Researchers at UCLA helped to pioneer an artificial intelligence algorithm over 10 years ago that adds quantitative analysis to the visual image analysis of computed tomography (CT) images at our institution in screening patients for interstitial lung disease (ILD) and for tracking changes to lung tissue over time to help manage treatment. The Quantitative Lung Fibrosis (QLF) score was developed to bring uniformity to the interpretation of CT lung images. A significant goal of the efforts was to make the interpretation of CT images generalizable across different imaging sites and CT equipment. Once the images are normalized, the computer model analyses each voxel to determine the likelihood of fibrosis at every point in the image. A voxel represents a position in three-dimensional space just as a pixel represents a position in a two-dimensional image.

QLF scores can predict changes in lung function

An exciting application of QLF is its use in adjusting the medical treatment of patients with idiopathic pulmonary fibrosis (IPF). “We have learned that changes in QLF score — whether a reduction or a worsening of the fibrosis — predict by 18 to 24 months changes of the lung function in IPF patients,” states Dr. Kim. “Patients can be baselined and then tested again after six months. When their scores worsen, it may be a signal to increase medication doses or to switch medication in an attempt to prevent lung function from worsening.” Conversely, when QLF scores improve, pulmonologists can consider reducing doses to minimize unwanted treatment side effects.

QLF scoring is also an important tool for monitoring rheumatoid arthritis patients for the development of interstitial lung disease. An estimated one in 10 rheumatoid arthritis patients will develop ILD over the course of their disease, leading to a significantly higher risk of mortality. It is important to define a threshold for treating lung disease in this population, and QLF scores proved the sensitivity needed to determine such a threshold.

UCLA is currently the only center on the West Coast that offers QLF testing.