

# NCI Workshop on Artificial Intelligence in Radiation Oncology

Day 1: Thursday, April 4, 2019

## Morning Session – Overview of AI in Medicine and Oncology

Session Chairs: Janet Eary, MD, NCI, & John Buatti, MD, Iowa

8:20-8:30      Opening Remarks  
C Norm Coleman, MD, PhD, National Institutes of Health

### Keynote Addresses

8:30-9:20      Ronald Summers, MD/PhD, National Institutes of Health  
***How close are we from routine clinical use of AI?***

9:20-10:10     James Zou, PhD, Stanford  
***Biomedical data science and future medicine***

10:10-11:00    Nathalie Japkowicz, PhD, American University  
***Causality, interpretability and robustness of deep learning***

11:00-11:20    Coffee Break and ‘Show-and-Tell’ on Participants’ Laptops

11:20-12:10    Keynote Speaker  
Constance Lehman, MD, MGH  
***AI in Health: the roadmap from discovery to implementation***

12:10-1:30     Lunch and ‘Show-and-Tell’ on Participants’ Laptops

## Afternoon Session – Current Research Topics in AI/Machine Learning and Challenges for Medical Application

Session Chairs: Kristy Brock, PhD, & Laurence Court, PhD

1:30-2:30      Keynote Speaker: Peter Chang, MD, UC Irvine  
***AI Infrastructure needs for Biomedical Research***

2:30-3:30      Keynote Speaker: Michael Kosorok, PhD, UNC  
***Recent Developments in Machine Learning and Precision Medicine with Implications in Clinical Research***

3:30-4:00      Panel Discussion, Q&A on AI Infrastructure and Data

4:00-4:30      Coffee Break and ‘Show-and-Tell’ on Participants’ Laptops

4:30-5:00      Keynote Speaker: Alan Yuille, PhD, JHU  
***Challenges of AI and their implications to AI medicine***

5:30-6:00      Panel Discussion (including industry companies – Elekta, Varian, Mevion, Apple, Google)  
***AI Commercialization and Clinical Implementation***

## Day 2: Friday, April 5, 2019

### Morning Session – AI-specific Issues on Radiation Oncology and Medical Imaging

Session Chairs: Steve Jiang, PhD & Pataje Prasanna, PhD, NCI

- 8:30-9:00 Joseph Deasy, PhD, MSKCC  
**AI in Radiation Oncology**
- 9:30-10:00 Berkman Sahiner, PhD, FDA  
**AI in Medical Imaging**
- 10:00-10:30 Coffee Break and ‘Show-and-Tell’ on Participants’ Laptops
- 10:30-11:00 Berkman Sahiner, PhD, FDA  
**AI Impact on the Radiation Oncologists**
- 11:00-11:30 David Jaffray, PhD, PMH  
AI Impact on the Medical Physicists
- 11:30-12:00 Panel Discussion Q&A
- 12:00-1:30 Lunch and Poster View

### Afternoon Session – Action Items and White Paper(s)

Session Chairs: Daniel Low, PhD & P Kinahan, PhD

- 1:30-2:00 Ceferino Obcemea, PhD, NCI, Issam El Naqa, PhD, Michigan, Lei Xing, PhD, Stanford  
**Summary of Workshop**
- 2:00-3:00 Group Discussion and Action Items  
Formation of five groups – Red Journal agreed to publish 3-5 articles and editorials summarizing the workshop
- AI for Medical imaging in Radiation Oncology;
  - Treatment planning and quality assurance with AI;
  - Outcome modeling and prediction with AI;
  - Database and informatics for AI;
  - Training and education in AI for radiation oncologists and physicists.
- 3:00 Adjourn

### Organizing committee

Lei Xing, PhD (Chair)	Department of Radiation Oncology, Stanford University
Issam El Naqa, PhD (Co-chair)	Radiation Oncology, University of Michigan, Ann Arbor
Ceferino Obcemea, PhD	NIH/NCI, Radiation Research Program
John Buatti, MD	University of Iowa, Iowa City, Iowa
Joe Deasy, PhD	Memorial Sloan Kettering Cancer Ctr, New York
Sanjay Aneja MD	Department of Therapeutic Radiology, Yale University