

**2021 SEAAPM Virtual Symposium
January 28 – 29, 2021****Practical Artificial Intelligence for the Medical Physicist**

*Program Directors: Xiaofeng Yang PhD, Emory University – Atlanta, GA
Jonathon A. Nye PhD, Emory University – Atlanta, GA*

Value

The symposium will be of significant value to medical physicists and other healthcare professionals who have an interest and involvement in artificial intelligence (machine/deep learning) in medical imaging and radiation therapy both as diagnostic and therapeutic physicists. Medical physics educators will benefit from the presentations in the continuing development of their learning activities.

The use of artificial intelligence (AI) to aid in prediction and decision making has become widely popular across a breadth of disciplines. AI is expected to have a significant impact on healthcare. For diagnostic radiology and radiation oncology, AI may greatly improve the computed-aid diagnosis, decision support, treatment outcome and reduce toxicity by providing more precise cancer detection, diagnosis, and staging towards more personalized and precision treatment strategy, faster and more accurate deformable image registration, more accurate target delineation and organ segmentation, better and more precise treatment planning and dose delivery, and more convenient, frequent, and accurate patient follow up, earlier and more accurate outcome prediction. To continue meaningful gains, it is critical to understand that a successful implementation depends as much on the nature of the task as on the nature of the algorithm and the availability and quality of data. This session provides an overview of the role of machine/deep learning in medical physics. In this session, limitations and appropriate use of various machine/deep learning approaches are explored, highlighting specific applications in radiomics, image synthesis, image segmentation and registration, treatment planning, and image-guided intervention.

Learning Objectives

1. Identify strengths and limitations of machine/deep learning models in medical physics, radiology and radiation oncology
2. Learn the common machine/deep learning algorithms and performance evaluation methods.
3. Learn what machine/deep learning means to medical physics, and what the current practices and challenges are.
4. Learn how machine/deep learning is being implemented in data augmentation, radiomics, image segmentation/registration and treatment planning
5. Understand how machine/deep learning can be utilized in image-guided intervention.


Credits

This meeting has applied to CAMPEP for approval of 10.5 MPCEC hours, including 9 that will be planned to meet the ABR's criteria for self-assessment activity (SAMs) credits. Of the 10.5 MPCEC credits, 9 will be designed to meet the ABR's criteria for a self-assessment activity in the ABR Maintenance of Certification Program.

Schedule

Thursday, January 28th

7:50-8:00 AM	Welcome and Overview, Day 1 Xiaofeng Yang PhD, Emory University
8:00-9:00 AM	Machine and deep learning concepts and their application to image restoration Joyita Dutta, PhD, University of Massachusetts Lowell
9:00-10:00 AM	AI based natural language processing to support cancer diagnosis and treatment Imom Banerjee, PhD, Emory University
10:00-10:10 AM	Gold Sponsor Presentation 
10:10-10:40 AM	Morning Break – Sponsored by Sun Nuclear Visit the Exhibitors
10:40-11:40 AM	Hands-on laboratory (machine/deep learning) Regression, decision trees, support vector machine (SVM) and convolutional neural network (CNN) Yabo Fu, PhD and Yang Lei, PhD, Emory University
11:40-12:40 PM	Spearhead clinically relevant radiologic biomarker discovery in precision oncology with habitat imaging Jia Wu, PhD, MD Anderson Cancer Center
12:40-12:50 PM	Gold Sponsor Presentation 
12:50-1:30 PM	Lunch Break – Sponsored by Varian Visit the Exhibitors
1:30-2:30 PM	AI for image augmentation, registration, and digital simulation Lei Ren, PhD, Duke University
2:30-3:30 PM	PET image reconstruction meets deep learning Jinyi Qi, PhD, University of California, Davis
3:30-3:40 PM	Gold Sponsor Presentation 
3:40-4:10 PM	Afternoon Break – Sponsored by Radformation Visit the Exhibitors
4:10-5:10 PM	AI-based image reconstruction: strengths and limitations Xun Jia, PhD, UT Southwestern Medical Center

6:00-7:30 PM	Interview Skills for the Early Career Medical Physicist (Joint Session with Scientific Meeting) Robert A. Rodgers, MS, Vanderbilt University Joshua M. Wilson, PhD, Duke University
Friday, January 29th	
7:50-8:00 AM	Welcome and Overview, Day 2 Jonathon A. Nye PhD, Emory University
8:00-9:00 AM	AI in Radiology: registration, segmentation and classification applications Sachin Jambawalikar, PhD, Columbia University
Gold Sponsor Presentation 	
9:00-9:10 AM	Morning Break – Sponsored by PacsHealth Visit the Exhibitors
9:40-10:40 AM	Sharing our experience on developing automation tools for clinical treatment planning Jackie Wu, PhD, Duke University
10:40-11:40 AM	Radiology AI: myths vs reality and the path to implementation Hari Trivedi, MD, Emory University
11:40-12:10 PM	Future of AI in radiation oncology and radiology, challenges and hopes Panel Discussion and Adjournment
12:10-1:00 PM	Lunch Break Visit the Exhibitors
1:00 PM	2021 SEAAPM Scientific Meeting Opens

The Southeast Chapter of AAPM would like to acknowledge the support of our Gold sponsors



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All times are given in Eastern Standard Time (EST).