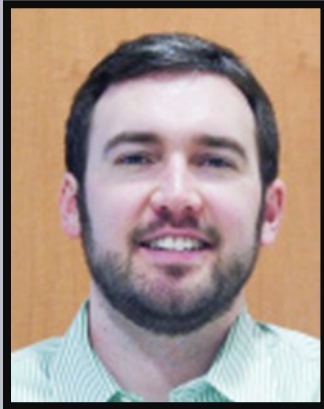


# Medical Physics Seminar

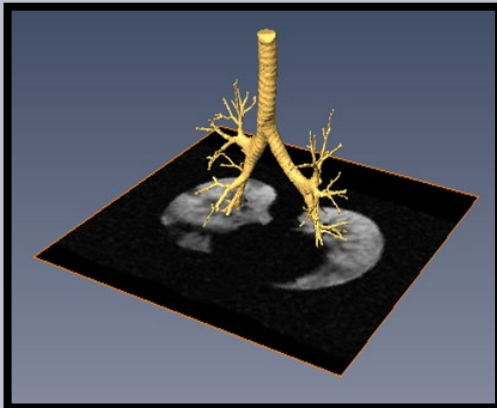
Monday, October 22nd 2018

1345 HSLC ~ 4:00 P.M.



**David Mummy**

Student of Dr. Sean Fain  
Department of Medical Physics  
University of Wisconsin—Madison



## Defining Asthma Phenotypes Using Hyperpolarized Gas MRI and CT

Hyperpolarized helium-3 gas MRI (HP  $^3\text{He}$  MRI) allows for the direct visualization of gas distribution in the lungs without the use of ionizing radiation, making it particularly suitable for longitudinal studies or studies in pediatric populations. Ventilation defects on HP  $^3\text{He}$  MRI have been associated with severe clinical outcomes in asthma, and regional measurements of ventilation defects can provide insights into localized mechanisms of airway obstruction, including assessing the functional significance of regional biomarkers obtained via other modalities such as CT. Ventilation defects can also be used to guide targeting bronchoscopic sampling of local cellular activity in defect vs. well-ventilated control sites.

This work explores associations of ventilation defects with severe clinical outcomes in asthma, regional measures of mucus plugging and air trapping on CT, and localized cell counts and histology obtained via image-guided bronchoscopy. These results lay the groundwork for developing image-based asthma phenotypes potentially useful in monitoring asthma disease progression and in the development and evaluation of targeted therapies.



**WISCONSIN**  
UNIVERSITY OF WISCONSIN-MADISON

1345 Health Sciences Learning Center (HSLC) 4:00 - 5:00 P.M.