

Session Title:	Adaptive Radiation Therapy
Date & Time:	08/02/2018 - 08:20AM
Location:	Karl Dean Ballroom C
Presenting Author:	Esther M. Vicente

Integrating Virtual Bronchoscopy with Ventilation Mapping for Preserving Post-Treatment Respiratory Function in Lung SAbR

• **Purpose:** Develop a patient-specific model to estimate the contribution of each airway to regional ventilation, and use this model to create stereotactic ablative radiotherapy (SAbR) plans that aim to preserve lung function.

• **Methods**

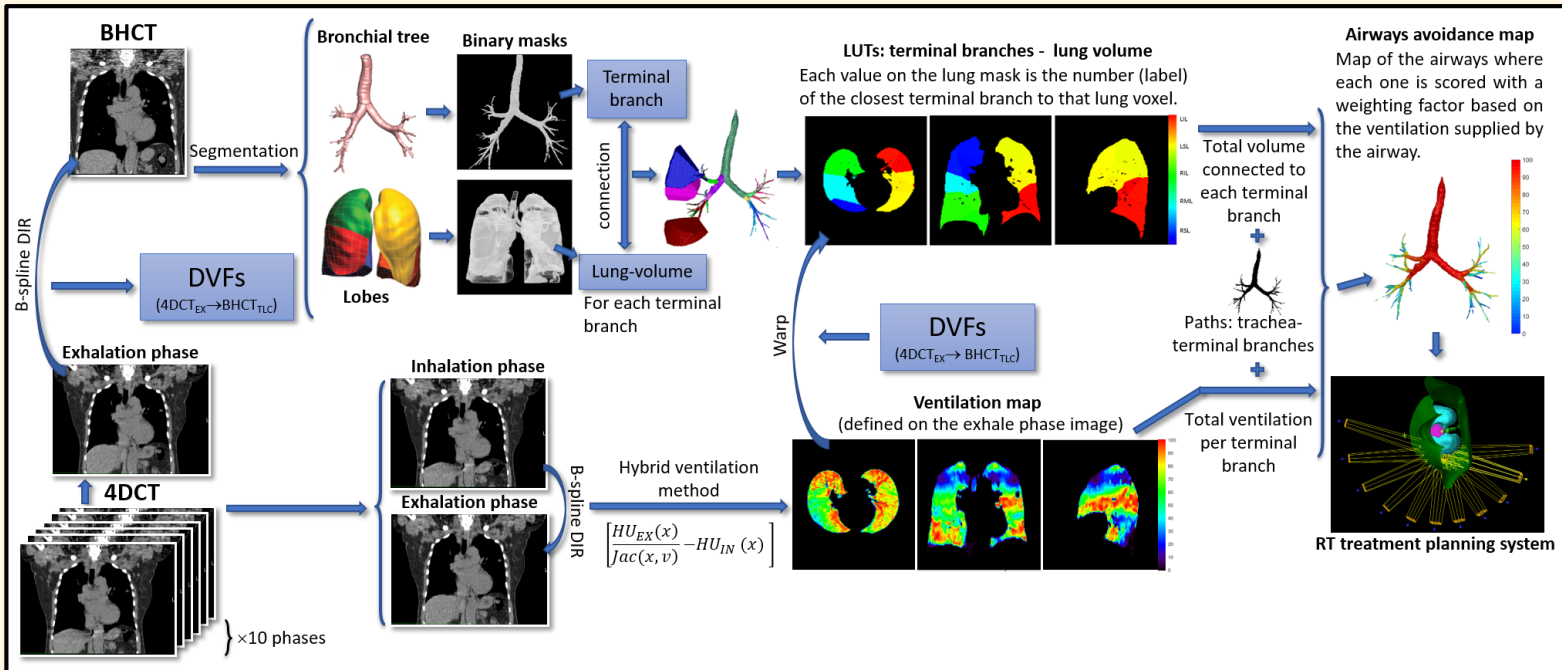


Figure 1. Workflow of the method to obtain the airways functionality to include this information in the treatment plan system.

• **Conclusions:** By combining information about regional ventilation with the individual elements of the airway tree, it is possible to create SAbR treatment plans that achieve clinical dose constraints while simultaneously sparing dose to the elements and regions of the lung responsible for lung function.

• **Results**

Figure 2. Airways avoidance map. The color of the airways represents the percentile values of the airways functionality in the range (1-100). These values are used in the optimization objective function of the proposed RT plan as weighting factors.

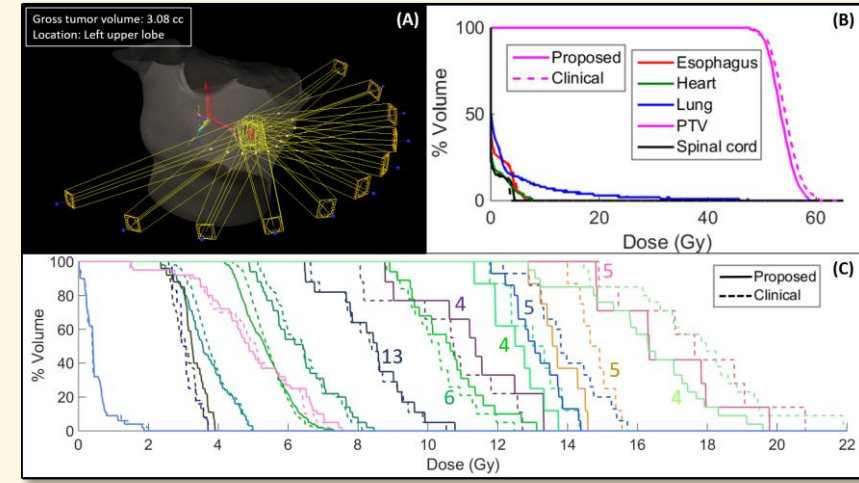
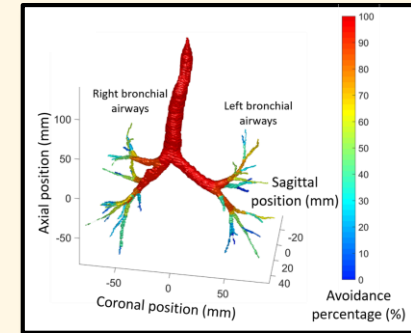


Figure 3. (A) Clinical 11-beam configuration for a 5-fx, 10Gy/fx SAbR IMRT plan. (B) DVH showing comparable dose distribution in the proposed plan (solid lines) and the clinical plan (dashed lines) for the PTV and critical organs considered. (C) DVH showing dose reduction in the proposed plan compared to the clinical for airways receiving more than 10 Gy (max dose constraint in our planning). The numbers beside the lines are the diameters of the airways in millimeters.