

ATS 2021 Highlights

Respiratory Structure and Function Early Career Professionals

Get to know members of the RSF Assembly



Johanna Uthoff, PhD

*Postdoctoral Research Scholar
Computer Science
University of Sheffield*

Is your research clinical, basic science or translational?

Translational

Tell us about your research?

I develop open-box artificial intelligence tools for medical imaging analysis. Recently, I have been working in cardiac magnetic resonance images (CMRI) of patients with suspected pulmonary arterial hypertension (PAH). We implement a tensor-feature extraction which discovers temporal-spatial characteristics we have found to be useful in diagnosis and survival predictions

Where do you see yourself in 5 years?

Over the last five years, I have seen this field blossom – I recall the first ATS I went to in 2015 where there were only a few other AI abstracts. Now, and looking to the future, I see AI becoming an important tool especially in radiology. In five see myself working with data to discover knowledge and improve lives.

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

It has given me a community of peers who have helped shape my research and challenged me to look deeper and to look further.

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Sex bias exists in diagnosing pulmonary arterial hypertension via machine learning

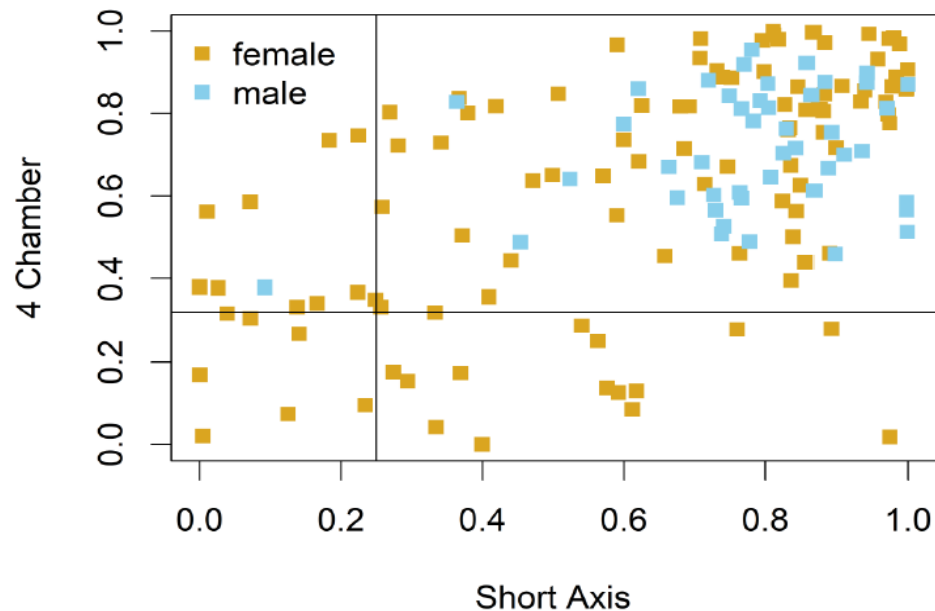
Objective: Pulmonary arterial hypertension (PAH) is more common in females, yet males tend to have a worse prognosis, indicating potential sex-based differences. Will such differences affect the PAH diagnosis accuracy by machine learning (ML) on cardiac magnetic resonance imaging (CMRI)?

Methods: A retrospective cohort of 220 consecutive subjects with PAH (105 F; 45 M) or with no pulmonary hypertension (51 F; 19 M) were included in the study. An ML pipeline was implemented using the baseline CMRI Short Axis and 4 Chamber scans for PAH diagnosis prediction utilizing (a) the full cohort and (b) only female subjects.

Results: No significant difference was found between the sexes using right heart catheterisation PAH diagnosis ($p=0.75$). In the full cohort, ML-predicted diagnosis demonstrated a bias towards correctly predicting PAH in males on both the Short Axis ($p=0.01$) and 4 Chamber ($p<0.01$).

Conclusions: This preliminary study found significant disparity in PAH prediction accuracy by ML between the sexes. This suggests that sex bias exists in CMRI-based PAH diagnosis via ML and sex-stratification could be beneficial in ML-based diagnosis.

Predicted PAH Diagnosis Scores



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