

THE HARTWELL FOUNDATION

2006 Individual Biomedical Research Award

Sean B. Fain, Ph.D.

**Assistant Professor
Medical Physics, Biomedical Engineering and Radiology**

University of Wisconsin Madison

**Functional Magnetic Resonance Imaging of the Lungs in Early
Childhood Asthma**



Dr. Fain offers an innovative proposal to develop and validate new technologies for imaging lung structure in infants with persistent wheezing, moderate to severe respiratory infections, and other associated asthma symptoms. While diagnosis and treatment of asthma early in life are a means to mitigate the development and severity of chronic asthma in adulthood, detection of the disease in the pediatric population is difficult. Conventional approaches in children have been limited to whole lung capacity measurements or low-resolution imaging, which are often unreliable when performed on developing lungs. Given the need for limiting exposure to ionizing radiation, imaging the lung in children is complex by virtue of the requirements for shortened breath-hold time and a desire for high spatial resolution. To overcome these obstacles, Fain proposes a non-invasive means of rapidly diagnosing and identifying asthma that does not rely on the use of ionizing radiation, and that will provide greater sensitivity than standard measures allow. He presents a compelling argument that his innovative technique for fast acquisition of 3-D images of lung using MRI of breathable non-radioactive helium gas will provide reliable longitudinal measures of lung structure and function. Such images will be useful in development and guidance of therapies in the at-risk pediatric population. By providing a means to early diagnosis, successful clinical intervention to limit or halt the progression of the disease will become more likely.