



Alabama State University  
Boston University  
Bryn Mawr College  
New Jersey Institute of Technology  
University of Calif. Los Angeles  
University of Pennsylvania  
Washington University in St. Louis

## Agenda

4<sup>th</sup> Annual Site Visit

April 27 and 28, 2020

The NSF Science and Technology Center for Engineering MechanoBiology

### DAY 1: Monday, April 27, 2020

BlueJeans link is activated at 7:45 AM

- 8:00 a.m. – 9:30 a.m. Center vision, legacy and an overview of accomplishments and plans for the future (Director and co-Directors ONLY)  
**1-Vivek Shenoy**, UPenn (55 min + 35 min Q&A)
- 9:30 a.m. – 10:00 a.m. NSF executive session
- 10:00 a.m. – 11:30 a.m. Research goals, outcomes, and accomplishments  
Accomplishments – first five years  
**2-Paul Janmey**, UPenn (20 min)  
Vision and outcomes – next five years  
**3-Elizabeth Haswell**, WashU (40 min)  
Q&A - 30 min
- 11:30 a.m. – 12:00 p.m. Selected technical presentation  
IRT 3: Mechanobiology of tissues  
**4-Dan Huh**, UPenn (20 min)  
Q&A - 10 min
- 12:00 p.m. – 12:30 p.m. NSF executive session and Lunch break
- 12:30 p.m. – 1:00 p.m. Site Visit Team interaction with Trainees
- 1:00 p.m. – 2:30 p.m. Poster session via BlueJeans links – *see pages 4-6 for details*
- Link – IRT 1
  - Link – IRT 2 -
  - Link – IRT 3 -
- 2:30 p.m. – 3:00 p.m. Selected technical presentation  
IRT 2: Mechanobiology of the nucleus  
**5-Joel Boerckel**, UPenn (20 min)  
Q&A - 10 min



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## Monday, April 27, 2020 (continued)

- 3:00 p.m. – 3:30 p.m. Selected technical presentation  
IRT 1: Mechanobiology of Cells (20 min)  
**6-Siobhan Braybrook, UCLA**  
**7-Charles Anderson, Penn State**  
Q&A - 10 min
- 3:30 p.m. – 4:00 p.m. NSF executive session
- 4:00 p.m. – 5:00 p.m. Meeting with administrators, *via NSF Zoom link*  
**Dawn Bonnell**, Vice Provost for Research, University of Pennsylvania  
**Vijay Kumar**, Dean, Penn Engineering  
**Jonathan Epstein**, Chief Scientific Officer, Perelman School of Medicine  
**David Meaney**, Senior Associate Dean, Penn Engineering  
**Aaron Bobick**, Dean, WashU Engineering  
**Moshe Kam**, Dean, NJIT Engineering  
**Manoj Mishra**, Director of the Center for Cancer Biology, Alabama State  
**Elise Morgan**, Associate Dean for Research, Boston University
- 5:00 p.m. – 6:00 p.m. Integration of research with education and knowledge transfer  
Industry integration  
**8-Robert Mauck**, UPenn (20 min)  
Education integration  
**9-Ram Dixit**, WashU (20 min)  
Q&A - 20 min
- 6:00 p.m. NSF executive session followed by critical feedback to PIs and a list of questions requiring clarification.
- 6:00 p.m. – (late) CEMB PIs : evening work session for response to NSF feedback



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## DAY 2: Tuesday, April 28, 2020

BlueJeans link is activated at 7:45 AM

- 8:00 a.m. – 9:30 a.m. CEMB's response to critical feedback (*CEMB Executive Committee - ONLY*)
- 9:30 a.m. – 10:00 a.m. NSF executive session
- 10:00 a.m. – 11:30 a.m. Education goals, outcomes, accomplishments, and vision  
Accomplishments and vision for future  
**10-Rebecca Wells**, UPenn (40 min)  
Evaluation and Education Partners Network (20 min)  
**11-Annie Jeong**, UPenn  
**12-Lizanne DeStefano**, external evaluator  
Q&A - 30 min
- 11:30 a.m. – 12:30 p.m. Diversity within the CEMB  
Accomplishments and vision for future  
**13-Treena Arinzeh**, NJIT (40 min + 20 min Q&A)
- 12:30 p.m. – 1:30 p.m. NSF executive session and Lunch break  
*Includes meeting with EAB members, **Peter Friedl** and **David Odde***
- 1:30 p.m. – 3:00 p.m. Knowledge Transfer within the CEMB  
Accomplishments and vision for future  
**14-Guy Genin**, WashU (20 min)  
High School Science Teacher Program (RET) (20 min)  
**15-Amanda Cottone**, UPenn  
**16-Elizabeth Hale**, Upper Darby High  
Collaboration with The Franklin Institute  
**17-Jayatri Das**, The Franklin Institute (20 min)  
Q&A - 30 min
- 3:00 p.m. – 4:00 p.m. Final Q&A and additional critical feedback questions



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## IRT 1: ENGINEER THE RECURSIVE DIALOG BETWEEN CELLS AND THEIR MECHANICAL ENVIRONMENT

BlueJeans Link:

Presenter: **Faviolla A. Baez-Cruz**, Ostap Lab, University of Pennsylvania

Title: "Kinetic characterization of *Drosophila* myosin-Is"

Presenter: **Him Shweta**, PhD, Goldman Lab, University of Pennsylvania

Title: "New Monomeric Bright Yellow Genetically Encoded Fluorescent Protein"

Presenter: **Apurva Limaye**, Arinzeh Lab, New Jersey Institute of Technology

Title: "Zein Protein Fibrous Matrices for Promoting Cell Growth and Osteogenic Differentiation"

Presenter: **Ivan Radin**, PhD, Haswell Lab, Washington University in St. Louis

Title: "Physcomitrium patens Piezo homologs provide a potential vacuolar osmotic sensing mechanism required for normal protonemal growth and vacuolar morphology"

Presenter: **Richard Vincent**, Arinzeh Lab, New Jersey Institute of Technology

Title: "Glycosaminoglycan Mimetic Variants for Cartilage Tissue Regeneration"

Presenters: **Abigail Loneker**, Wells Lab, University of Pennsylvania and

**Kari Miller**, Haswell lab, Washington University in St. Louis

Title: "Mechanical Effects of Inclusions on Plant and Animal Cell Behavior"

**\*Pilot grant project\***

Presenter: **Palash Dutta**, PhD, Chen lab, Boston University

Title: "Piconewton Forces Measured Using  $\alpha$ -Actinin Tension Sensors at the Sarcomere Within Induced Pluripotent Stem Cell-derived Cardiomyocytes"



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## IRT 2: IMPLANT AND EXPLOIT MECHANICAL MEMORY

BlueJeans Link:

Presenters: **Natasha Bilkey**, Dixit Lab, Washington University in St. Louis

**Kalpna Mandal**, PhD, Janmey Lab, University of Pennsylvania

Title: "Understanding how directional growth of plant roots influences mechano-sensation"

***\*Pilot grant project\****

Presenter: **Eoin McEvoy**, PhD, Shenoy Lab, University of Pennsylvania

Title: "Gap Junctions amplify spatial variations in cell volume and stiffness in proliferating solid tumors"

Presenter: **Yintong Chen**, Anderson Lab, Pennsylvania State University

Title: "PECTATE LYASE LIKE12 (PLL12) functions in plant growth and stomatal dynamics in *Arabidopsis thaliana*"

Presenter: **Ethan Hoppe**, Pickard and Genin Labs, Washington University in St. Louis

Title: "Arabidopsis Hypocotyl Viscoelasticity"

Presenter: **Su Chin Heo**, PhD, Mauck Lab, University of Pennsylvania

Title: "Degeneration Alter Chromatin Organization and Mechano-Responsivity in Human Tenocytes"

Presenter: **Manasvita Vashisth**, Discher Lab, University of Pennsylvania

Title: "Mechanosensing by the Lamina Protects against Nuclear Rupture, DNA Damage, and Cell-Cycle Arrest -- Interplay with Oxidative Stress"

Presenter: **Wonho Kim**, PhD, Jain Lab, University of Pennsylvania

Title: "Investigation of BRD4 function in the maintenance of chromatin architecture"



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### IRT 3: EMULATE CELL AND TISSUE FUNCTION FOR 4D ANALYSIS

BlueJeans Link:

Presenters: **Claudia Loebel**, MD, PhD, Burdick Lab, University of Pennsylvania

**Matthew Davidson**, PhD, Burdick Lab, University of Pennsylvania

Title: "Engineered lung alveolar organoids to probe fibrotic remodeling in COVID-19 induced lung injuries"

***\*Special, COVID-19 pilot project\****

Presenter: **Joseph Collins**, Boerckel Lab, University of Pennsylvania

Title: "YAP and TAZ mediate mechanical regulation of embryonic bone development"

Presenter: **Dongning Chen**, Wells Lab, University of Pennsylvania

Title: "The Effect of Large Proteoglycans on the Structure and Mechanics of Collagenous Matrices and Tissues"

Presenter: **Jose E. Zamora**, McCloskey Lab, UC Merced

Title: "Perivascular Tri-Cultures Generate Perfusable Vasculature"

Presenters: **Andy Clark**, Cheng Lab, Bryn Mawr College

**Emile Kraus**, Janmey Lab, University of Pennsylvania

**Alexander Bennett**, Carpick Lab, University of Pennsylvania

Title: "Ultra-soft Magnetorheological Elastomers for Biological Applications"

***\*Pilot grant project\****

Presenter: **Matthew Davidson**, PhD, Burdick Lab, University of Pennsylvania

Title: "Mechanochemical Adhesion and Plasticity in Multifiber Hydrogel Networks"

Presenter: **Ryan Calcutt**, Dixit Lab, Washington University in St. Louis

Title: "Developing Artificial Scaffolds for Plant Cell Growth"