# ATS 2022 Highlights

## Respiratory Structure and Function Early Career Professionals


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## *Get to know members of the RSF Assembly*

***Is your research clinical, basic science or translational?***

Translational

***Tell us about your research?***

My lab is developing new ways to visualize & measure regional lung structure & function. One facet of this is hyperpolarized xenon gas magnetic-resonance imaging (MRI) to understand regional airflow obstruction & pulmonary diffusion. My research emphasizes rare-lung diseases where we need "every tool in the box" to understand disease processes & ultimately improve patient outcomes.

***Where do you see yourself in 5 years?***

Now is such an exciting time for lung MRI! I will continue to develop faster MRI techniques especially for younger children who are unable to do spirometry or other clinical tests. My lab will grow; I enjoy seeing my trainees "get the spark" for translational research & go on to do impactful science.

***What do you find is the major benefit of RSF Assembly Membership?***

Many of us in RSF come from diverse basic & physical science or engineering backgrounds but we are all united by the desire to see our science improve respiratory health. RSF is a great home to build the bridge from "bench to bedside" and to network and find new collaborators and mentors.

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*If you or someone you know would like to be featured as an ATS RSF ECP please email Katrina Tonga (katrina.tonga@sydney.edu.au)*

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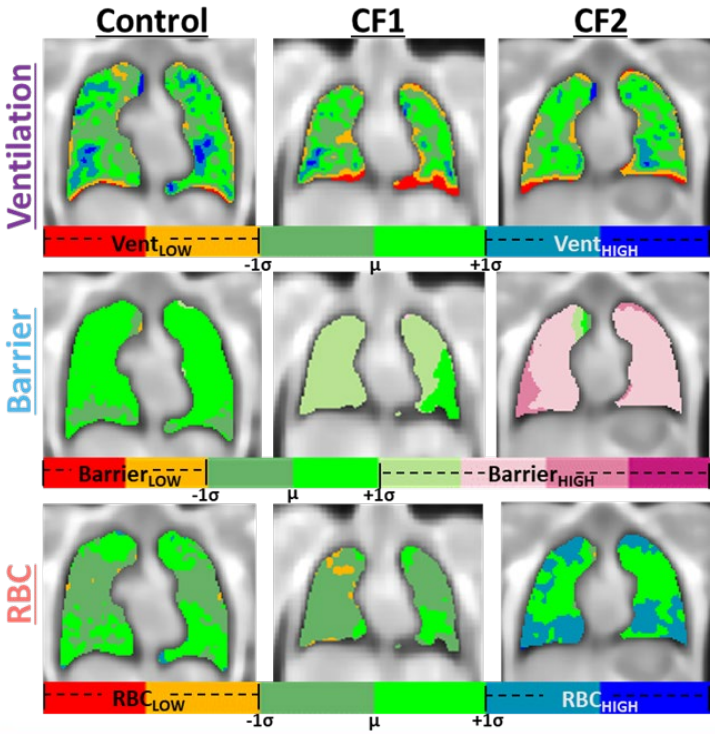


### Ventilation and diffusion abnormalities in young people with cystic fibrosis using Xe gas-exchange MRI


**Objective:** We hypothesized Xe gas-exchange MRI would reveal novel diffusion features in cystic fibrosis (CF). Xe gas-exchange MRI is an emerging technique that capitalizes on the diffusion of inhaled Xe gas through the pulmonary tissues to generate maps of ventilation, diffusion-barrier (interstitial tissue & blood plasma) uptake, and red-blood cell (RBC) transfer, like a spatially-resolved diffusion-capacity measurement but with compartmental granularity.

**Methods:** Xe gas-exchange images were in 43 people with CF and 13 healthy controls, ages 5-30 years old. Gas-exchange maps for each compartment were generated using means (μ) and standard deviations (σ) of a healthy-reference population.

**Results:** The CF group had more airflow obstruction; $Ventilation_{LOW}$ was 18.4%±8.9% versus 12.5%±6.5% for controls ($p$=0.02). The CF group had more lung with abnormally-high Xe signal in the barrier compartment. $Barrier_{High}$ was 56.5%±35.5% in CF versus 21.0%±33.1% for controls, $p$=0.003, but there were no significant differences in the RBC compartment ($p$>0.2).

**Conclusion:** Xe gas-exchange MRI is sensitive to both ventilation and diffusion abnormalities in people with CF. Elevated barrier Xe signal suggests abnormal diffusion-barrier features such as thickened alveolar-capillary tissue, fibrosis, or inflammation and a previously unrecognized early diffusion abnormality in mild CF.