A. Personal Statement

The primary aim of the proposed project is to determine if the Lung Clearance Index (LCI), a non-invasive measure of inhomogeneity of ventilation, has high specificity as a screening test to discriminate those cystic fibrosis (CF) infants/toddlers not needing chest CT scans to assess for early CF lung disease. The second aim of this project is to determine if LCI measurements in cross-sectional and longitudinal study designs are highly associated with quantitative CT air trapping (AT) and other CT indices (e.g. CF CT scoring) in 30 CF infants/toddlers followed over a 24-month period. The third aim of this project is to determine if initial quantitative CT AT predicts development of CT bronchiectasis 24-months later. By carefully evaluating the relationship between the LCI and quantitative CT air trapping, we will establish whether the LCI could be used as a meaningful early screening test for following young CF infants and toddlers. From this study appropriate sample-size calculations will be determined to further explore the relationship between the LCI and quantitative CT air trapping in a much larger follow-on study involving 2 major CF Centers in Northern and Southern California, having the goal of assessing the feasibility of using the LCI as a Statewide initial lung screening test for detecting early CF lung disease in CF children identified by the California Newborn Screening Program.

I will serve as the principal investigator for this proposed study overseeing all testing, and data acquisition and analysis for this E.W. “Al” Thrasher Grant proposal. I have the necessary expertise, leadership abilities, and previous experience to successfully direct and carry out the specific aspects of this proposal. I have been the principal investigator for the CF TDN Natural History Study in Children with Mild CF Lung Disease, a two-year dual sponsored project between Novartis Pharmaceutical Company and the Cystic Fibrosis TDN comparing quantitative CT measurements with CF CT scoring. In addition, through collaboration with Dr. Steven Stick (Perth, Australia), I have successfully developed a controlled ventilation infant CT (CViCT) scanning protocol at Packard Children’s Hospital at Stanford, completing 60 CViCT cases without adverse events associated with this procedure over the past 2 years. My laboratory has focused on quantitative chest CT analysis over the last 13 years, initially focusing on regional air trapping in children and adults with cystic fibrosis, and subsequently developing quantitative airway measurement techniques to study CF airway disease. In addition, our laboratory has also developed a software application using lung densitometry to assess interstitial lung disease. I have successfully developed and administered several CT research projects involving CF children and adults leading to peer-review publications. My previous experience with the CF TDN Natural History Study in combination with my experience developing CViCT scanning and my laboratory focus provides a well-tailored preparation for the proposed work. I anticipate from the results of this proposed project we will be able to effectively determine whether the LCI is a viable initial screening test, and will be able to determine an appropriate sample size determination for a much larger study comparing the LCI and quantitative CT air trapping as a follow-on study.

B. Positions and Honors

Positions and Employment

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<tr>
<th>Year</th>
<th>Position</th>
<th>Institution/Location</th>
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<tbody>
<tr>
<td>2009-</td>
<td>Associate Professor, Pediatrics</td>
<td>Stanford University Medical Center</td>
</tr>
<tr>
<td>2001-2009</td>
<td>Assistant Professor, Pediatrics</td>
<td>Stanford University Medical Center</td>
</tr>
<tr>
<td>1998-2001</td>
<td>Staff Physician</td>
<td>Stanford University Medical Center</td>
</tr>
<tr>
<td>1997-1998</td>
<td>Staff Physician/Research Associate</td>
<td>Stanford University Medical Center</td>
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<tr>
<td>1996-1997</td>
<td>Post Doctoral Research Associate</td>
<td>Stanford University Medical Center</td>
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<tr>
<td>1993-1996</td>
<td>Fellow</td>
<td>Stanford University Medical Center</td>
</tr>
<tr>
<td>1990-1993</td>
<td>Internship &amp; Residency</td>
<td>Stanford University Medical Center</td>
</tr>
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EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE (if applicable)</th>
<th>YEAR(s)</th>
<th>FIELD OF STUDY</th>
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<tbody>
<tr>
<td>University of California, Santa Barbara, CA</td>
<td>BA</td>
<td>1975</td>
<td>Liberal Arts</td>
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<tr>
<td>San Diego State University, San Diego, CA</td>
<td>MA</td>
<td>1983</td>
<td>Exercise Physiology</td>
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<tr>
<td>Brown University, Providence, RI</td>
<td>MD</td>
<td>1990</td>
<td>Medicine</td>
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<tr>
<td>Stanford University, Stanford, CA</td>
<td>Residency</td>
<td>1990-93</td>
<td>Pediatrics</td>
</tr>
<tr>
<td>Stanford University, Stanford CA</td>
<td>Fellowship</td>
<td>1993-1997</td>
<td>Pediatric Pulmonary</td>
</tr>
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</table>
Other Experience and Professional Memberships

1994-2010 Member, American Thoracic Society
1994-1995 Cystic Fibrosis Foundation Clinical Fellowship Award
1995 Certification; Pediatrics; Board Certified
1997 Member, Pulmonary Focus Group for HRCT Imaging; Imatron, Inc.,
1997 Member, HRCT Imaging Task Force for CF patients; North American CF Conference
2002 Certification: Pediatric Pulmonology
2002-2010 Member, HRCT Imaging Task Force for CF patients, Cystic Fibrosis Foundation Therapeutic Development Network 2002-2010
2007 NIH Program Project Grant Reviewer

Honors

2006 Provider of the Year, Cystic Fibrosis Foundation, Northern California Chapter
2007 Honorary Invited Participant, Leuven, Belgium, European Respiratory Society
2007 Honorary Invited Speaker Annual Scientific Meeting, Sydney, Australia, Auckland, New Zealand, The Thoracic Society of Australia & New Zealand

Intellectual Property

1. Dynamic Respiratory Control (Respiratory Function Valve), 10/14/03, Stanford Docket S97-121 Patent # 6,631,716.
4. 3D Bronchial Morphology Analysis Package, Copyright, Stanford Docket S02-254, Submitted to OTL 2002, {Raghav/Venkataramin/Robinson disclosure to OTL. Stanford holds copyright to the material}.

C. Selected Peer-reviewed Publications (Selected from 24 peer-reviewed publications)

Most relevant to the current application


**Additional previous publications of importance to the field (in chronological order)**


**D. Research Support**

**Ongoing Research Support**

1) Packard Children’s Hospital – Auxillary Grant; Project Title: Controlled ventilation CT imaging in infants & young children with chronic lung disease at LPCH; Role: PI. Development & implementation of controlled ventilation infant CT scanning at LPCH. P.I. for project. 10/01/07-11/31/13.

**Grants – Pending**