

HARIKRISHNAN PARAMESWARAN

Assistant Professor
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EDUCATION AND RESEARCH EXPERIENCE

- 2014-2016 Boston University *Postdoctoral Fellow*
Project: Modeling the cortical actin cytoskeleton
Funding: NIH/ NHLBI Pathway to Independence Award K99/R00 (PI),
number 1K99HL122513
Mentor: Dr. Kenneth R Lutchen
- 2012-2014 Boston University *Postdoctoral Fellow*
Project: Factors Determining Hyperresponsiveness for Intact Airways
Mentor: Dr. Kenneth R Lutchen
- 2011-2012 Boston University *Postdoctoral Fellow*
50% effort was at Wyss Institute, Boston MA (Designation did not change)
Project: implementing variable breathing patterns in Wyss institute's lung-
on-a-chip system
Mentor: Dr. Bela Suki
- 2009-2012 Boston University *Postdoctoral Fellow*
Project: Effect of Variable Stretch on Mitochondrial dynamics and ATP
production in smooth muscle cells.
Mentor: Dr. Bela Suki
- 2009 Boston University *Ph.D. Biomedical Engineering*
Dissertation: Effect of Microscopic Structural Changes on Macroscopic
Functional Properties: Imaging and Modeling the Lung Parenchyma in Three
Dimensions
Research Advisor: Dr. Bela Suki,
Committee Members: Dr. Dimitrije Stamenovic, Dr. Wayne Mitzner,
Dr. Kenneth R. Lutchen, Dr. Elise F Morgan.
- 2004 Boston University *M.S. Biomedical Engineering*
Thesis: Analyzing the Microscopic Structure of Lung Tissue Using Image
Processing Techniques

1999 Kerala University *B.Tech. Electronics & Telecommunication Engg.*
Thesis: Spectral Analysis of lung sounds.

EMPLOYMENT

2017- present	Assistant Professor	Northeastern University, Boston, MA
2009-2012	Post-Doctoral Fellow	<i>Boston University, Boston MA</i>
2002-2009	Research Assistant	<i>Boston University, Boston MA</i>
5/03 - 8/03	Summer Intern, CT Division	GE Medical Systems, Waukesha, WI
1999-2002	Systems Engineer	<i>WT Call translations group, Maidenhead, UK</i>

CURRENT & PENDING RESEARCH SUPPORT

EXTERNAL

Current: NIH NIGMS R01: GM110268 (8/20-07/24)
In vivo analysis of mechanotransduction [PI: Erin Cram]
Role: Co-Investigator responsible for Aim 2 of 3 aims
Total funding: \$1,338,352.00

NSF CAREER AWARD (7/21-6/26):
Elucidating the role of Collective Cell-Matrix interactions in the mechanobiology
of airway narrowing
PI: Hari Parameswaran
Total Funding: \$602,650

Completed: NIH R21 HL129468 (06/01/16 – 05/31/18)
Advanced Image-Based Approach to Assess How Fibrillar Collagen Modulates
Airway Reactivity
Role: PI
Total funding: \$375,000

NIH NHLBI R00 HL122513 (7/1/17- 6/30/20)
Extracellular determinants of airway smooth muscle force: A new paradigm for
sustained airway constriction
Role: PI
Total Costs: \$249,000/year

INTERNAL

Tier 1 grant (with Prof. Erin Cram, Biology)
\$50,000 (7/1/19 – 8/30/20.)

Alpha Fund Prototype (one-time award)
\$10,000

HONORS

[2011-2018] One of 35 peer nominated experts to serve on the program committee member for the Respiratory Structure Function assembly of the American Thoracic Society (ATS). This body sets the agenda for the one of the largest & prestigious respiratory conferences (16,000 attendees from 95 countries).

[2013] American Thoracic Society's abstract scholarship award.

[2009] Finalist for best Ph.D. thesis dissertation -- College of Engineering, Boston University, Boston MA.

[2005] Award for best Biomedical engineering research publication, Boston University, Boston MA.

[2002-2009] Boston University Graduate Research Fellowship

[2005] Boston University Graduate Teaching Fellowship.

[1995-1999] University merit scholar, College of Engineering, Kerala University.

RESEARCH COLLABORATORS

External

- Dr. Ramaswamy Krishnan, Beth Israel Deaconess Medical Center
- Dr. Xingbin Ai, Mass. General Hospital
- Dr. Yan Bai, Mass. General Hospital
- Dr. Paul Mathew MD. Tufts Medical Center, Boston
- Dr. Dhananjay Tambe, University of South Alabama.

Internal

- Dr. Erin Cram, Dept. of Biology Northeastern University
- Dr. Jeff Ruberti, Dept. of Bioengineering, Northeastern University

TEACHING AND ADVISING

1. Create and teach a new graduate level course: BIOE5800: Signals and Systems in Bioengineering, Fall 21.
2. Created and taught a new graduate level course "BIOE5440: Cell as a Machine" in Spr 18, Spr19, Spr20 and Spr21.

3. Taught “Math Methods for Engineers”, an undergraduate mathematics course in Spr 17, Fall 18, Fall 19 and Fall 20.
4. Guest lecturer for Multiscale Biomechanics (BIOE5650) in Fall '18: delivered lecture on multiscale mechanics of the smooth muscle.
5. Guest lecture in “Principles of Bioengineering (BIOE 7374) in Spr'17, Fall 19 and Fall '20. Delivered lecture on the role of physical forces in disease development.

Semester	Course	New	Enrollment	Trace Evaluations (/5.0)	
				Learning	Instructor
Spring 21	BIOE5440: Cell as a machine	Yes	33	4.4	4.7
Spring 20			22	4.4	4.5
Spring 19			21	4.1	4.3
Spring 18			6	5.0	4.7
Fall 20	GE 2361: Math Methods for Engineers	No	35	4.4	4.6
Fall 19			42	4.2	4.0
Fall 18			17	4.2	3.8
Spring 17			21	4.0	4.3

POSTDOCTORAL FELLOWS & VISITING SCHOLARS

1. Samuel Polio, PhD: Postdoctoral fellow in my lab (1 paper in Sci. Reports).
2. Diego Vargas, PhD: Visiting Scholar from KU Leuven, Belgium (1 paper in Biophysical Journal)
3. Niccole Schaible, PhD: Visiting Scholar from Beth Israel Deaconess hospital.

PhD STUDENTS SUPERVISED

1. **Suzanne Elizabeth Stasiak** [expected completion Fall '22]
Project Title: Mechanobiology of asthma.
 Suzie is working on understanding the fundamental mechanisms by which how pathological changes in the extracellular matrix can lead to the exaggerated constriction of airways seen in asthmatics
2. **Ryan Robert Jamieson** [expected completion Fall '22]
Project Title: Using lung macrophages to target collagen remodeling in asthma.
 Ryan is working on a developing a potential therapy for asthma which targets collagen remodeling in the airway extracellular matrix.
3. **Caroline McCormick** [expected completion Fall '24]
Project Title: Mechanobiology of neural innervation in airways. Caroline's thesis focuses on understanding the role of mechanobiology on alterations in structure,

connections and function (plasticity) of neurons that innervate the airways in asthma.

- Thesis committee member **Mckay Cavanaugh** Ph.D. Chem. Engineering, Northeastern University (current)
- Thesis committee member **Narges Yazdani** Ph.D. Chem. Engineering, Northeastern University (current)
- External Reader for **Amin Iravani** Ph.D. Physiology, University of Auckland, Auckland, NZ (Spring 21)
- Thesis committee member for **Jeffrey Bouffard**, Ph.D. Bioengineering, Northeastern University (Fall '19)
- External Reader for **Alvenia Cairncross** Ph.D. Physiology, University of Western Australia, Perth (Fall 18)
- Thesis committee member for **Jarred Mondendo**, Ph.D. Biomedical Engineering, Boston University (Fall '17)
- Thesis committee member for **Perla Castaneda**, Ph.D. Biology, Northeastern University

M.S. STUDENTS

- [2019] Thesis committee member for Catherine Luo (Advisor: A.Asthagiri)
- [2018] Thesis committee member for Alex Hruska (Advisor: A.Asthagiri)

UNDERGRADUATE STUDENTS

Katherine Coyne: (Spring and Summer 2018): co-author on a conference abstract. [PEAK ASCENT AWARD Winner]

Ralston Augspurg: (Spring 2019-Fall 2020) co-author on 1 publication, 1 manuscript under review and 2 conference abstracts. [PEAK ASCENT AWARD Winner].

Nihal Bharath (Spring 2019-Spring 2020) co-authors on one manuscript.

Alec Silverman (Spring 2019)

Meagan Morgan (Spring 2019)

Sponsored an undergraduate Capstone group (advised by Dr. Jeff Ruberti) Michael Parrish, Taylor Duckworth, Alexander Rivas, Jacob Potts and India Aitkenhead

INVITED TALKS

1. *New Paradigms in the development of Asthma: Unraveling the role of the matrix* Draper Labs, Cambridge, MA, 22nd Sept, 2017.
2. *Bioengineering Custom Cell Microenvironments with Versatile Maskless Photopatterning*

Nature research webcast * (with Dr. Manuel Thery, University of Grenoble, France)
November 28, 2018

3. *Can increased stiffness of the airway extracellular matrix drive the development of airway hyperreactivity in asthma?*
Centre for Heart Lung Innovation seminar series, St. Paul's Hospital, University of British Columbia, Vancouver CA September 27, 2019,
4. *Altered intercellular communication can result in airway hyperreactivity in asthma*
Biomedical Science and Engineering Seminar Series, Center for Engineering in Medicine at Massachusetts General Hospital, Boston MA. November 1, 2019
5. *Mechanisms and Interventions to Inhibit Extracellular Matrix Driven Bronchoconstriction in Asthma.* Dept. of electrical and Biomedical engineering, University of Vermont. *November 11, 2020*
6. *A glitch in the Matrix: the mechanobiology of airway hyperreactivity.* Molecular & Integrative Physiology Seminar Series, Harvard School of Public Health, Boston MA *Feb 2, 2021*
7. *Collective agonist sensing, a new paradigm for airway closure.*
University of Colorado, Denver *Feb 11, 2021*
8. *Intercellular Communication Dictates the Agonist Response of Smooth Muscle Cell Ensembles.* Center for Vascular Biology Research, Beth Israel Deaconess Medical Center, Boston MA Friday, April 9th

CITATION REPORT from Google Scholar (updated 7/9/2021)

Total Citations: 1882

H-index: 22

i10-index: 35

PUBLICATIONS

PEER REVIEWED JOURNAL ARTICLES

2021

1. Stiffening of the Extracellular Matrix is a Sufficient Condition for Airway Hyperreactivity. R.R Jamieson, S.E Stasiak, S. R. Polio, C McCormick, R.D Auspsburg, J.W Ruberti, and **H. Parameswaran** Journal of Applied Physiology. March 2021.

[Chosen for APS select, the American Physiological Society's collection of best physiology papers]

2020

2. Intercellular communication controls agonist-induced calcium oscillations independently of gap junctions in smooth muscle cells. S.E Stasiak, R.R Jamieson, J. Bouffard, E.J. Cram and **H. Parameswaran** Science Advances. Aug 5 2020.
3. Intercellular adhesion stiffness moderates cell decoupling as a function of substrate stiffness D. A. Vargas*, T. Heck, B. Smeets, H. Ramon, **H. Parameswaran** and H. Van Oosterwyck Biophysical Journal. July 2020, 119(2):243-257
* First author was a visiting scholar in my lab during the summer of 2018

2019

4. Extracellular matrix regulates force transmission pathways in multicellular ensembles of human airway smooth muscle cells. S.R Polio, S.E Stasiak, R Krishnan and **H. Parameswaran** Sci Rep. 2019 Jul 2;9(1):9564.
5. CT Imaging-Based Low-Attenuation Super Clusters in Three Dimensions and the Progression of Emphysema. Mondoñedo JR*, Sato S, Oguma T, Muro S, Sonnenberg AH, Zeldich D, **H. Parameswaran**, Hirai T, Suki B. Chest. 2019 Jan;155(1):79-87.
* First author was a advised by HP as a Ph.D thesis committee member.

2018

6. The Digestive Protease Role for Cela1 in Postnatal Lung Matrix Remodeling and AAT-Deficient Emphysema R. Joshi, A. Heinz, Q Fan, S Guo, B Monia, C.E.H. Schmelzer, A.S. Weiss, M.Batie, **H. Parameswaran**, B.M.Varisco. Am J Respir Cell Mol Biol. 2018 Aug;59(2):167-178.
7. Blood pressure-induced physiological strain variability modulates wall structure and function in aorta rings. Imsirovic J, Bartolák-Suki E, Jawde SB, **Parameswaran H**, Suki B Physiol Meas. 2018 Oct 30;39(10):105014.

2016

8. Regulatory Roles of Fluctuation-Driven Mechanotransduction in Cell Function. Suki B, **Parameswaran H**, Imsirovic J, Bartolák-Suki E. Physiology (Bethesda). 2016 Sep;31(5):346-58

9. Mitochondrial iron chelation ameliorates cigarette smoke-induced bronchitis and emphysema in mice M Cloonan, K.Glass, A.R. Bhashyam, M.E Laucho-Contreras, M. Cervo, M.A Pabon, C. Konrad, F. Polverino, K. Miziumura, M. Ghosh, **H. Parameswaran**, N.M Williams, K.T. Rooney, Z.H Chen, M.P. Goldklang, G.Yuan, S.C Moore, D.L. Demeo, T.A. Rouault, J.M. D'Armiento, E.A Schon, G. Manfredi, J. Quackenbush, A. Mahmood, Edwin .K. Silverman, C.A. Owen and Augustine M. Choi. *Nature Medicine* 22, 163–174 (2016)
10. Mechanical forces accelerate collagen digestion by bacterial collagenase in lung tissue strips. E.Yi, S. Sato, A Takahashi, **H. Parameswaran**, TA Blute, E.B.Suki, B Suki *Front. Physiol.*, (2016)

2015

11. Linking ventilation heterogeneity quantified via hyperpolarized ³He MRI to dynamic lung mechanics and airway hyperresponsiveness J.Liu, **H. Parameswaran**, M.S. Albert, K.R. Lutchen *PLoS ONE* 10(11): e0142738.
12. Can Breathing-Like Pressure Oscillations Reverse or Prevent Narrowing of Small Intact Airways? B. Harvey, **H. Parameswaran** and K.R. Lutchen *J. Appl. Physiol.* 2015.
13. Scale Dependence of Structure-Function Relationship in the Emphysematous Mouse Lung S. Sato, E.B. Suki, **H. Parameswaran**, H. Hamakawa and B. Suki *Front. Physiol.* 6:146. 2015.
14. Fluctuation-driven mechanotransduction regulates mitochondrial-network structure and function E.B.Suki, J. Imsirovic, **H. Parameswaran**, T. Wellman, N Martinez, P.G. Allen, U. Frey and B. Suki. *Nature Materials.* 2015 Jul 27
15. Lung structure and function in elastase-treated rats: A follow-up study. M.V. Szabari, J. Tolnai, B.A. Maár, **H. Parameswaran**, E. Bartolák-Suki, B. Suki and Z. Hantos. *Respir Physiol Neurobiol.* 2015.

2014

16. A computational model of the response of adherent cells to stretch and changes in substrate stiffness **H. Parameswaran**, K.R. Lutchen and B. Suki *J. Appl. Physiol.* 116: 825-34, 2014.
17. Topographical control of multiple cell adhesion molecules for traction force microscopy S.R. Polio, **H. Parameswaran**, E.P. Canovic, D. Stamenovic, M.L. Smith *Integrative Biology* 6(3): 357-65, 2014

18. Proteoglycans maintain lung stability in an elastase-treated mouse model of emphysema. A. Takahashi, A. Majumdar, **H. Parameswaran**, E.B. Suki and B Suki. *Am. J. Respir. Cell Mol. Biol.* 51(1): 26-33, 2014
19. Computational modeling helps uncover mechanisms related to the progression of emphysema. B. Suki and **H. Parameswaran** *Drug Discov. Today* 70(27-28): 4245-4249, 2014
20. JNK suppresses pulmonary fibroblast elastogenesis during alveolar development. S. Liu, **H. Parameswaran**, S.M. Young and B. Varisco. *Resp. Res.* 15: 34, 2014

2013

21. Semiautomatic segmentation of ventilated airspaces in healthy and asthmatic subjects using hyperpolarized (3)He MRI. J.K. Lui, A.S. Laprad, **H. Parameswaran**, Y. Sun, M.S. Albert and K.R. Lutchen. *Comput. Math. Methods. Med.* Mar 31 2013.
22. Can Tidal Breathing with Deep Inspirations of Intact Airways Create Sustained Bronchoprotection or Bronchodilation? B. Harvey, **H. Parameswaran**, K.R. Lutchen J. *Appl Physiol.* May 30 2013.
23. Emphysema and Mechanical Stress-induced Lung Remodeling B. Suki, S. Sato, **H. Parameswaran**, M.V. Szabari, A. Takahashi, and E.B. Suki. *Physiology* June 2013.

2012

24. Acute mechanical forces cause deterioration in lung structure and function in elastase-induced emphysema. M.V. Szabari, **H. Parameswaran**, S. Sato, Z. Hantos, E.B. Suki and B. Suki. *Am J Physiol Lung Cell Mol Physiol.* Oct 2012
25. Functional and morphological assessment of early impairment of airway function in a rat model of emphysema. J. Tolnai, M.V. Szabari, G. Albu, B. Maar, **H. Parameswaran**, E.B. Suki, B. Suki and Z Hantos. *J. Appl. Physiol.* Jun 2012
26. Jamming dynamics of stretch-induced surfactant release by alveolar type II cells. A. Majumdar, S.P. Arold, E. B. Suki, **H. Parameswaran**, and B. Suki *J. Appl. Physiol.* Oct 2011.

2011

27. Linking Microscopic Patterns of Tissue Destruction in Emphysema to Macroscopic Stiffness Decline using a Three-Dimensional Computational Model. **H. Parameswaran**, A. Majumdar and B. Suki. *PLoS Computational Biol.* 7(4), April 2011.

28. Dynamics of Enzymatic Digestion of Elastic Fibers and Networks under Tension. A. Araujo, A. Majumdar, **H. Parameswaran**, E. Yi, J. Spencer, M. Nugent and B. Suki. Proc. Natl. Acad. Sci. USA. May 2011.



29. Structure-function relations in an elastase-induced mouse model of emphysema H. Hamakawa, E.B. Suki, **H. Parameswaran**, A. Majumdar, K. Lutchen, B. Suki. Am. J. Respir. Cell Mol. Biol. Sept. 2011 [HP's work was featured on the cover]

30. Microtubule dynamics regulate cyclic stretch- induced cell alignment in human airway smooth muscle cells, M.Morioka*, **H. Parameswaran*** K. Naruse, M. Kondo, M. Sokabe, Y. Hasegawa, B. Suki, and S. Ito PLoS-ONE 6(10), October 2011.(* **Equal Contribution**)

31. Mechanical failure, Stress Redistribution, Elastase Activity and Binding Site Availability on Elastin During the Progression of Emphysema. B. Suki, R. Jesudason, S. Sato, **H. Parameswaran**, A.D. Araujo, A. Majumdar, P.G. Allen, E. Bartolak-Suki Pulm. Pharmacol. Ther. April 2011.

2010

32. Mechanical forces regulate elastase activity and Binding site availability in lung elastin, R. Jesudason, S. Sato, **H. Parameswaran**, A.D. Araujo, A. Majumdar, P.G. Allen, E.B. Suki and B. Suki. Biophys. J. 99(9): 3076-83, 2010.

33. Autophagy protein LC3B activates extrinsic apoptosis during cigarette-smoke induced emphysema. Z. Chen, H. Lam, Y. Jin, HH. Kim, J. Cao, S. Lee, E. Ifedigbo, **H. Parameswaran**, S. Ryter and A. Choi. Proc. Natl. Acad. Sci USA. 107(44): 18880-5, 2010.

2009

34. Three-dimensional measurement of alveolar airspace volumes in normal and emphysematous lungs using micro-CT, **H. Parameswaran**, E.B. Suki, H. Hamakawa, A. Majumdar, P. Allen, B. Suki. J. Appl. Physiol. 107(2): 583-592, 2009.

35. Estimating the diameter of airways susceptible for collapse using crackle sound, A. Majumdar, Z. Hantos, J. Tolnai, **H. Parameswaran**, R. Tepper, and B. Suki. J. Appl. Physiol.,107(5):1504-12, 2009.

2008-2004

36. Quantitative characterization of airspace enlargement in emphysema. **H. Parameswaran**, A. Majumdar, S. Ito, A. M. Alencar, and B. Suki. *J. Appl. Physiol.* 100: 186-193, 2006.
37. Pattern of parenchymal destruction determines lung function decline. **H. Parameswaran**, A. Majumdar, H. Hamakawa, and B. Suki. *J. Appl. Physiol.* 105(6):1984-1984, 2008.
38. Alveolar macrophage activation and an emphysema like phenotype in adiponectin deficient mice. R. Summer, F. Little, N. Ouchi, Y. Takemura, T. Aprahamian, D. Dwyer, K. Fitzsimmons, B. Suki, **H. Parameswaran**, A. Fine, K. Walsh. *Am. J. Physiol.: Lung Cell Mol. Physiol.* 294: L1035-L1042, 2008.
39. Early emphysema in the tight skin and the pallid mice: roles of microfibril associated glycoprotein, collagen and mechanical forces. S. Ito, E.B. Suki, J.M. Shipley, **H. Parameswaran**, A. Majumdar, B. Suki. *Am. J. Respir. Cell Mol. Biol.* 34(6):688-694, 2006.
40. Mechanics, nonlinearity, and failure strength of lung tissue in a mouse model of emphysema: possible role of collagen remodeling. S. Ito, E.P. Ingenito, K.K. Brewer, L.D. Black, **H. Parameswaran**, K.R. Lutchen, B. Suki. *J. Appl. Physiol.* 98: 503-511, 2005.
41. Tissue heterogeneity in the mouse lung: effects of elastase treatment. S. Ito, E.P. Ingenito, S. P. Arold, **H. Parameswaran**, N. T. Tgavalekos, K. R. Lutchen, and B. Suki. *J. Appl. Physiol.* 97: 204-212, 2004.

Invited Book Chapter

1. Assessing Structure-Function Relations in Mice Using the Forced Oscillation Technique and Quantitative Histology. **H. Parameswaran** and B. Suki *Methods Mol Biol.* 2017;1639:77-91.

Invited letter

1. Morphological quantification of emphysema: A debate **H. Parameswaran**, A. Majumdar, S. Ito, A. M. Alencar, and B. Suki. *J. Appl. Physiol.* 100(4):1420-1421, 2006.

Conference Presentations

[list only includes conferences which review abstracts and publish proceedings(cited)]

1. Arold, S.P., H.K. Parameswaran, E.P. Ingenito, B. Suki. A mechanical stretching device to deliver variable stretch patterns to alveolar epithelial cells. American Thoracic Society

- International Conference, Seattle, May, 2003. *Am. J. Respir. And Critical Care Med.* Vol. 167, p. A57.
2. Parameswaran, H., K.K. Brewer, A. Majumdar, A.M. Alencar, B. Suki. An image processing technique for automated feature recognition of alveolar structure during macroscopic deformation. American Thoracic Society International Conference, Seattle, May, 2003. *Am. J. Respir. And Critical Care Med.* Vol. 167, p. A844.
 3. Parameswaran, H., A. Majumdar, K.K. Brewer, S. Ito, A.M. Alencar and B. Suki. Automated Image Analysis of Lung Tissue Structure. Published in Proceedings of the Biomedical Engineering Society Conference (National Level), October 2003, Nashville, *Annals Biomed. Engg.* 31: suppl. 1, 12.P3.14, 2003.
 4. Majumdar, A., H. Parameswaran, P. Basu, K.K. Brewer and B. Suki. Tracking edges when Vertices Disappear: Automated Analysis of a Sequence of Lung Tissue Images. Published in Proceedings of the Biomedical Engineering Society Conference (National Level Conference), October 2003, Nashville, *Annals Biomed. Engin.* 31: suppl. 1, 12.P3.27, 2003.
 5. Brewer, K.K. H. Parameswaran, S. Ito, B. Suki. Changes in the mechanical properties and alveolar wall structure of mouse lung tissue strips: the effects of in vivo and vitro elastase treatment. American Thoracic Society International Conference, Orlando, May, 2004. *Am. J. Respir. And Critical Care Med.* Vol. 169, p. A273.
 6. Parameswaran, H., A. Majumdar, K. Brewer, A.M. Alencar, B. Suki. Deformation of the alveolar wall structure in vitro: an image processing analysis. American Thoracic Society International Conference, Orlando, May, 2004. *Am. J. Respir. And Critical Care Med.* Vol. 169, p. A496
 7. Parameswaran, H., A. Majumdar, A.M. Alencar, S. Ito, and B. Suki. Measuring the progression of emphysema in the lung: Mean linear intercept vs. Alveolar diameter. Published in Proceedings of the Biomedical Engineering Society Conference (National Level Conference), October 2004, Philadelphia, *Annals Biomed. Engin.* 32: suppl. 1, Abstract 112, 2004.
 8. B.Suki, K.K. Brewer, S. Ito, A. Majumdar, A.M. Alencar, H. Parameswaran, L.D. Black, E.P. Ingenito, K.R. Lutchen. New insight into structure-function relations from mouse models of emphysema. American Thoracic Society International Conference, San Diego, May, 2005. *Am. J. Respir. And Critical Care Med.* Vol. 171, p. A17.
 9. Ito, S., E.P. Ingenito, H. Parameswaran, B. Suki. Respiratory mechanics, dynamic non-linearity, and tissue composition in emphysema: comparison of tight-skin and pallid mice. American Thoracic Society International Conference, San Diego, May, 2005. *Am. J. Respir. And Critical Care Med.* Vol. 171, p. A142.

10. Parameswaran H., A. Majumdar, S. Ito, A.M. Alencar, B. Suki. On the characterization of airspace enlargement in emphysema. American Thoracic Society International Conference, San Diego, May, 2005. *Am. J. Respir. And Critical Care Med.* Vol. 171, p. A501.
11. B. Suki. A. Majumdar, K.K. Brewer, H. Parameswaran and K. Lutchen Lung Tissue Viscoelasticity: From Fibers to Constitutive Equations. Published in Proceedings of the Biomedical Engineering Society Conference (National Level Conference), September 2005, Baltimore, *Annals Biomed. Engin. Supplement*, Abstract 530, pp. 41, 2005.
12. Majumdar, H. Parameswaran, J. Tolnai, R. Tepper, Z. Hantos and B. Suki Estimating The Diameter Of Airways Susceptible For Collapse Using Crackle Sound. Published in Proceedings of the Biomedical Engineering Society Conference (National Level Conference), September 2005, Baltimore, *Annals Biomed. Engin. Supplement*, Abstract 532, pp. 41, 2005.
13. Black, LD, J. Nandhavan, H. Parameswaran, A. Majumdar, P.J. Stone and B. Suki. Development Of An Imaging System To Measure True Stress: Applications To Mouse Models Of Emphysema. Published in Proceedings of the Biomedical Engineering Society Conference (National Level Conference), September 2005, Baltimore, *Annals Biomed. Engin. Supplement*, Abstract 1146, pp. 68, 2005.
14. H. Parameswaran, A. Majumdar and B. Suki. Relating Microscopic and Macroscopic Indices Of Alveolar Destruction In Emphysema. Published in Proceedings of the Biomedical Engineering Society Conference (National Level Conference), September 2005, Baltimore, *Annals Biomed. Engin. Supplement*, Abstract 1150, pp. 68, 2005.
15. H. Parameswaran, A. Majumdar, A. Thammanomai, B. Suki, Relation between Macroscopic and Microscopic Structure of the Lung in Emphysema, American Thoracic Society International Conference, San Diego, May, 2006. *Am. J. Respir. And Critical Care Med.* Abstract, Vol. 173. pp. 208.
16. Majumdar, H. Parameswaran, J. Tolnai, R. Tepper, Z. Hantos, B. Suki, Locating Airways That Are Vulnerable to Collapse Using Crackle Sound, American Thoracic Society International Conference, San Diego, May, 2006. *Am. J. Respir. And Critical Care Med.* Abstract, Vol. 173. pp. 460.
17. E. Bartolak Suki, S. Ito, M.J. Shipley, A. Majumdar, H. Parameswaran, B. Suki, Microfibril Associated Glycoprotein 2 and Transforming Growth Factor Beta1 Are Involved in the Pathogenesis of Emphysema in the Tight Skin and Pallid Mice, American Thoracic Society International Conference, San Diego, May, 2006. *Am. J. Respir. And Critical Care Med.* Abstract, Vol. 173. pp. 546.

18. B. Suki, Ito, E. Bartolak Suki, M. Shipley, H. Parameswaran, A. Majumdar, Early Emphysema in the Tight Skin and the Pallid Mice: Roles of Collagen and Mechanical Forces, American Thoracic Society International Conference, San Diego, May, 2006. Am. J. Respir. And Critical Care Med. Abstract, Vol. 173. pp. 626.
19. L.D. Black, J. Nandhavan, H. Parameswaran, A. Majumdar, P.J. Stone, Ph.D., B. Suki, Comparison of True Stress and Engineering Stress in Mouse Models of Emphysema, American Thoracic Society International Conference, San Diego, May, 2006. Am. J. Respir. And Critical Care Med. Abstract, Vol. 173. pp. 873.
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