Saturday, June 25

6:30 p.m.-8:30 p.m.  Welcome and Keynote Lectures
Harbor Ballroom

**Session Chairperson: Joan S. Brugge**, Harvard Medical School, Boston, MA

6:30 p.m.-6:45 p.m.  Welcome and Opening Remarks
Joan S. Brugge

6:45 p.m.-7:30 p.m.  Reengineering the tumor microenvironment to improve cancer treatment:
Bench to bedside
Rakesh K. Jain, Harvard Medical School and Massachusetts General Hospital, Boston, MA

7:30 p.m.-8:15 p.m.  Advances in drug delivery
Robert S. Langer, Massachusetts Institute of Technology, Cambridge, MA

8:15 p.m.-8:30 p.m.  Discussion

8:30 p.m.-10:00 p.m.  Opening Reception
Galleria Hall

Sunday, June 26

7:30 a.m.-8:30 a.m.  Continental Breakfast
Harbor Foyer

8:30 a.m.-10:30 a.m.  Plenary Session 1: Cancer Modeling/System Biology
Harbor Ballroom

**Session Chairperson: Joe W. Gray**, Oregon Health & Science University, Portland, OR

8:30 a.m.-9:00 a.m.  An integrated omic-multiscale imaging view of breast cancer
Joe W. Gray

9:00 a.m.-9:30 a.m.  Game theory and personalized cancer treatment
Robert H. Austin, Princeton University, Princeton, NJ

9:30 a.m.-10:00 a.m.  New methods and better theory for pre-clinical cancer pharmacogenomics
Mario Niepel, Harvard Medical School, Boston, MA

10:00 a.m.-10:15 a.m.  Systems analysis of signaling pathway adaptation to design effective PI3K-based
combination therapies using ovarian cancer patient-derived xenografts*
Ioannis K. Zervantonakis, Harvard Medical School, Boston, MA

10:15 a.m.-10:30 a.m.  Implantable microdevice for in-situ precision medicine*
Oliver Jonas, Brigham & Women’s Hospital, Boston, MA

*Short talks from proffered abstracts
CONFERENCE PROGRAM

10:30 a.m.-11:00 a.m.  Break
Harbor Foyer

11:00 a.m.-1:00 p.m.  Plenary Session 2: Microfluidics and Model Systems
Harbor Ballroom

Session Chairperson: Cynthia A. Reinhart-King, Cornell University, New York, NY

11:00 a.m.-11:30 a.m.  Mechanism of metastatic migration and invasion in confined matrices
Cynthia A. Reinhart-King

11:30 a.m.-12:00 p.m.  Single cell functional proteomics and metabolomics: A conduit to physicochemical models of tumor biology
James R. Heath, California Institute of Technology, Pasadena, CA

12:00 p.m.-12:30 p.m.  Interstitial fluid pressure, matrix compliance, and tumor phenotype
Celeste M. Nelson, Princeton University, Princeton, NJ

12:30 p.m.-12:45 p.m.  Mechanobiology of epithelia on native basement membranes and relevance for cancer cell invasion*
Marija Plodinec, Institute of Pathology, University Hospital Basel, Basel, Switzerland

12:45 p.m.-1:00 p.m.  Mechanisms and pathophysiologic relevance of fluid shear stress resistance in malignant cells*
Michael Henry, University of Iowa, Carver College of Medicine, Iowa City, IA

1:00 p.m.-3:30 p.m.  Poster Session A/Lunch
Galleria Hall

3:30 p.m.-5:30 p.m.  Plenary Session 3: Tumor Mechanobiology
Harbor Ballroom

Session Chairperson: Valerie M. Weaver, University of California Medical Center, San Francisco, CA

3:30 p.m.-4:00 p.m.  Extrinsic and intrinsic forces regulate cancer progression and aggression
Valerie M. Weaver

4:00 p.m.-4:30 p.m.  Visualizing cell and matrix dynamics in tumors
Lance L. Munn, Harvard Medical School, Boston, MA

4:30 p.m.-5:00 p.m.  Targeting the mechanosensing machinery to limit glioblastoma initiation and invasion
Sanjay Kumar, University of California, Berkeley, CA

5:00 p.m.-5:15 p.m.  Glycoprotein-mediated tissue mechanics regulate glioblastoma aggression*
J. Matthew Barnes, University of California San Francisco, San Francisco, CA

5:15 p.m.-5:30 p.m.  VEGF-targeted therapy induces extracellular matrix remodeling and increases mechanical barriers to therapy in colorectal cancer liver metastases*
Dai Fukumura, Massachusetts General Hospital and Harvard Medical School, Boston, MA

*Short talks from proffered abstracts
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| 5:30 p.m.-6:45 p.m.| Funding Opportunities: Physical Sciences in Oncology Programs  
Harbor Ballroom  
Session Chairperson: Nastaran Z. Kuhn, National Cancer Institute, Bethesda, MD |
| 5:30 p.m.-5:45 p.m.| Nastaran Z. Kuhn                           |
| 5:45 p.m.-6:00 p.m.| Krastan B. Blagoev, National Science Foundation, Arlington, VA |
| 6:00 p.m.-6:15 p.m.| Pushpa Tandon, National Cancer Institute, Rockville, MD |
| 6:15 p.m.-6:30 p.m.| Piotr Grodzinski, National Cancer Institute, Bethesda, MD |
| 6:30 p.m.-6:45 p.m.| Jamie Meredith, Cancer Research UK, London, United Kingdom |
| 6:45 p.m.-6:00 p.m.| Evening off/Dinner on Own                  |

**MONDAY, JUNE 27**

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| 7:30 a.m.-8:30 a.m.| Continental Breakfast  
Harbor Foyer |
| 8:30 a.m.-10:30 a.m.| Plenary Session 4: Imaging  
Harbor Ballroom  
Session Chairperson: Ralph Weissleder, Massachusetts General Hospital, Boston, MA |
| 8:30 a.m.-9:00 a.m.| 2-hydroxyglutarate MR spectroscopy: A new window into glioma biology  
Elizabeth A. Maher, UT Southwestern Medical Center, Dallas, TX |
| 9:00 a.m.-9:30 a.m.| Imaging drug delivery and nanotherapeutics  
Ralph Weissleder |
| 9:30 a.m.-10:00 a.m.| Imaging tumor metabolism with hyperpolarized $^{13}$C-labeled cell substrates  
Kevin M. Brindle, Cancer Research UK Cambridge Research Institute, Cambridge, United Kingdom |
| 10:00 a.m.-10:15 a.m.| A biosensor mouse to predict the dissociation and spread of pancreatic cancer*  
Paul Timpson, The Garvan Institute of Medical Research, Sydney, Australia |
| 10:15 a.m.-10:30 a.m.| Mutant KRAS decouples glycolysis from cell mechanics in non-small cell lung cancer*  
Jin Suk Park, UT Southwestern Medical Center, Dallas, TX |
| 10:30 a.m.-11:00 a.m.| Break  
Harbor Foyer |

*Short talks from proffered abstracts
11:00 a.m.-1:00 p.m.  **Plenary Session 5: Drug Delivery and Nanomedicine**  
Harbor Ballroom  
**Session Chairperson: Mark Saltzman**, Yale University, New Haven, CT

11:00 a.m.-11:30 a.m.  Convection-enhanced delivery of nanomaterials for glioma  
Mark Saltzman  

11:30 a.m.-12:00 p.m.  Spherical nucleic acids as a powerful new platform for cancer immunotherapy  
Chad A. Mirkin, Northwestern University, Evanston, IL  

12:00 p.m.-12:30 p.m.  Engineering novel approaches to drug delivery  
Joseph M. DeSimone, University of North Carolina, Chapel Hill, NC  

12:30 p.m.-1:00 p.m.  Targeted polymeric nanoparticles: From academic innovations to clinical trials and lessons learned  
Omid C. Farokhzad, Brigham & Women’s Hospital, Boston, MA  

1:00 p.m.-3:00 p.m.  Free time/Lunch on own  

3:00 p.m.-5:00 p.m.  **Plenary Session 6: Tumor Immunology and Immunotherapy**  
Harbor Ballroom  
**Session Chairperson: Melody A. Swartz**, University of Chicago, Chicago, IL

3:00 p.m.-3:30 p.m.  Lymphatic vessels in the tumor microenvironment shape the response to immunotherapy  
Melody A. Swartz  

3:30 p.m.-4:00 p.m.  Material-based therapeutic cancer vaccines  
David J. Mooney, Harvard University, Cambridge, MA  

4:00 p.m.-4:30 p.m.  Engineering synergistic innate and adaptive immunotherapy  
K. Dane Wittrup, Massachusetts Institute of Technology, Cambridge, MA  

4:30 p.m.-4:45 p.m.  Polymeric mechanical amplifiers of tumor apoptosis*  
Michael John Mitchell, Massachusetts Institute of Technology, Cambridge, MA  

4:45 p.m.-5:00 p.m.  Significant improvements in therapeutic index for conjugated payloads using a nanoparticle-drug conjugate (NDC) platform to provide sustained drug release and potentially improved anticancer effects*  
Chester Metcalf, III, Cerulean, Waltham, MA  

5:00 p.m.-7:00 p.m.  **Poster Session B/Reception**  
Galleria Hall  

*Short talks from proffered abstracts
Tuesday, June 28

7:30 a.m.-8:30 a.m.  Continental Breakfast  
Harbor Foyer

8:30 a.m.-9:15 a.m.  Keynote Address  
Harbor Ballroom  
Session Chairperson: Joan S. Brugge, Harvard Medical School, Boston, MA
8:30 a.m.-9:15 a.m.  Non-coding RNA from discovery to therapy  
Phillip A. Sharp, MIT Koch Institute for Integrative Cancer Research, Cambridge, MA

9:15 a.m.-9:30 a.m.  Break  
Harbor Foyer

9:30 a.m.-11:30 a.m.  Plenary Session 7: RNA-based Therapies and Gene Editing  
Harbor Ballroom  
Session Chairperson: Daniel G. Anderson, Massachusetts Institute of Technology, Cambridge, MA
9:30 a.m.-10:00 a.m.  Nucleic acid delivery systems for RNA therapy and gene editing  
Daniel G. Anderson
10:00 a.m.-10:30 a.m.  Two new tools in oncology: CRISPR & Fluorescent In Situ Sequencing (FISSeq)  
George M. Church, Harvard Medical School, Boston, MA
10:30 a.m.-11:00 a.m.  Title to be announced  
Feng Zhang, Massachusetts Institute of Technology, Cambridge, MA
11:00 a.m.-11:30 a.m.  Progression to metastatic disease: Why is microRNA so crucial?  
Herbert Levine, Rice University, Houston, TX

Departure