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Full Reference: Chen Cheng¹, Mark Gardner¹, Owen T Dillon¹, Youssef Ben Bouchta¹, Purnima Sundaresan², Paul J Keall¹, “Real-Time Volumetric Imaging of the Head and Neck on a Standard Linac Using a Kalman Filter”

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Conference/Meeting Name: The American Association of Physicists in Medicine (AAPM) 66th Annual Meeting

Location: Los Angeles, California, The United States of America

Dates: 21 - 25 July 2024

Presentation Type: Oral



Picture of Image X students and researchers in front of AAPM sign in the AAPM Conference foyer. I am standing on the very right.

The American Association of Physicists in Medicine (AAPM) annual meeting drew about 4000 researchers, professionals and clinicians to the world’s largest program of scientific and technical exhibits, and educational, proffered and professional presentations targeted towards the medical physics community. The theme this year was “Embracing Change, Impacting Patient Care”. This theme was reflected throughout in the talks on emerging technologies, patient impact and outcomes from clinical trials globally, focussed sessions and meetings on disseminating current practices at various clinics and developing guidelines for clinical procedures and practices.

Looking at the conference program and attendance in sessions, there was a lot of “buzz” in theranostics, AI methods designed to improve or automatic various processes in diagnostic and radiation therapy workflows and adaptive radiotherapy. Some highlights were the talks of experiences in developing and translating technologies from the lab to clinical deployment at scale, including Dr Kristy Brock’s talk about deploying a deep learning-based imaging analysis method for liver cancer radiotherapy. It was also inspiring and insightful to see how advanced motion management technologies have been deployed at various clinics (e.g. in Memorial Sloan Kettering and University of California, Los Angeles - UCLA) for lung, prostate and liver cancers and see the reports on positive patient outcomes for survival and toxicities from clinical trials. The conference also featured a symposium focussed on real-time volumetric imaging methods for various imaging modalities, an emerging area very much relevant to my research. Attending various scientific sessions and symposiums and talking with experts in motion management and image analysis inspired my research. The proffered scientific sessions and poster sessions were very useful for learning of the latest developments in the field and identifying priorities and directions for future research.

In the first motion management session, I gave a talk about our proposed method for performing volumetric imaging of the head and neck using a standard treatment device and reported on the model's performance using patient images and motion traces. The talk received some interest, with attendees asking questions during and after the session about aspects of the algorithm design and framework for our project. I had the opportunity to meet some collaborators of the Image X institute in-person for the first time from Canada and the US working on motion management, interventional imaging, photon counting technologies. Prior to the conference, I organised to meet with Dr Dan Ruan at UCLA working on motion management algorithms, reconstruction and AI methods. We also have continued communication after the conference, thus opening avenues for future collaboration. AAPM also had a large exhibit hall with many diagnostic and radiation therapy vendor stalls and showcases. I the opportunity to talk to vendors to learn more about their motion management implementations, technological design and quality control processes.

The AAPM conference also had many events aimed at students and trainees. This included the Women Physicists' Luncheon, which involved a Q & A session with senior women physicists and provided the opportunity to meet other women physicists and researchers. I will continue to meet with some of these individuals through the monthly virtual "Women Who Coffee and Curie" morning tea sessions post-conference. Another highlight was the speed mentoring event, which was a great event for networking with researchers, industry professionals and clinical professionals. I was able to introduce myself and my research to many individuals I hadn't contacted previously and get helpful advice for my professional and research management questions.

A highlight post-conference was the short research visit to UCLA to view their facilities (imaging machines, labs and cyclotron) and discuss research that is currently underway at their research groups. Overall, attending the 2024 AAPM annual meeting was an educational and invaluable experience for learning about cutting-edge innovations in broad research areas of medical physics all working towards the common goal of "Embracing Change, Impacting Patient Care" and for meeting with field leaders and collaborators from all over the world.



Photo in front of the UCLA mascot on campus.