# AbstractID: 9368 Title: A Novel Integrated Approach for Individualizing Beam Directions and Motion Management

**Purpose:** To develop an integrated technique to individualize treatment planning (TP) and management of inter- and intra-fraction motion for NSCLC patients treated with 3DCRT or SBRT. **Method and Materials:** The technique involves first using MV-CBCT in a *cine* mode prior to planning for optimal beam angle selection and verification of ITV and PTV 4DCT planning-based margins. The angles are selected based on optimal geometrical tumor mass separation with respect to the surrounding OARs and optimal viewing of tumor motion in longitudinal (superior-inferior/SI), vertical (anterior-posterior/AP), and lateral (left-right/LR) directions. Secondly, MV-CBCT is used for daily tumor volume localization just prior to treatment. Thirdly, the EPID is deployed during treatment delivery to verify tumor motion and margins by capturing 7 frames per sec over 30 sec. Since the beam angles were selected to optimally view the target motion, the clinical benefits of using MV-fluoroscopy (MV-fluoro) to monitor tumor motion are maximized. To improve the contrast-to-noise ratio on the CB projection data and MV-fluoro image frames, post-processing with filtering techniques was used. Volumes of interest from the planning 4DCT were projected onto the MV-cine and MV-fluoro. **Results:** Data show optimal planning beam angles that ensured highly conformal dose distributions and viewing tumor motion in SI, AP, and LR directions derived from the *cine* data were feasible. The patient tumor volume was localized with MV-CBCT, which represents an average static volumetric image of the patient over 60 sec. The MV-fluoro data confirmed the tumor mass was located within the PTV during treatment despite respiratory motion. **Conclusion:** Individualizing margins using 4DCT, deriving optimal beam angles based on quasi 3D motion data from MV-cine, localizing with CB, and verifying tumor motion and margins with MV-fluoro is a clinically viable integrated technique, allowing for inter- and intra-fraction motion management.