

11:45-12:05	**John Slater, PhD**, University of Delaware *A new traction force microscopy platform containing a built-in zero-stress state*
12:05-12:25	**Sarah Calve, PhD**, Purdue University *Measurement of heterogeneous extracellular matrix fibril deformation in situ*
12:25-12:45	**Liming Bian, PhD**, The Chinese University of Hong Kong *Self-assembled injectable nanocomposite hydrogels stabilized by bisphosphonate-magnesium (Mg2+) coordination regulates the differentiation of encapsulated stem cells via tunable mechanosensitive network structure*
12:45-1:05	**Akhilesh Gaharwar, PhD**, Texas A&M University *Widespread changes in transcriptome profile of human mesenchymal stem cells by two-dimensional (2D) nanosilicates*
1:05-1:25	**Yizhou Dong, PhD**, The Ohio State University *Engineering CRISPR/Cpf1 to maximize genome editing efficiency*
1:30-3:00	**Lunch with leaders (Keynote/Invited Speakers, Awardees)**
1:30-6:00	**Afternoon break**
6:00-8:00	**Welcome reception**

Thursday, January 4, 2018

7:15 AM	Continental breakfast
8:00-10:00	**Session III - Multiscale mechanobiology of health & disease I (Session chairs, Guohao Dai and Michael King)**
8:00-8:40	**KEYNOTE SPEAKER: MELODY SWARTZ, PhD**, University of Chicago *Lymphatic vessels in the tumor microenvironment: How active transport mechanisms regulate local immunity*
8:40-9:00	**Cynthia Reinhart King, PhD**, Vanderbilt University *Metastatic cell migration through complex microenvironments*
9:00-9:20	**Christopher Chen, PhD**, Boston University *Mechanoregulation of vascular function by the Notch receptor*
9:20-9:40	**Bianxiao Cui, PhD**, Stanford University *Membrane curvature at the nano-bio interface*
9:40-9:50	**Student/Fellow Award: Claire Robertson, PhD**, Lawrence Berkeley National Lab *Laminin microstructure compensates for dystroglycan loss in breast epithelial cells*

PROGRAM

9:50-10:00	**Student/Fellow Award: Sangpil Yoon, PhD**, University of California, San Diego *hPiezo1 needs stronger force for mechanical activation than mPiezo1*
10:00-11:00	**Poster session with coffee break**
11:00-1:00	**Session IV - Multiscale mechanobiology of health & disease II (Session chairs, Song Li and Robert Mauck)**
11:00-11:40	**KEYNOTE SPEAKER: FARSHID GUILAK, PhD**, Washington University in St. Louis *Deconstructing mechanotransduction to identify targets for mechanobiologic therapies*
11:40-12:00	**Dawn Elliott, PhD**, University of Delaware *Microscale structure, mechanics, and damage of tendon*
12:00-12:20	**Shelly Peyton, PhD**, University of Massachusetts, Amherst *Tissue guided hydrogel design*
12:20-12:40	**Amit Pathak, PhD**, Washington University in St. Louis *Mechanical memory in collective cell migration*
12:40-12:50	**Student/Fellow Award: Edward Bonnevie, PhD**, University of Pennsylvania *Prestrain regulates mechanosensation in fibrous microenvironments*
12:50-1:00	**Student/Fellow Award: Milos Spasic**, Columbia University *Drug screening of primary cilia-targeted therapies for in vivo osteoporosis treatment*
1:00-2:30	**Mentoring lunch**
1:00-4:00	**Afternoon break**
4:00-6:00	**Workshop on NIH/NSF funding opportunities**
	David Fyhrie, PhD, Biomechanics and Mechanobiology Program, NSF **Christina Payne, PhD**, Engineering Biology & Health Cluster at CBET, NSF **Rosemarie Hunziker, PhD**, NIBIB Program Officer, NIH (via video link) **Guy Genin, PhD**, Washington University in St. Louis, NSF Science and Technology Center for Engineering MechanoBiology **Pam Kreeger, PhD**, University of Wisconsin, NIH Next Generation Researchers Initiative Working Group
6:00-9:30	**Gala dinner** *2018 Shu Chien Award recipient:* **Michael Shuler, PhD**, Cornell University

PROGRAM

Friday, January 5, 2018

7:15 AM	Continental breakfast
8:00-10:00	**Session V - Cellular heterogeneity and systems approaches in mechanobiology (Session chair, Brenton Hoffman and Christopher Jacobs)**
8:00-8:40	**KEYNOTE SPEAKER: DENNIS DISCHER, PhD**, University of Pennsylvania *Scaling concepts and mechanisms in matrix mechanobiology: from differentiation to cancer*
8:40-9:00	**Pamela Kreeger, PhD**, University of Wisconsin-Madison *Heterogeneity in ovarian cancer – is the microenvironment a viable target?*
9:00-9:20	**Clark Hung, PhD**, Columbia University *Modulation of cell-to-cell variability for functional tissue engineering of cartilage*
9:20-9:40	**Delphine Dean, PhD**, Clemson University *Cardiac cell heterogeneity and mechanical properties*
9:40-9:50	**Student/Fellow Award: Kaitlin Fogg, PhD**, University of Wisconsin, Madison *Alternatively activated macrophage-derived HB-EGF and extracellular matrix stiffening promote the expansion of ovarian cancer spheroids*
9:50-10:00	**Student/Fellow Award: Junghyun Kim**, University of California, Berkeley *Multi-variable mechanical phenotyping with mechano-node-pore sensing*
10:00-11:00	**Poster session with coffee break**
11:00-1:00	**Session VI - Novel tools for mechanobiology (Session chair, Peter Yinxiao Wang)**
11:00-11:40	**KEYNOTE SPEAKER: MOLLY STEVENS, PhD**, Imperial College London *Exploring and engineering the cell-material interface for regenerative medicine and mechanobiology*
11:40-12:00	**Kris Noel Dahl, PhD**, Carnegie Mellon University *Measuring intracellular force and chromatin condensation by tracking sub-nuclear sensors*
12:00-12:20	**Todd Sulchek, PhD**, Georgia Institute of Technology *Microfluidic cell sorting by biophysical properties to examine heterogenic states of cells*
12:20-12:40	**Robert Tranquillo, PhD**, University of Minnesota *Fibroblast contact guidance in aligned fibrin fibril networks via sensing of stiffness anisotropy*

PROGRAM

12:40-12:50	**Student/Fellow Award: Yash Shah**, University of Florida *Magnetic particle translation as a surrogate measure for synovial fluid mechanics*
12:50-1:00	**Student/Fellow Award: Kelsey Gray**, University of Maryland *Electrodeposition of PEG-hyaluronan-gelatin hydrogels to spatiotemporally control cell matrices for mechanobiological study*
1:00-6:00	**Afternoon break**
	Key West trip (tenative - registration required)

Saturday, January 6, 2018

7:15 AM	Continental breakfast
8:00-10:00	**Session VII - Modulating stem cell mechanobiology in regenerative medicine (Session chair, Adam Feinberg)**
8:00-8:40	**KEYNOTE SPEAKER: TODD McDEVITT, PhD**, Gladstone Institute/University of California, San Francisco *Engineering the self-directed multicellular organization of human pluripotent stem cell systems*
8:40-9:00	**Robert Mauck, PhD**, University of Pennsylvania *Reprogramming cell and ECM physical properties to promote dense connective tissue repair*
9:00-9:20	**Guohao Dai, PhD**, Northeastern University *Nrp1 mediated rrterial differentiation of pluripotent stem cells*
9:20-9:40	**Weiqiang Chen, PhD**, New York University *Mechano-modulation of cancer stem cells through endogenous traction-imbalance*
9:40-9:50	**Student/Fellow Award: Tuğba Topal**, University of Michigan *Acoustic tweezer induced cyclic forces mediate rapid epithelial-mesenchymal transition in human embryonic stem cells*
9:50-10:00	**Student/Fellow Award: Anastasia Korolj**, University of Toronto *Microcurvature promotes podocyte differentiation in vitro*
10:00-10:15	**Networking and coffee break**

PROGRAM

10:15-12:15	**Panel discussion: Translating mechanobiology to the clinic**
	Moderator: **Michele Marcolongo, PhD**, Drexel University *Industry participant:* **Nick Geisse, PhD**, NanoSurface Biomedical, Inc. *Academic participants:* **Farshid Guilak, Dennis Discher, Delphine Dean, Robert Mauck, Bianxiao Cui** *CMBE SIG council participants:* **Michael King**
12:15	**Awards ceremony, closing remarks, and conference survey**

KEYNOTE SPEAKERS

CATO LAURENCIN, University of Connecticut

Cato T. Laurencin is a University Professor in Chemical Engineering, Materials Science, Biomedical Engineering, and Orthopaedic Surgery at the University of Connecticut. He is the Founder and Director of both the Institute for Regenerative Engineering and the Raymond and Beverly Sackler Endowed Center for Biomedical, Biological, Physical and Engineering Sciences at the University of Connecticut. He is an expert in biomaterials, nanotechnology, stem cell science, drug delivery systems, and regenerative engineering. Dr. Laurencin received the NIH Director's Pioneer Award and two NSF Emerging Frontiers in Research and Innovation Awards. He is an elected member of the National Academy of Engineering and the National Academy of Medicine. He is an elected fellow of the Indian National Academy of Engineering, the Indian National Academy of Sciences, the African Academy of Sciences, and is an Academician of the Chinese Academy of Engineering. Dr. Laurencin has been honored by the White House on three occasions, receiving the Presidential Faculty Fellow Award, the Presidential Award for Excellence in Science, Math and Engineering Mentoring, and the National Medal of Technology and Innovation.

MELODY SWARTZ, University of Chicago

Melody A. Swartz is a Professor in the Institute of Molecular Engineering at the University of Chicago, where she holds the William B. Ogden Chair as well as a joint appointment in the Ben May Department for Cancer Research. Her education was in Chemical Engineering, first with a BS from the Johns Hopkins University, and then a PhD from Massachusetts Institute of Technology. She undertook postdoctoral studies at Brigham & Women's Hospital in Boston before starting in 1999 as an Assistant Professor at Northwestern University, jointly in the Departments of Biomedical Engineering and Chemical Engineering. In 2003, she was recruited to the Ecole Polytechnique Fédérale de Lausanne (EPFL), where she was promoted to Full Professor in the Institute of Bioengineering and the Swiss Institute for Experimental Cancer Research. Trained as a bioengineer, she uses quantitative approaches in immunobiology and physiology, including biotransport and biomechanics, to develop a deeper understanding of how the lymphatic system regulates immunity in homeostasis and disease, particularly in cancer and chronic inflammation. Her lab applies this knowledge to develop novel immunotherapeutic approaches in cancer, including lymph node-targeting vaccine approaches, as well as in vitro model systems that recapitulate relevant features of the 3D, perfused tumor microenvironment.

KEYNOTE SPEAKERS

FARSHID GUILAK, Washington University in St. Louis

Farshid Guilak is a Professor of Orthopaedic Surgery at Washington University in St. Louis, Director of Research for the St. Louis Shriners Hospitals for Children, and co-director of the Washington University Center of Regenerative Medicine. He also has appointments in the Departments of Developmental Biology and Biomedical Engineering. His laboratory is pursuing a multidisciplinary approach to investigate the etiology and pathogenesis of various musculoskeletal diseases – particularly arthritis – as a basis for developing new bioengineering-based therapies. He has published over 300 articles in peer-reviewed journals and has co-edited four books. Dr. Guilak is the editor-in-chief of the *Journal of Biomechanics*, Associate editor for *Osteoarthritis & Cartilage*, and serves on several other journal editorial boards. He is also the Founder and President of Cytex Therapeutics, a startup company focusing on developing new regenerative medicine therapies for musculoskeletal conditions.

DENNIS DISCHER, University of Pennsylvania

Dennis E. Discher is the Robert D. Bent chaired Professor at the University of Pennsylvania and Director of a National Cancer Institute (NCI)-designated Physical Sciences Oncology Center at Penn (PSOC@Penn). His lab discovered matrix elasticity effects on stem cell differentiation. Ongoing studies range from the basic mechanobiology of diverse stem cells, cancer cells, and nuclei to the soft matter physics and chemistry of natural and synthetic polymers via computation and application to disease. Recent efforts focus most specifically on physical determinants of DNA damage and genome variation, as well as macrophage engineering to attack tumors. He has been at Penn since 1996 and has faculty appointments in Engineering & Applied Science as well as Physics, Pharmacology, and Cell & Molecular Biology. He is an elected member of the US National Academy of Medicine, the US National Academy of Engineering, and a Fellow of the American Association for the Advancement of Science, with additional honors and Service including the Friedrich Wilhelm Bessel Award from the Humboldt Foundation of Germany, Chair of the NIH Gene & Drug Delivery Study Section, and membership on the Editorial Board for Science.

KEYNOTE SPEAKERS

MOLLY STEVENS, Imperial College London

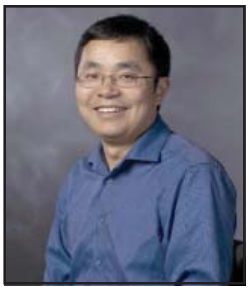
Dr. Molly Stevens is Professor of Biomedical Materials and Regenerative Medicine & Research Director for Biomedical Material Sciences at Imperial College London. Her research focusses on designing and developing innovative bio-inspired materials for applications in regenerative medicine, tissue engineering, and biosensing and has been recognised by over 20 major awards, including the 2016 Clemson Award from the Society for Biomaterials.

TODD McDEVITT, Gladstone Institute/UC, San Francisco

Todd McDevitt is a Senior Investigator at the Gladstone Institutes and a Professor in the Department of Bioengineering and Therapeutic Sciences at the University of California, San Francisco. Dr. McDevitt has 20 years of experience in biomaterials and tissue engineering research and for the past 15 years has focused primarily on stem cell and tissue engineering. The primary objective of Dr. McDevitt's research is to engineer stem cell technologies capable of directing differentiation and morphogenesis more effectively in order to create new models of development and disease, novel drug screening platforms, and regenerative medicine therapies. The McDevitt laboratory has been a leader in the development of novel 3D suspension culture platforms for stem cell morphogenesis and scalable biomanufacturing. In addition to stem cell tissue engineering efforts, the McDevitt laboratory has also innovated several parallel approaches to develop stem cell-derived molecular therapies for immunomodulation, tissue repair and regeneration, and anti-aging applications.

INVITED SPEAKERS

Dr. Guy
Genin



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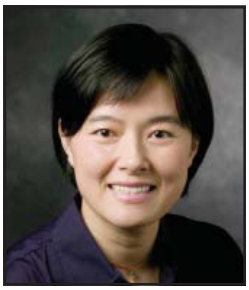

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Dahl

POSTERS

Abstracts are available online at www.BMES.org/CMBEConf18Abstracts

Poster teaser presentations (*denoted below): Wed, Jan 3, 10-10:45am
Poster session: Thurs, Jan 4 and Fri, Jan 5, 10-11:00am

Poster No.	Authors	Title
P1	Nasya Sturdivant, Hector Rosas-Hernandez, Syed Ali and Kartik Balachandran	Characterization of blood-brain barrier breakdown in an in vitro stretch model and in vivo closed-head injury model of mild to moderate traumatic brain injury
P2	Marina Shumakovich, Gregory Dawson and Kimberly Stroka	Engineered Hyaluronic Acid Matrices for Studying Unique Mechanobiology of Tumor Metastasis Across the Blood-Brain Barrier
P3	Michelle Dawson, Deepraj Ghosh and Botai Xuan	Biophysics of Giant Polyploidal Cancer Cells that Form in an Aging Tumor Stroma
P4	Amina Mohammadalipour, Monica Burdick and David Tees	Biomechanical phenotype of breast cancer stem cells
P5	Karin Wang and Jeffrey Fredberg	Reshaping the breast tumor boundary by initiating collective migration in a model system
P6	Andy Fleszar, Darian James, Alyssa Walker, Paul Weisman, Paul Campagnola and Pamela Kreeger	The physical properties of ovarian cortical inclusion cysts promote fallopian tube epithelial cell invasion
P7	Michael Mitchell	Disrupting Physical Interactions Between Multiple Myeloma and the Bone Marrow Niche In Vivo via Nanoparticle-Mediated RNAi
P8	Nabiollah Kamyabi and Siva Vanapalli	Cancer cells survive mechanical fragmentation under microcirculatory conditions
*P9	Isabelle Stasenko, Efraín Cermeño and Andrés García	Breast Cancer Cell Adhesive Properties and Correlation to Tumor Initiating Cell (TIC) Phenotype
P10	Hydari Begum, Kristen Nemes and Keyue Shen	Understanding Metabolic Reprogramming at the Tumor-Stromal Interface In Vitro
P11	Rebecca Moriarty and Kimberly Stroka	Effect of mechanical confinement on sarcoma cell cycle progression
P12	Yamicia Connor, Yonatan Tekleab, Sarah Tekleab, Shyama Nandakumar, Divya Bharat and Shiladitya Sengupta	A 3D Co-Culture Model of Tumor-Endothelial Interaction
P13	Andres Rubiano, Song Han, Steven Hughes and Chelsey Simmons	Stromal Remodeling Protects Pancreatic Cancer Cells from Chemotherapy in 3D Microtissues
P14	Isaac Adjei, Madison Temples, Julie Djeu and Blanka Sharma	Engineering Tumor Microenvironments to Investigate Natural Killer Cell-Cancer Cell Interactions
P15	Manisha Shah, Elizabeth Leary, Jeffrey Morgan and Eric Darling	Incorporation of Cell Mimicking Microparticles into a 3D Tumor Model of Melanoma
P16	Zhen Ma, Nathaniel Huebsch, Bruce Conklin, Costas Grigoropolous and Kevin Healy	Biomechanics-guided disease modeling of human familial cardiomyopathy
P17	Jesse Rogers, Angela Zeigler, Jeffrey Saucerman, Jeffrey Holmes and William Richardson	Fibroblast Systems Mechanobiology Model Predicts Mechano-Adaptive Infarct Therapies
P18	Lauren Baugh, Phil Hinds, Gordon Huggins and Lauren Black	CD44 Signaling Promotes Mineralization in an in Vitro Model of CAVD
P19	Hanna Sanyour, Josh Childs, Na Li, Alex Rickel and Zhongkui Hong	Does Membrane Cholesterol Regulate the Biomechanics and Migration of Vascular Smooth Muscle Cell Substrate Stiffness Dependently?
*P20	Ishita Tandon, Olivia Kolenc, Kyle Quinn and Kartik Balachandran	Label-Free Metabolic Imaging to Assess Calcific Aortic Valve Disease Progression
P21	Katelyn Reece and David Long	Imaging the Glycocalyx on Human Microvascular Endothelial Cells (HMEC-1)
P22	Jessica Perez, Ishita Tandon and Kartik Balachandran	Role of Local Renin-Angiotensin System in Altering Aortic Valve Function and Remodeling
P23	Debanjan Mukherjee and Shawn C. Shadden	The Role Of Hemodynamics In Organizing Transport In Thrombus Neighborhood
P24	Sarah Basehore and Alisa Clyne	Shear stress alters endothelial glucose metabolism
*P25	Ian Harding, Solomon Mensah, Ming Cheng, Ronodeep Mitra and Eno Ebong	The Endothelial Glycocalyx Under Flow: An Important Factor in Endothelium Function
P26	Deborah Leckband, Arkaprava Dan, Xinyu Kong and Roberto Andresen-Eguiluz	Adhesion Proteins and Growth Factor Receptors Coordinate to Regulate Endothelial Mechanotransduction

POSTERS

Abstracts are available online at www.BMES.org/CMBEConf18Abstracts

Poster No.	Authors	Title
P27	Rosalyn Sayaman, Claire Robertson, Wen-Rong Lie, Amir Jaberi, Zheyun Xu, Mark Labarge and Mina Bissell	Fibronectin disrupts normal breast myoepithelial function in basement membrane homeostasis and promotes alteration of laminin network microstructure
P28	Joseph O'Connor, Sandeep Nalluri, Paul Blanchard and Esther Gomez	Biophysical regulation of epithelial-mesenchymal transition
P29	Joshua Morgan, Peter Sariano, Olivia Powell and Jason Gleghorn	Leveraging embryonic development to generate a functional smooth muscle culture model
P30	Yanitza Rodriguez	Studying the Cellular Mechanisms of Epilepsy: Characterization of Cerebral Organoids with PCDH19 Mutation
P31	Christopher Neal, Braden Stuart, Robert Tung and A.J. Mellott	Culturing Human Wharton's Jelly Cells in the Presence of Mechanical Tension as a Model of Cutaneous Wound Healing
P32	Evan Phillips, Brett Haislup, Joseph Sincavage, Katsiaryna Prudnikova, Mary Mulcahey, Michele Marcolongo	Diffusion of Biomimetic Proteoglycans Results in Cartilage Pericellular Augmentation: A New Model to Explore Mechanotransduction
*P33	Matthew Fisher, Stephanie Cone and Paul Warren	The Anterior Cruciate Ligament of the Knee: A Unique Model for Exploring the Impact of Mechanobiology at Multiple Scales During Post-Natal Growth
P34	Judith Piet, Roland Baron and Sandra Shefelbine	Mechanobiology in the aging skeleton: Can old bones respond to load?
*P35	Timothy Jacobsen, Paula Hernandez and Nadeen Chahine	Actomyosin Contractility Mediates Multiscale Mechanobiology of the Intervertebral Disc in Pro-Inflammatory Environments
P36	Emily Moore, Yaxing Zhu, Han Seul Ryu and Christopher Jacobs	Periosteal osteochondroprogenitors contribute to load-induced adult bone formation through a primary cilium-mediated mechanism
P37	Brittany Jacobs and Kyle Allen	Exercise Effects on Gait in a Rodent Model of Osteoarthritis
P38	Whasil Lee, Andrea Schwartz, Holly A. Leddy, Amy L. McNulty, Farshid Guilak and Wolfgang Liedtke	Enhanced expression and function of the mechanosensitive ion channel Piezo1 in osteoarthritic chondrocytes
*P39	Ryan Mcdonough, Janty Shoga and Christopher Price	DREADDs: A Tool for the Chemogenetic Manipulation of Chondrocyte Activity In Vitro
P40	Salma Mahzoon and Michael Detamore	Bioactive Peptides for Designing Chondroinductive Biomaterials
P41	Abdolrasol Rahimi, Ryan Richter and Natasha Case	Effects of Varying Low Intensity Ultrasound Parameters on Osteoblast Responses
P42	Michael Duffy, Mckenzie Sup and Christopher Jacobs	Adenylyl cyclase 3 is differentially expressed in osteocyte primary cilia and contributes to mechanotransduction
P43	Brian Graham, Axel Moore, Margot Farnham, David Burris and Christopher Price	The Role of Activity in Cartilage Function and Homeostasis: Implications for Joint Health
*P44	Johanna Farkas, James Monaghan and Sandra Shefelbine	Exploring joint morphogenesis in regeneration of the axolotl salamander limb
P45	Lauren Resutek and Adam Hsieh	Chordoma Cell Mechanosensitivity to Substrate Stiffness is Dependent on Vimentin Intermediate Filaments
P46	Andrew Tamashunas, Vincent Tocco, James Matthews, Hendrik Luesch, Jonathan Licht and Tanmay Lele	Abnormal Nuclear Morphologies in Cancer: Role of Chromatin Regulators
P47	In Kyu Sung, Zhiyao Ma, Wai Ki Wong, Hon Chung Chau, Singwan Wong, Yifei Yao and Arthur Mak	Intracellular Redox Status and Myoblast Viability Under Prolonged Compressive Loading
*P48	Joel Boerckel, Pinar Zorlutuna, Mervin Yoder and Devon Mason	Cytoskeletal feedback control of mechanotransduction and cell motility by YAP/TAZ
*P49	Bo-Jian Lin, Shun-Hao Tsao and Grace Chao	Lipid Rafts Sense and Direct Electric Field-induced Migration
P50	Yijia Pan, Linda Shi, Daryl Preece, Veronica Gomez-Godinez, Seung-Hynn Woo, Shaoying Lu, Shu Chien, Michael Berns and Yingxiao Wang	Laser induced shockwave elicits the transient mode of the biomodal actions of mechanosensor Piezo1
P51	William Bachman and David Long	Force Transmission and Morphological Variation in Populations of Endothelial Cell Clusters

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Abstracts are available online at www.BMES.org/CMBEConf18Abstracts

Poster No.	Authors	Title
P52	Mary Doolin and Kimberly Stroka	Human Mesenchymal Stem Cell Nuclei Deform Anisotropically in Response to Mechanical Confinement
P53	Morgan Chabanon, James Cs Ho, Atul N Parikh and Padmini Rangamani	Pulsatile Lipid Vesicles as a Model for Osmotically Activated Artificial Cells
P54	Rosa Kaviani, Chris Sitaras, Haruka Yoshie and Allen Ehrlicher	Filamin A mechanosensing in shear stress
P55	Daniel Stewart, P. Nicole Serrano, Malcolm Maden and Chelsey S. Simmons	Influences of Matrix Elasticity on Dermal Fibroblasts in Regenerative Mouse Model
P56	A.J. Mellott	Breaking the Barrier to Mesenchymal Stem Cell Expansion Through a Novel 3D Expandable Scaffold
*P57	Xufeng Xue, Yubing Sun, Agnes Resto-Irizarry, Koh Meng Aw Yong, Yi Zheng, Yue Shao, Shinuo Weng and Jianping Fu	Mechanically Guided Emergent Patterning of Neuroectoderm Tissue Using Human Pluripotent Stem Cells
P58	Kerim Kaylan, Ian Berg and Gregory Underhill	Notch signaling coordinates with cell contractility to regulate biliary differentiation of liver progenitor cells
P59	Arghya Paul	Mechanobiologically-Activated Stem Cells for Cardiac Repair : in vitro and in vivo studies
P60	Hao Ma, Shengchang Tang, Po-Chiao Lin and Kristi Anseth	Controlling differentiation of human mesenchymal stem cells in viscoelastic synthetic microenvironments
P61	Jennifer Soto, Szeyue Wong, Julia Chu and Song Li	Role of Mechanotransducers in the Direct Conversion of Fibroblasts into Neurons
P62	Daniel Bowers and Justin Brown	A Systems Mechanobiology Approach to Understand the Role of ECM Geometry on Stem Cell Differentiation
P63	Glendon Plumton, Alfonso Martin-Pena, Glyn Palmer, Adam Biedrzycki, Vrunda Trivedi and Blanka Sharma	Hydrogels with Conditionally Active Reporters to Monitor Stem Cell Recruitment and Chondrogenesis
P64	Archana Singh and Prakriti Tayalia	Semi-synthetic hydrogel matrices for studying differences in cell behavior in 2D and 3D microenvironment
P65	Omar Banda, Ryan Taitano and John Slater	A Reference-Free Strain Measurement Platform for Mechanical Characterization of Hydrogels and Traction Force Microscopy
P66	Tolou Shokuhfar	Nanotubes with Optimal Stiffness for Enhanced Mechano-response of Osteoblasts
P67	Shikhar Mehta, Rebecca Reals, Andrew Doyle, Snehasis Bhakta, Armin Vedadghavami and Ambika Bajpayee	Co-targeting Multiple Joint Tissues with IL-1RA for Treatment of Osteoarthritis
P68	Muzhaozi Yuan, Ya Wang and Yi-Xian Qin	Promotion of neuro-cell motility and regeneration by nerve growth factor coated superparamagnetic iron oxide-gold nanoparticle and triggered by dynamic magnetic field
P69	Weikun Xiao, Alireza Sohrabi, Yasmin Ghochani, Christopher Walthers, Arshia Ehsanipour, Rongyu Zhang, Songping Sun, Jesse Liang, Lisa Ta, Harley Kornblum, David Nathanson and Stephanie Seidlits	Biomaterials Mimicking the Glioblastoma Microenvironment
P70	Moonhor Ree, Jin Chul Kim, Kyungho Kwon, Jongchan Lee and Hoyeol Lee	Self-Assemblies of Organic Polymers and Their Biosensing Characteristics
P71	Michael Yaeger, Barbara Muller-Borer, Sky Reece, Brita Kilburg-Basnyat, Bin Lou, Mary Thomassen, Mike Fessler, Kimberly Kew, William Allen and Kymberly Gowdy	Designing a Dysfunctional High Density Lipoprotein (D-HDL) Mimetic Peptide to Better Characterize D-HDL Function
*P72	Shengchang Tang, Hao Ma, Po-Chiao Lin and Kristi Anseth	Developing novel viscoelastic hydrogels based on boronate esters for understanding cell-matrix interactions
P73	Shruti Salunkhe, Divya Bijukumar, Dalton Morris, Deborah Hall, Robin Pourzal and Mathew Mathew	Experimental Evidence of Macrophages on Cell Induced Corrosion of CoCrMo alloy: Hip Implant Application
P74	N'Dea Irvin-Choy	Bio Metamaterials for Orthopedics

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Abstracts are available online at www.BMES.org/CMBEConf18Abstracts

Poster No.	Authors	Title
P75	Daniel Chester, Rahul Kathard, Jeremy Nortey and Ashley Brown	Colloidal Thin Films with Highly Controllable Viscoelastic Properties for Directing Cellular Responses
P76	David Medina Cruz and Thomas Webster	Synthesis and Characterization of Biogenic Selenium Nanoparticles with Antimicrobial Properties Made by Staphylococcus aureus, Methicillin-resistant Staphylococcus aureus (MRSA), Escherichia coli and Pseudomonas aeruginosa.
P77	Candice Sears, Eoin McNeill, Zach Richards, David Chimene, Nick Sears, Akhilesh Gaharwar, Carl Gregory and Roland Kaunas	Nanoengineered Ionic-Covalent Entanglement (NICE) Bioink that Mimics the Osteogenic Niche for Craniomaxillofacial Implants
P78	Tracie Ferreira, Nicholas Macedo, Antonio Cabral and Jaqueline Tran	Influencing Cell Membrane Potential with Electrotherapy to Promote Improved Wound Healing
P79	Anna Liu, Muhymin Islam, Nicholas Stone, Vikram Varadarajan, Jenny Jeong, Sam Bowie, Peng Qiu, Edmund Waller, Alexander Alexeev and Todd Sulchek	Ultrafast microfluidic mechanical compression of cells for efficient intracellular delivery of large macromolecules
P80	Md Shamim Ahmmed and Siva Vanapalli	Multidimensional High Throughput Mechanical Phenotyping of Cells
P81	Daniel Shiwarski, Joshua Tashman, Malachi Blundon, Brooke McCartney and Adam Feinberg	Mapping 3D Mechanical Strains during Tissue Morphogenesis with a Novel Fibronectin-based Nanomechanical Biosensor
P82	Kai Wang, Jiafeng Liu and Yong Yang	Understanding Nanotopographical Modulation of Cell Behavior
*P83	Eleanor Ory, Desu Chen, Kristi Chakrabarti, Keyata Thompson, Cornell Lee, Wolfgang Losert and Stuart Martin	Microtentacle Features and Dynamics of Tumor Cells on Lipid Tethering Surfaces
P84	Katherine Young, Tom Bongiorno, John McDonald and Todd Sulchek	Single Cell Genomechanics: New Method to Combine Mechanical and Gene Expression Data on Single Cell Level
P85	Heesoo Kim, Kyungho Kwon, Changsub Kim and Jongchan Lee	A New Cell-Membrane Mimicking System and Its Biological Affinities
P86	Daniel Whitefield, Stephen Spagnol, Travis Armiger, Li Lan and Kris Dahl	Quantifying DNA Damage Response in Transcriptionally Active vs Repressed Chromatin
*P87	Mizanur Rahman, Marton Toth, Taslim Anupom, Monica Driscoll and Siva Vanapalli	Hammering worms and neural mechanobiology: Insights into traumatic brain injury
*P88	Travis Armiger, Marsha Lampi, Cynthia Reinhart-King and Kris Dahl	Probing Epithelial Monolayers with Subnuclear Sensors of Cellular Forces
P89	James Carrow, Lauren Cross, Robert Reese, Manish Jaiswal, Carl Gregory, Roland Kaunas, Irtisha Singh and Akhilesh Gaharwar	Whole-Transcriptome Analysis of Two-Dimensional Nanosilicates to Discern Pivotal Cellular Pathways
P90	Samantha Pellegrino and Christopher Norberg	Cytotoxicity Analysis of Lipidic Ionic Liquids for Biomedical Applications

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SCHEDULE-AT-A-GLANCE

TUESDAY, JANUARY 2, 2018		
3:00 pm - 7:00 pm	Registration	Town Hall

WEDNESDAY, JANUARY 3, 2018		
7:00 am - 1:30 pm	Registration	Town Hall
7:00 am - 7:45 am	Continental breakfast	Town Hall
7:45 am - 8:00 am	Welcome/Introduction	South Ballroom
8:00 am - 10:00 am	SESSION I - BIOINSPIRED ENGINEERING: MECHANOBIOLOGY OF MORPHOGENESIS AND DEVELOPMENT	South Ballroom
10:00 am - 10:45 am	Poster teaser session with coffee break	North Ballroom
10:45 am - 1:25 pm	SESSION II - RISING STARS	South Ballroom
1:30 pm - 3:00 pm	Lunch with leaders (by invitation only)	Tarpon Room
1:30 pm - 6:00 pm	Afternoon break	
6:00 pm - 7:00 pm	Registration	Town Hall
6:00 pm - 8:00 pm	Welcome reception	Lagoon/beach

THURSDAY, JANUARY 4, 2018		
7:00 am - 2:00 pm	Registration	Town Hall
7:15 am - 8:00 am	Continental breakfast	Town Hall
8:00 am - 10:00 am	SESSION III - MULTISCALE MECHANOBIOLOGY OF HEALTH & DISEASE I	South Ballroom
10:00 am - 11:00 am	Poster session with coffee break	North Ballroom
11:00 am - 1:00 pm	SESSION IV - MULTISCALE MECHANOBIOLOGY OF HEALTH & DISEASE II	South Ballroom
1:00 pm - 2:30 pm	Mentoring lunch (registeration required)	Sailfish Room
1:00 pm - 4:00 pm	Afternoon break	
4:00 pm - 6:00 pm	Workshop on NIH/NSF funding opportunities	South Ballroom
6:00 pm - 9:30 pm	Gala dinner	Palm Court

FRIDAY, JANUARY 5, 2018		
7:00 am - 1:00 pm	Registration	Town Hall
7:15 am - 8:00 am	Continental breakfast	Town Hall
8:00 am - 10:00 am	SESSION V - CELLULAR HETEROGENEITY AND SYSTEMS APPROACHES IN MECHANOBIOLOGY	South Ballroom
10:00 am - 11:00 am	Poster session with coffee break	North Ballroom
11:00 am - 1:00 pm	SESSION VI - NOVEL TOOLS FOR MECHANOBIOLOGY	South Ballroom
1:00 pm - 6:00 pm	Afternoon break (tentative Key West trip, registration required)	

SATURDAY, JANUARY 6, 2018		
7:00 am - 11:00 am	Registration	Town Hall
7:15 am - 8:00 am	Continental breakfast	Town Hall
8:00 am - 10:00 am	SESSION VII - MODULATING STEM CELL MECHANOBIOLOGY IN REGENERATIVE MEDICINE	South Ballroom
10:00 am - 10:15 am	Networking and coffee break	Town Hall
10:15 am - 12:15 pm	Panel discussion: Translating mechanobiology to the clinic	South Ballroom
12:15 pm - 12:45 pm	Awards ceremony, clonging remarks, and conference survey	South Ballroom

LEGEND

Registration	Sessions I-VII	Rising Stars	Funding workshop	Lunch with leaders
Evening events	Poster sessions	Afternoon breaks	Translational panel	Mentoring lunch

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