iPoLS Annual Meeting 2018

Friday, June 22
Main Auditorium, Rice University BioScience Research Collaborative (BRC), 6500 Main St,

3:00-6:00  Introductory Remarks – Dr. Herbie Levine, Rice University
Talks – Session 1: DNA
3:10-3:55  Dr. Simon Mochrie – Introduction
4:00-4:15  Radoslav Aleksandrov – Coordinated repair of complex DNA lesions
4:20-4:35  Margaret Bullock – NF-κB-chromatin interactions drive diverse phenotypes by modulating transcriptional bursting
4:40-4:55  Dmitriy Bobrounikov – Genome-wide single-molecule positioning of nucleosomes within entire genes
5:00-5:20  Dr. Michele Di Perro – The three-dimensional architecture of the human genome: it’s nuclear physics!
5:25-5:40  Sumit Sinha – Collective phenomena of cells in evolving tumors
5:45-6:00  Melia Bonomo – Modularity and hierarchy in CRISPR-Cas target recognition

Saturday, June 23  Main Auditorium, Rice BRC

8:25-12:00  Welcome Remarks - Dr. Krastan Balgoev, NSF
Talks – Session 2: Mechanics
8:30-9:15  Dr. Arpita Upadhyaya – Introduction
9:20-9:40  Dr. Mauro Mugnai – Modeling the walking of Myosin VI Motor
9:45-10:00  Aravind Chandrasekaran – Intricate mechano-chemical interplay among actin filament treadmilling and the activities of Myosin

10:00-10:15  Coffee break
10:15-10:35  Dr. Antonin Fruleux – Variable tissue growth and mechanical response
10:40-10:55  Jordan Shivers – Mechanics of fibrous networks with embedded inclusions
11:00-11:15  Yanjun Yang – Role of the supracellular actomyosin cable during epithelial wound healing
11:20-11:35  Abby Bull – Physical control of Actin dynamics in immune cells
11:40-11:55  Jessica Faubel – Tailorable, regenerating hyaluronan brushes: A novel class of biointerfaces generated by hyaluronan

12:00-1:00  Lunch  BRC Event Space

12:45-2:45  Poster Session 1: Odd numbered posters
### 2:40-3:00  **Coffee break**

### 3:00-6:15  **Talks – Session 3: Molecules**

- **3:00-3:45**  
  Dr. Dave Thirumalai – Introduction

- **3:50-4:10**  
  Dr. Xingchen Lin – PAGE4 and conformational switching: Insights from molecular dynamics simulations and implications for prostate cancer

- **4:15-4:30**  
  Clark Templeton – The impact of magnesium concentration on the tertiary structure of an RNA model

- **4:35-4:50**  
  Mark Hortal – Forcing the reversibility of a mechanochemical reaction

- **4:55-5:10**  
  Yihang Wang – Predictive information bottleneck for sampling and driving rare events in biophysics

- **5:15-5:30**  
  Thomas Rademaker – A mathematical relationship between ligand antagonism and adversarial examples

- **5:35-5:50**  
  Dongheon Lee – Kinetic Monte Carlo modeling of multivalent binding of CTB proteins with GM1 receptors

- **5:55-6:10**  
  Weilu Shen – Light-activated substrates for intracellular delivery

### 6:40-6:45  **Board buses at BRC for dinner at St. Arnold’s Brewery**

### 7:00-9:30  **Dinner at St. Arnold’s Brewery**

#### Sunday, June 24  **Main Auditorium, Rice BRC**

- **8:30-12:15**  
  **Talks – Session 4: Organisms**

- **8:30-9:15**  
  Dr. Josh Shaevitz – Introduction

- **9:20-9:50**  
  Dr. Minsu Kim – Stochastic nature of bacterial eradication using antibiotics

- **9:55-10:10**  
  Ashish George – Chirality provides a direct fitness advantage and facilitates intermixing in cellular aggregates

- **10:15-10:30**  
  **Coffee**

- **10:30-10:45**  
  Cassidy Yang – Exploring the 3D mechanics of *Myxococcus xanthurus* aggregation

- **10:50-11:10**  
  Dr. Yasemin Aydin – Design of a soft earthworm robot

- **11:15-11:30**  
  Jeff Gau – Springs and wings: energetic consequences of deformable structures in insect flight

- **11:35-11:50**  
  Bahnisikha Dutta – Prey and mound disassembly, manipulation and transport by fire ant swarms

- **11:55-12:10**  
  Olga Shishkov – Competition of feeding fly larvae causes active mixing

#### Monday, June 25  **Main Auditorium, Rice BRC**

- **8:30-12:15**  
  **Talks – Session 5: Systems**

- **8:30-9:15**  
  Dr. Mohit Kumar Jolly - Introduction

- **9:20-9:50**  
  Dr. Qiong Yang – From molecules to development: revealing mechanisms and functions of biological clocks
Tyler Smith – Increased dimensionality of cell-cell communication can decrease the precision of gradient sensing

Dongya Ji – Systems biology analysis of cancer metabolism

Coffee break

Dr. Rati Sharma – Stress response dynamics that span different signaling pathways

Roshni Bano – Studying fluctuations in the chemotactic signaling network in \( E.\ coli \)

Shubham Tripathi – A mechanism for epithelial-mesenchymal plasticity in populations of cancer cells

Sarthak Chandra – Locally tree-like approximations for avalanches on networks: Limitations and extensions

Lunch and Workshops

Event Space for lunches, Alternative Career Panel in Auditorium, Science iPoLS Business meeting for PoLS Faculty, Event Space

Poster Session 2: Even numbered posters  BRC Event Space

Coffee break

Talks – Session 6: Information Processing

Dr. Ilya Nemenman – Introduction

Thomas Dupic – Genesis of alpha-beta T-cell receptor through high-throughput pairing

Jason George – Stochastic modeling of tumor progression and immune evasion

Jacob Baron – Invariances in a combinatorial olfactory receptor code

Coffee break

Xiaowen Chen – Searching for collective behavior in a small brain

Zachary Jackson – Dynamics of Tinnitus and coordinated reset therapy

Chaoyi Jin – Diffusion dynamics of AMPAR receptors under basal and LTP conditions

Baohua Zhou – Chance, long tails, and inference: a non-Gaussian, Bayesian theory of vocal learning in songbirds

Tuesday, June 26  Main Auditorium, Rice BRC

Talks – Session 7: New directions in Biophysics

Dr. Zan Luthey-Schulten – Synthetic cells

Dr. Erez Aiden – DNA Structure

Dr. Jeff Molldrem – Immunology and Cancer

Dr. Kirsten Siebach – Mars Rover Mission
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