**Cancer Systems Biology Consortium (CSBC) & Physical Sciences-Oncology Network (PS-ON)**

**Annual Investigators Meeting**

September 25-28, 2018, Natcher Conference Center, NIH Campus, Bethesda, MD

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### Tuesday, September 25, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>*9:30–11:00 am</td>
<td><strong>CSBC/PS-ON Education and Outreach &amp; Patient Advocacy Working Groups</strong></td>
<td>Room G1/G2</td>
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<tr>
<td>12:00 – 1:00 pm</td>
<td>Check-in</td>
<td>Lobby</td>
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<tr>
<td>1:00 – 1:30 pm</td>
<td><strong>Welcoming Remarks and Meeting Overview</strong></td>
<td>Auditorium</td>
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<td></td>
<td>Dan Gallahan, PhD, Deputy Director, Division of Cancer Biology, NCI</td>
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<tr>
<td>1:30 – 2:50 pm</td>
<td><strong>Session I: Lightning Talks: Overviews of U54 Centers</strong></td>
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<td>Chair: Nastaran Zahir, PhD, Associate Director, Division of Cancer Biology, NCI</td>
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<td>2:50 – 3:00 pm</td>
<td><strong>Mathematical Oncology bioRxiv Collection</strong></td>
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<td>Alexander (Sandy) Anderson, PhD, Chair, Integrated Mathematical Oncology, H. Lee Moffitt Cancer Center</td>
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<td>Jennifer Couch, PhD, Chief, Structural Biology and Molecular Applications Branch, Division of Cancer Biology, NCI</td>
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<td>3:00 – 5:00 pm</td>
<td><strong>Poster Session</strong></td>
<td>Atrium</td>
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### Wednesday, September 26, 2018

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 – 9:00 am</td>
<td>Check-in</td>
<td>Lobby</td>
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<tr>
<td>9:00 – 9:20 am</td>
<td><strong>Opening Remarks by the NCI Director</strong></td>
<td>Auditorium</td>
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<td>Ned Sharpless, MD, Director, NCI</td>
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<td></td>
<td><strong>With introduction by Dinah Singer, PhD, Deputy Director (Acting), NCI; Director, Division of Cancer Biology, NCI</strong></td>
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<td>9:20 – 11:20 am</td>
<td><strong>Session 2: Cellular and Extracellular Interactions</strong></td>
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<td>Chair: Andrea Bild, PhD, Professor, Medical Oncology and Therapeutics Research, City of Hope</td>
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<tr>
<td>9:20</td>
<td>Scientific Presentations</td>
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<td></td>
<td>Monitoring dynamic heterogeneous responses to microenvironmental signals and therapeutic inhibitors</td>
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<td><strong>Laura Heiser, PhD, Associate Professor, Biomedical Engineering, Oregon Health &amp; Science University</strong></td>
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<td>9:40</td>
<td>Engineered ECM platforms to analyze progression in high grade serous ovarian cancer</td>
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<td><strong>Pam Kreeger, PhD, Associate Professor, Biomedical Engineering, University of Wisconsin</strong></td>
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<td>10:00</td>
<td>Metabolic status and adaptability of breast cancer stem cells</td>
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<td><strong>Gary Luker, MD, Professor, Radiology and Biomedical Engineering, Molecular Biology and Immunology, University of Michigan</strong></td>
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<td>10:20</td>
<td>Fructose Fuels Metabolic and Epigenetic Reprogramming of Liver Metastasis</td>
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<td><strong>Xiling Shen, PhD, Hawkings Family Associate Professor, Biomedical Engineering, Duke University</strong></td>
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CSBC & PS-ON Annual Investigators Meeting
Sept 25-28, NIH, Natcher Conference Center

Invited speaker
10:40 Real-Time In vivo Imaging of Immunotherapy
Mikael Pittet, PhD, Associate Professor, Radiology, Harvard Medical School

11:20 – 1:30 pm Networking Break
Room E1/E2

11:30 – 12:30 pm Scientific Working Group meetings
Tumor Deconvolution Working Group
Room G1/G2
Brain Tumor Working Group
Room 45A

12:30 – 1:30 pm Lunch – On Your Own
Working Lunch: Resource & Data Sharing Working Group
Room G1/G2

1:30 – 2:15 pm U01 Lightning Talks
Chair: Shannon Hughes, PhD, Program Director, Division of Cancer Biology, NCI
Auditorium

Session 3: Computational Modeling of Cancer for Precision Medicine
Session Chair: Justin Guinney, PhD
Vice President, Computational Oncology, Sage Bionetworks

Scientific Presentations
2:15 Pan-cancer analysis of time-to-distant metastasis in the context of node-positive and node-negative disease
Andrew Gentles, PhD, Assistant Professor, Biomedical Informatics Research, Stanford University

2:35 Joining Forces: Combining Machine Learning and Mechanistic Models to Predict Tumor Cell Density for Glioblastoma Patients
Kristin Swanson, PhD, Professor, Neurosurgery, Mayo Clinic

2:55 Exploiting space and trade-offs in drug scheduling using adaptive therapy
Alexander (Sandy) Anderson, PhD, Chair, Integrated Mathematical Oncology Department
H. Lee Moffitt Cancer Center

3:15 Modeling malignant myelopoiesis to increase efficacy of targeted leukemia therapy
John Lowengrub, PhD, Chancellor’s Professor, University of California, Irvine

Invited Speaker

3:35 Using deep learning to model the hierarchical structure and function of cancer cells
Trey Ideker, PhD
Division Chief, Medical Genetics, Professor of Bioengineering and Medicine
University of California, San Diego

4:30 – 6:00 pm Poster Session
Atrium

Thursday, September 27, 2018

9:00 – 11:00 am Session 4: Genetic and Proteomic Interactions
Session Chair: Trey Ideker, PhD, Division Chief, Medical Genetics, Professor of Bioengineering and Medicine, University of California, San Diego
Auditorium
## Scientific Presentations

**9:00**
Metabolome-wide features of therapeutic responses in head and neck cancer  
**Melissa Kemp, PhD, Associate Professor, Biomedical Engineering, Georgia Institute of Technology**

**9:20**
A structure-based physical interactome for the human proteome: Biophysical mechanisms for cellular dysregulation and a complementary resource for high-throughput experimental PPI methods  
**Diana Murray, PhD, Program Director, Systems Biology, Columbia University**

**9:40**
Systematic identification of the actionable kinase dependencies of chemotherapy-resistant triple-negative breast cancer  
**Jean-Philippe Coppé, PhD, Research Scientist, University of California, San Francisco**

**10:00**
Systems approach for mapping functional cancer genome atlases in vivo  
**Sidi Chen, PhD, Assistant Professor, Genetics and Systems Biology, Yale University**

### Invited Speaker

**10:20**
Development of new CRISPR/Cas9-based tools to study drug interactions and mechanisms of cellular uptake  
**Michael Bassik, PhD, Assistant Professor, Genetics, Stanford University**

### Networking Break

11:00 – 1:30 pm

#### 11:10 – 12:30
**Scientific Working Group Meetings**

- **Protein-Protein Interactions Working Group**  
  Room G1/G2

- **Single-Cell RNA Sequencing Working Group**  
  Room 45A

#### 12:30 – 1:30
**Lunch – On Your Own**

### 1:30 – 2:15 pm
**U01 Lightning Talks**  
**Session Chair: Nastaran Zahir, PhD, Associate Director, Division of Cancer Biology, NCI**

### 2:15 – 4:15 pm
**Session 5: Non-coding Genome**  
**Session Chair: Jonathan Licht, MD, Director, University of Florida Health Cancer Center**

#### Scientific Presentations

**2:15**
Micromechanics and structure of metaphase chromosomes and the cell nucleus  
**John Marko, PhD, Professor, Molecular Biosciences, Physics and Astronomy, Northwestern University**

**2:35**
Nuclear rupture at sites of high curvature compromises retention of DNA repair factors  
**Dennis Discher, PhD, Professor, Chemical and Biomolecular Engineering, Bioengineering, and Mechanical Engineering and Applied Mechanics, University of Pennsylvania**

**2:55**
Squish and squeeze - the role of the nucleus and lamins in breast cancer metastasis  
**Jan Lammerding, PhD, Associate Professor, Biomedical Engineering, Cornell University**

**3:15**
Enhancer Reprogramming Promotes Breast Cancer Cell Lineage Plasticity to Achieve Endocrine Resistance  
**Jason Liu, PhD, Assistant Professor, University of Texas Health Science Center - San Antonio**
Invited Speaker
3:35
The mechanisms underlying the impact of NSD2 overexpression on gene regulation in multiple myeloma

Jane Skok, PhD, Sandra and Edward H. Meyer Professor, Pathology, New York University School of Medicine; Director, Cancer Genome Dynamics Program, Perlmutter Cancer Center

4:15 – 4:45 pm
Break

4:45 – 6:00 pm
Steering Committee Face-to-Face Meetings
CSBC members only
Room G1/G2
PS-ON members only
Room 45A

Friday, September 28, 2018

9:00 – 11:30 am
Session 6: Translational Physical and Systems Biology
Auditorium

Session Chair: David Odde, PhD, Professor, Biomedical Engineering, University of Minnesota

9:00
Patient Advocacy
Carole Baas, PhD, Patient Advocate, NCI PS-ON

Scientific Presentations
9:30
Quantifying drug combination synergy along potency and efficacy axes
Vito Quaranta, MD, Professor, Biochemistry & Pharmacology, Vanderbilt University

9:50
A systems biology driven drug-repositioning strategy identifies digoxin as a potential treatment for Groups 3 and 4 medulloblastoma
Stephen T. Wong, PhD, John S. Dunn, Sr. Presidential Distinguished Chair, Biomedical Engineering; Director, Precision Oncology, Houston Methodist Cancer Center; Professor, Radiology, Pathology, Laboratory Medicine, Neurology, and Neuroscience, Cornell University

10:10
Linked single-cell biophysical and transcriptional profiles resolve heterogeneity in PDX models of B-cell acute lymphoblastic leukemia and suggest mechanisms of in vivo resistance
Scott Manalis, PhD, Professor, Biological and Mechanical Engineering, Massachusetts Institute of Technology

10:30
Synergistic interaction of physics and biology modulate biological barriers in the liver
Mauro Ferrari, PhD, Ernest Cockrell Jr. Presidential Distinguished Chair, President and CEO, Houston Methodist Research Institute, Director, Inst. For Academic Medicine

Invited Speaker
10:50
Biological Therapies for Brain Tumors
Fred Lang, MD. Professor, Neurosurgery, University of Texas, MD Anderson Cancer Center

11:30 – 12:45
Working Group Updates (10 min each)
Education & Outreach and Patient Advocacy
Resource & Data Sharing
Brain Tumor
Single-Cell RNA Sequencing
Protein-Protein Interactions
Tumor Deconvolution

12:45 – 1:00 pm
Closing Remarks by Dan Gallahan, PhD, Deputy Director, Division of Cancer Biology, NCI

1:00 pm
Meeting Adjournment