

# 2017 Frontiers of Predictive Oncology and Computing II Meeting



Computational Pathology encompasses linked morphological and molecular tissue characterization. Cancer is a complex multi-faceted disease characterized by heterogeneous coupled tumor and stroma niches and by complex patterns tumor/host immune modulation and response. Accurate multi-scale tissue characterization is crucial to understanding of tumor heterogeneity and immune response. Gaining an understanding of multi-scale systems biology of cancer will play a central role in development, selection and personalization of targeted and immune therapies. Experimental data driving these efforts range from universally acquired Pathology studies scanned in using now inexpensive whole slide imaging platforms to data obtained using high end platforms capable of acquiring combined morphological and highly multiplexed molecular data.

Tissue analysis and modeling is both computation and data intensive – many crucial tasks have resource requirements that extend into and beyond the exascale range. The workshop will bring together researchers to shed light on relationship between cancer signaling pathway alternations, tumor niches, tumor immune suppression and host immune response. The focus of the workshop will be on developing a research agenda to drive computational pathology experimental design, cancer population studies and computational modeling.

## Primary Goals for the Meeting:

- Bring together experts from industry, government, and academia working across the combined frontiers of pathology, radiology (multi-scale imaging), predictive oncology and computing
- Provide insight into existing challenges and efforts to address challenges where multi-scale imaging, predictive oncology and computing share common opportunities
- Provide opportunities to share in discussion of new opportunities arising from new ideas for collaborations, cross-disciplinary education, and shared efforts to accelerate cancer research and clinical application of research advances
- Bring focus to the role of “computational pathology” across multiple time and length scales and areas of application ranging from digital pathology to opportunities in drug discovery and integrated multi-scale modeling
- Share future visions from multiple perspectives to develop a common appreciation for the integrated role domain knowledge, technology, and information will play in the future for computationally predictive oncology

## Meeting History:

The Frontiers of Predictive Oncology and Computing meeting is an annual event tying its origins to the original Biological Applications of Advanced Strategic Computing meetings initiated by Livermore National Laboratory. Bringing a specific focus to the challenges and opportunities for cancer, the first Frontiers of Predictive Oncology and Computing meeting was held July 2016 in Washington DC. At this meeting over 100 thought leaders from industry, government and academia converged to share insights, knowledge and vision for the future of computationally predictive oncology.

## This Year's Meeting:

The second Frontiers of Predictive Oncology and Computing meeting brings focus to the topic of “computational pathology”, discussing the broader application of technology, computation and domain expertise to understand and describe the specifics of cancer as a disease. With origins in digital pathology, extended in recent years to include molecular level signatures through sequencing and other forms of enhanced observation, the concept of “computational pathology” embraces the dynamic range of options from virtual microscopy to molecular to probe cancer and capture observations of disease behaviors across space and time scales. The Frontiers of Predictive Oncology and Computing meeting brings context to these methods of observation, providing insight into the key role the collected information plays in the development of computationally predictive oncology models and methods.

## Specific Topical areas to be discussed include:

- Longitudinal Multi-modal data in predictive oncology - Pre-diagnosis, detection, and post-diagnosis monitoring
- Multiscale data in predictive oncology – From molecular, cellular, and tumor, to organ, tissue, body, and population
- Clinical and commercial applications - Predictive oncology applied (metastasis, treatment decisions, treatment development, etc.)
- Computational frontiers - HPC, sensors, edge computing

FPOC II is an invitation-only event.

Registration Fees: \$250

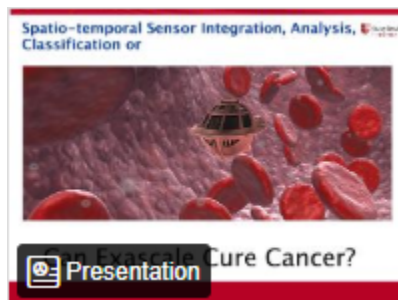
A downloadable version of the agenda may be found as follows:





## Day 1

### Day 1 Overview - Computational Pathology and Predictive Oncology: Joel Saltz, MD, PhD



### Keynote – Cancer Moonshot – One Year Later: Jerry Lee, PhD; Dmitri Kusnezov, PhD



### Plenary Session - Drivers for Predictive Oncology Impacting Computational Pathology – Patients, Treatments, and Improving Outcomes: John Baldoni, PhD





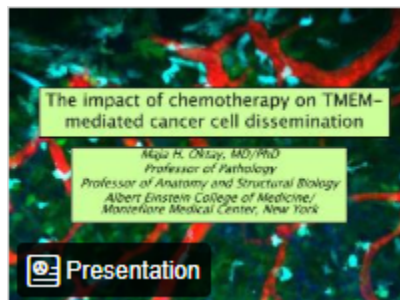
**Plenary Session - Drivers for Predictive Oncology Impacting Computational Pathology – Patients, Treatments, and Improving Outcomes: Janet Eary, MD**



**Plenary Session - Drivers for Predictive Oncology Impacting Computational Pathology – Patients, Treatments, and Improving Outcomes: Kun Huang, PhD**

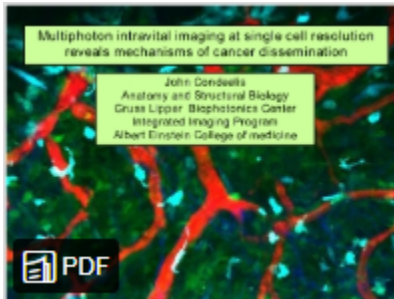


**Plenary Session - Frontier Technologies to Probe Biology – Unlocking Frontiers of Computational Pathology: Maja Oktay, MD, PhD**





**Plenary Session - Frontier Technologies to Probe Biology – Unlocking Frontiers of Computational Pathology: John Condeelis, PhD**



**Plenary Session - Frontier Technologies to Probe Biology – Unlocking Frontiers of Computational Pathology: Vesteinn Thorsson, PhD**

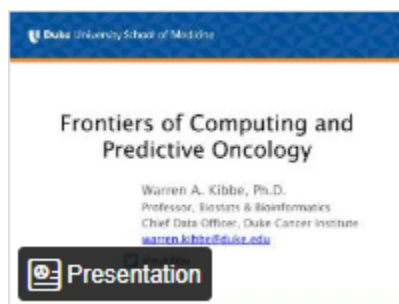


**Panel Session - Exploring the Frontiers of Computing and the Future of Computational Pathology: Scott Hammond, MD**

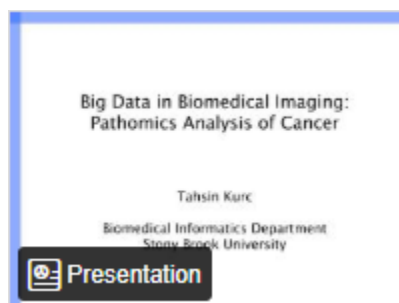


**Panel Session - Exploring the Frontiers of Computing and the Future of Computational Pathology: Warren Kibbe, PhD**





### Panel Session - Exploring the Frontiers of Computing and the Future of Computational Pathology: Tahsin Kurc, PhD



### Panel Session - Exploring the Frontiers of Computing and the Future of Computational Pathology: Fred Streitz, PhD



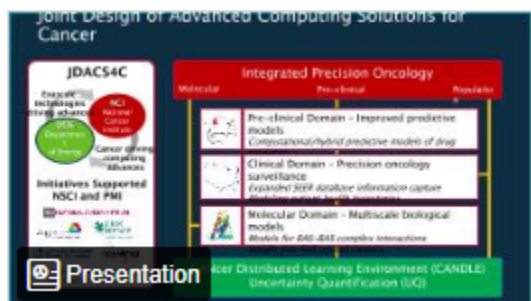
## Day 2

### Keynote – Towards a Digital Pathology Commons: Michael Becich, MD, PhD

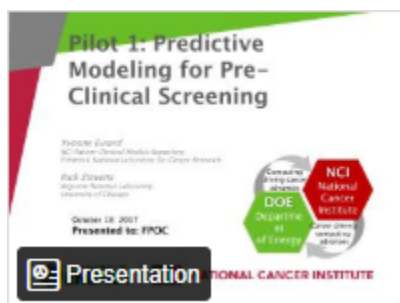




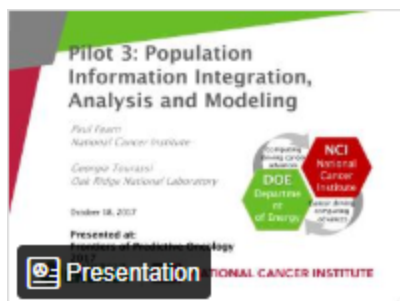
**Plenary Session – Joint Design of Advanced Computing Solutions for Cancer (JDACS4C): Frontier Collaborations in Predictive Oncology and Computing: Amy Gryshuk, PhD; Eric Stahlberg, PhD**



**Plenary Session – Joint Design of Advanced Computing Solutions for Cancer (JDACS4C): Frontier Collaborations in Predictive Oncology and Computing: Yvonne Evrard, PhD; Rick Stevens, PhD**

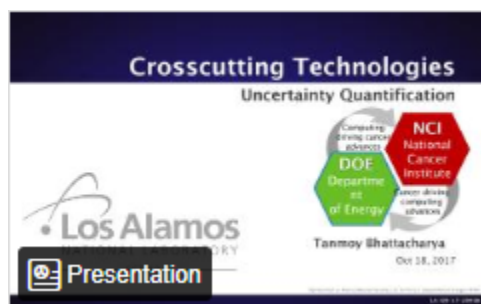


**Plenary Session – Joint Design of Advanced Computing Solutions for Cancer (JDACS4C): Frontier Collaborations in Predictive Oncology and Computing: Gina Tourassi, PhD**



**Plenary Session - Computing Frontiers: JDACS 4C Cross-cutting Technologies: Tanmoy Bhattacharya, PhD**



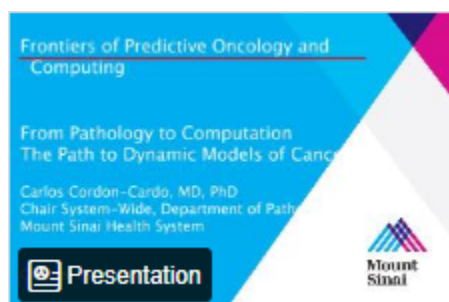


**Panel Session – Longitudinal and Multiscale Data: Challenges and Opportunities for Computational Pathology: Rachael Callcut, MD, MSPH**

**Opening Video: SmarterHEALTH**

<http://centerfordigitalhealthinnovation.org/our-portfolio/#portfolio>

**Panel Session – Longitudinal and Multiscale Data: Challenges and Opportunities for Computational Pathology: Carlos Cordon-Cardo, MD, PhD**



**Breakout Session I - Informing Cancer Treatments with Computational Predictive Oncology**



**Breakout Session II - Predictive Oncology Algorithms and Software – Challenges, Opportunities and Paths Forward**





### Breakout Session III - Evolving Role of Pathology, Tissue and Biospecimen Data in Predictive Oncology and Analytics



For any event related inquiries, please contact Miles Kimbrough via [miles.kimbrough@nih.gov](mailto:miles.kimbrough@nih.gov) or 240.276.5251