

CURRICULUM VITAE
September 2008

Name: Jeffrey Joseph Fredberg, Ph.D.
Address: 27 Tall Tree Road, Sharon, MA 02067
Date of Birth: June 7, 1946
Place of Birth: Newton, Massachusetts

Education:

1968	BSME	Tufts University
1971	SMME	Massachusetts Institute of Technology
1972	ME	Massachusetts Institute of Technology
1973	Ph.D	Massachusetts Institute of Technology

Academic Appointments:

1977-1978	Lecturer in Mechanical Engineering, Massachusetts Institute of Technology
1980-1981	Lecturer in Mechanical Engineering, Tufts University.
1981-1983	Research Associate in Medicine, Department of Medicine, Harvard University.
1983-1986	Assistant Clinical Professor of Pediatrics (Biomedical Engineering) Department of Pediatrics, Harvard University.
1984-	Lecturer in Mechanical Engineering, Massachusetts Institute of Technology
1986-1988	Research Associate in Physiology in the School of Public Health Department of Environmental Sciences and Physiology Harvard University
1986-1991	Associate Professor of Pediatrics (Biomedical Engineering) Department of Pediatrics Harvard University.
1988-1991	Associate Professor in the Department of Environmental Sciences and Physiology Harvard School of Public Health
1991-	Professor of Bioengineering and Physiology Department of Environmental Health, Harvard School of Public Health

Major Administrative Responsibilities.

1979-1995	Founder and President, The Biomechanics Institute
1997-2006	Director, Physiology Program, Department of Environmental Health, Harvard School of Public Health.

Hospital Appointments:

1981	Research Associate in Medicine, Brigham and Women's Hospital, Boston, MA
1981-92	Research Associate in Medicine, Children's Hospital Medical Center, Boston, MA

Other Professional Positions and Major Visiting Appointments:

1968-1972	Member of Technical Staff, Bell Telephone Laboratories.
1973-1978	Senior Research Scientist, Cambridge Collaborative, Inc.
1978-	Senior Research Scientist, The Biomechanics Institute
1985	Visiting Scientist, Rappaport Family Institute for Research in Medical Sciences, Technion
1986-1987	Visiting Scientist, Meakins-Christie Laboratories, McGill University
1992	Visiting Professor, University of Paris XII, Creteil
2007-2012	International Scientific Committee, Institute for Bioengineering of Catalunya. (Ministry for Universities and Research, Ministry for Health of the local Catalan Government, University of Barcelona, Technical University of Catalunya).

Awards and Honors:

1967	Tau Beta Pi
1968	B.S. magna cum laude
1969	Sigma Xi
1982	American Physiological Society
1993	American Thoracic Society
1994	Japanese Society of Bioengineering, Keynote Speaker, Sendai
1994	Fellow, American Institute of Medical and Biological Engineering
1999	Lifetime Achievement Award in Mechanical Engineering Practice, Tufts University
2000	Keynote speaker, Biomedical Engineering Day, Boston University
2002	<i>Joseph R. Rodarte</i> Award for distinguished scientific achievement and sustained overall accomplishment in respiratory physiology and medicine. Respiratory Structure and Function Assembly, American Thoracic Society.
2003	<i>Southwest Mechanics Lecture Series</i> (Oklahoma State U., Southern Methodist U., Texas A&M U., Tulane U., U. Houston, U. Oklahoma, U. Texas Arlington, U. Texas Austin)
2003	<i>A.C. Suhren, Jr. Lecturer</i> , Tulane University
2003	<i>Joseph R. Rodarte Lecturer</i> , Baylor College of Medicine
2003	Plenary Lecturer, Physics of Nonequilibrium Complex Systems (PHYNECS), Sant Feliu de Guixols, Spain
2004	Chadwick Medal, the highest honor awarded by the Massachusetts Thoracic Society. For meritorious contributions to the study and treatment of tuberculosis and other thoracic diseases.
2005	Fellow of the Biomedical Engineering Society
2007	Office of Life Sciences Distinguished Lecture, National University of Singapore (NUS).
2008	Fisher & Paykel Healthcare Plenary speaker, Workshop on Multi-scale Modeling of the Respiratory System, Auckland, NZ

Major Committee Assignments:

1984-5	Review Group Member, Small Business Innovative Research Program (SBIR), National Institutes of Health
1983-	Ad hoc consultant, Program Project Study Section, and Respiratory and Applied Physiology Study Section, National Institutes of Health.
1984-1985	Ad hoc consultant to the Steering Committee, High Frequency Intervention Multicenter Trials, National Heart, Lung and Blood Institute.
1991-1993	Respiratory and Applied Physiology Study Section, National Institutes of Health
1994-1997	Priority and Resource Committee, Inspiraplex, Respiratory Health Network Centres of Excellence, Canada.
1998-	Executive Committee, Liberty Mutual-Harvard Program in Occupational Safety and Health
1998-2000	Harvard University Research Policy Committee

1998-	Harvard- MIT HST/DEAS Bioengineering Committee
1998-	Health, Science and Technology (HST) Graduate Committee, MIT
1999-	Harvard University Hearing Pool
1999-2001	NASA Life Sciences Standing Panel for Cellular and Molecular Biology
2002-2006	Program Project Review Committee, National Heart, Lung and Blood Institute, NIH
2002	Study Section Boundary Team, Center for Scientific Review, Pulmonary Sciences IRG, NIH
2004	Primary discussant in NSF/NIH interagency panel on Research at the Interface of Life and Physical Sciences: Bridging the Sciences.
2005-	Joint Library Committee

Memberships in Professional Societies:

American Thoracic Society
 North American Society of Biorheology
 Acoustical Society of America
 American Association for the Advancement of Science
 American Institute of Physics
 American Society of Mechanical Engineers
 Biomedical Engineering Society (Senior Member)
 International Lung Sounds Association.
 European Respiratory Society

American Thoracic Society

Chair elect: Program Committee of the Respiratory Structure and Function Assembly 1995-6
 Chair: Program Committee of the Respiratory Structure and Function Assembly 1996-7
 International Conference Committee 1996-7
 Chair: Long Range Planning Committee, Respiratory Structure and Function Assembly 1997-9
 International Conference Long Range Planning Committee 1997-8
 Nominating Committee: Respiratory Structure and Function Assembly, 1999-2000
 Chair, Long Range planning Committee 2006-2008
 Chair, Respiratory Structure and Function Assembly

Editorial Boards

1989-1996	Journal of Applied Physiology
1999-2008	Journal of Applied Physiology
2000-	Respiratory Research
2002-2005	American Journal of Physiology: Lung Cellular and Molecular Physiology
2005-	Mechanics & Chemistry of Biosystems

Corporate Board of Directors/ Scientific Advisory Board

1990-3	Board of Directors, Superior Healthcare Group, Inc.
2007-	Scientific Advisory Board, Boston Biomedical Research Institute
2008-2010	Board of Directors, American Thoracic Society

Major Research Interests:

To illuminate the physical foundations of respiratory function using the tools of engineering science.

1. Mechanics of airway luminal narrowing
2. Biophysics of contractile cells
3. Mechanics of the cytoskeleton
4. Mechanical properties of respiratory tissues.
5. Fluid dynamics and acoustics in the airways.
6. Species transport and exchange.

Professional Consulting:

3M Medical Products Division
Sontek, Inc.
Moore Business Forms, Inc.
Hydro-Acoustics, Inc.
MGD Graphics System, Rockwell International
Research Triangle Institute
Mead DIJIT, Mead Corporation
Hood Laboratories
Prolexys Pharmaceuticals

Teaching Experience:

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| 1977-1978 | Theoretical Acoustics, graduate level, course organizer and lecturer, Department of Mechanical Engineering, M.I.T. |
| 1980-1981 | Fluid Mechanics, undergraduate level, course organizer and lecturer, Department of Mechanical Engineering, Tufts University. |
| 1981- | Respiration Mechanics, postgraduate non-credit, course organizer and lecturer, Harvard School of Public Health, Children's Hospital. |
| 1981- | Dynamics of Pulmonary Airflow, postgraduate non-credit, course organizer and lecturer, Harvard School of Public Health, Children's Hospital. |
| 1981- | Oscillation Mechanics of the Lung, postgraduate non-credit, course organizer and lecturer, Harvard School of Public Health, Children's Hospital. |
| 1981- | Thesis/research supervision - Primary supervision of B.S., M.S., Ph.D. level students, M.I.T. |
| 1981- | Primary research supervision of postgraduate pulmonary trainees, Pulmonary Division, Children's Hospital. |
| 1984 | Harvard Medical School, Department of Continuing Education, High Frequency Ventilation, Arthur Bennotti, M.D., Course Organizer, Lectures on High Frequency Oscillation Mechanics. |
| 1986-7 | Respiratory Dynamics, postgraduate non-credit course at The Children's Hospital, with J. Mead, L. Reid, M.E. Avery. |
| 1989 | Fundamentals of Respiratory Research, postgraduate non-credit course at The Children's Hospital, with J. Drazen. |

- 1989 Advanced Respiratory Physiology, graduate credit course at the Harvard School of Public Health, with faculty.
- 1990 Respiratory Mechanics, with JM Drazen, MEB Wohl
- 1991- Advanced Topics in Respiratory Biology. Lung Development; Chemical electrical and mechanical signalling in the cell
- 1993- Respiratory pathophysiology, with J. Drazen, HST-100, MIT
- 1993- Advanced topics in Physiology (EH225, BPH207, BPH727)
- 2006 Conduct of Science (MED SCI 300)

National Institutes of Health Grants and Contracts

Principal Investigator: NO1 HR 62901
1975-8 Pulmonary function testing in infants and children.
1978-80 Competitive renewal

Principal Investigator: RO1 HL 23335
1979-80 Chest wall impedance in lung sound transduction.

Principal Investigator: RO1 HL 26800
1980 Partitioning respiratory system impedance.
1983 Competitive renewal
1984 Relinquished in favor of PO1 HL33009

Principal Investigator: RO1 HL 27051
1982 Studies on central airway mechanics.
1984 Competitive renewal
1984 Relinquished in favor of PO1 HL33009

Responsible Investigator: PO1 HL 34616
1981 SCOR: Respiratory Disorders of Neonates and Children, Mary Ellen Avery PI
Project 4. High frequency ventilation.
1986-Competitive renewal

Responsible Investigator: PO1 HL 33009
1984 PPG Nonuniform Ventilatory Mechanics, Jeffrey M. Drazen PI
Project 4. Oscillation mechanics of the lung.
Project 5. Inhomogeneous emptying during forced expiration.

Principal Investigator: 1 RO1 HL43828-01A1
1990 Mechanics of Lung Tissue
1990 Relinquished in favor of PO1 HL33009

Principal Investigator: RO3 TW0092
Fogarty International Center
1992-3. A direct assay of small airway function.
1993-5 Competitive renewal

Principal Investigator: RO1 HL 66193-01
2000-2005 Airway narrowing and novel muscle mechanisms Ann. dir costs: \$250,000

Active:

Principal Investigator: PO1 HL 33009, Program Project
1988-1990 Physical Determinants of Lung Function and Dysfunction
1990-1995 Competitive renewal
1995-2000 Competitive renewal.
2001-2006 Competitive renewal Ann. dir. costs: \$1,464,000

Principal Investigator: RO1 HL 59682
1997-2002 Airway mechanics and smooth muscle shortening.
2003-2007 Competitive renewal Ann. dir. costs: \$225,000

Principal Investigator: RO1 HL 65960, Bioengineering Research Partnership
2000-2005 Micromechanics of airway smooth muscle cells in culture. Ann. dir costs: \$471,000
2005-2010 Competitive renewal

BIBLIOGRAPHY

Original Reports:

1. Fredberg, JJ. Pseudo-sound generation at athero-sclerotic constrictions in arteries. *Bull. Math. Biol.* 1974; 36:143-155.
2. Fredberg JJ, Manning, JE. Piledriver noise: acoustic radiation from a cylindrical pipe under periodic axial impacts. *Trans. ASME, J. Eng. Indus.* 1975; 97, Ser. B(4):1219-1222.
3. Fredberg JJ. Origin and character of vascular murmurs: model studies. *J. Acoust. Soc. Am.* 1977; 61:1077-1085.
4. Fredberg JJ, Hoening A. Mechanical response of the lungs at high frequencies. *Trans. ASME, J. Biomech. Eng.* 1978; 100(2):57-66.
5. Fredberg JJ, Sidell RS, Wohl MEB, DeJong RG. Canine pulmonary input impedance measured by transient forced oscillations. *Trans. ASME, J. Biomech. Eng.* 1978; 100(2):67-71.
6. Fredberg JJ, Moore JA. Distributed response of complex branching duct networks. *J. Acoust. Soc. Am.* 1978; 63(3):954-961.
7. Fredberg JJ. A modal perspective of lung response. *J. Acoust. Soc. Am.* 1978; 63(3):962-966.
8. Sidell RS, Fredberg JJ. Non-invasive inference of airway network geometry from broadband lung reflection data. *Trans ASME, J. Biomech. Eng.* 1978; 100(3):131-138.
9. Fredberg JJ, Mead J. Impedance of intrathoracic airways during low frequency periodic flow. *J. Appl. Physiol.: Respirat. Environ. Exercise. Physiol.* 1979;47(2):347-351.
10. Fredberg JJ. Spatial considerations in oscillation mechanics of the lungs. *Federation Proceedings.* 1980; 39:2747-2754.
11. Fredberg JJ, Wohl MEB, Glass GM, Dorkin HL. Airway area from acoustic reflections measured at the mouth. *J. Appl. Physiol.: Respirat. Environ. Exercise. Physiol.* 1980; 48(5):749-758.
12. Fredberg JJ. Augmented diffusion in the airways can support pulmonary gas exchange. *J. Appl. Physiol.: Respirat. Environ. Exercise. Physiol.* 1980; 49(2):232-238.
13. Slutsky AS, Drazen JM, Ingram RH Jr., Kamm RD, Shapiro AH, Fredberg JJ, Loring SH, Lehr J. Effective pulmonary ventilation with small volume oscillations at high frequency. *Science.* 1980; 209:609-611.
14. Fredberg JJ. Acoustic determinants of respiratory system properties. *Ann. Biomed. Eng.* 1981; 9:463-473.
15. Fredberg JJ, Holford SK. Discrete lung sounds: crackles (rales) as stress relaxation quadrupoles. *J. Acoust. Soc. Am.* 1983; 73(3):1036-1046.
16. Dorkin HL, Stark AR, Werthammer JW, Strieder DJ, Fredberg JJ, Frantz ID III. Respiratory system impedance from 4-40 Hz in paralyzed intubated infants with respiratory disease. *J. Clin. Invest.* 1983; 72:903-910.
17. Special Conference Report, High frequency ventilation for immature infants. *Pediatrics.* 1983; 71(2):280-287.
18. Fredberg JJ, Keefe DH, Glass GM, Castile RG, Frantz III, ID. Alveolar pressure nonhomogeneity during small-amplitude high-frequency oscillation. *J. Appl. Physiol.: Respirat. Environ. Exercise. Physiol.* 1984; 57(3): 788-800.
19. Brooks LJ, Castile RG, Glass GM, Griscombe NT, Wohl MEB, Fredberg JJ. Reproducibility and accuracy of airway area by acoustic reflection. *J. Appl. Physiol.: Respirat. Environ. Exercise. Physiol.* 1984; 57(3): 777-787.
20. Fredberg JJ, Ingram RH, Jr., Castile RG, Glass GM, Drazen JM. Nonhomogeneity of lung response to inhaled histamine assessed with alveolar capsules. *J. Appl. Physiol.* 1985; 58(6):1914-1922.

21. Allen JL, Fredberg JJ, Keefe DH, Frantz III, ID. Alveolar pressure magnitude and asynchrony during high frequency oscillations of excised rabbit lungs. *Am. Rev. Resp. Dis.* 1985;132:343-349.
22. Allen JL, Frantz III ID, Fredberg JJ. Regional alveolar pressure during periodic flow: dual manifestations of gas inertia. *J. Clin. Invest.* 1985; 76: 620-629.
23. Wilson TA, Fredberg JJ, Rodarte JR, Hyatt RE. Interdependence of regional expiratory flow. *J. Appl. Physiol.* 1985; 59(6):1924-1928.
24. Allen JL, Frantz III ID, Fredberg JJ. Regional alveolar pressure during large amplitude periodic flow. *Progress in Respiration Research*, 1986; 21: 161-164.
25. Allen JL, Frantz III ID, Fredberg JJ. Heterogeneity of mean alveolar pressure during high frequency oscillations. *J. Appl. Physiol.* 62(1):223-228, 1987.
26. Solway J, Fredberg JJ, Ingram RH, Pedersen OF, Drazen JM. Interdependent lung emptying during forced expiration: a transistor model. *J. Appl. Physiol.* 62(5): 2013-2025, 1987.
27. Butler JP, Feldman HA, Fredberg JJ. Dimensional Analysis Does Not Determine a Mass Exponent for Metabolic Scaling. *American Journal of Physiology* 253 [Regulatory Integrative Comp. Physiol. 22] R195-R199, 1987.
28. Boynton BR, Fredberg JJ, Buckley BG, Frantz ID III. Rib cage versus abdominal displacement in rabbits during forced oscillations to 30 Hz. *J. Appl. Physiol.* 63(1):309-314, 1987.
29. Fredberg, JJ, GM Glass, BR Boynton, ID Frantz III. Factors Influencing Mechanical Performance of Neonatal High Frequency Ventilators. *J. Appl. Physiol.* 62(6):2485-2490, 1987.
30. Rubinstein, I, PA McLean, R Boucher, N Zamel, JJ Fredberg, V Hoffstein. Effect of Mouthpiece, Nose Clips, and Head Position on Airway Area by Acoustic Reflections. *J. Appl. Physiol.* 63(4): 1469-1474, 1987.
31. Butler, JP, RB Banzett, JJ Fredberg. Inspiratory Valving in Avian Bronchi: Aerodynamic Considerations. *Respiration Physiology.* 72(2):241-256, 1988.
32. McNamara JJ, Castile RG, Glass GM, Fredberg JJ. Heterogeneous lung emptying during forced expiration. *J. Appl. Physiol.* 63(4):1648-1657, 1987.
33. Hoffstein, V, RG Castile, CR O'Donnel, GM Glass, DJ Strieder, MEB Wohl, JJ Fredberg. In vivo estimation of tracheal distensibility and hysteresis in normal adults. *J. Appl. Physiol.* 63(6):2482-2489, 1987.
34. Martin, T.R., R.G. Castile, J.J. Fredberg, J. Mead, M.E.B. Wohl. Airway size is related to sex but not lung size in healthy adults. *J. Appl. Physiol.* 63(5):2042-2047, 1987.
35. Wang, N., RB Banzett, JP Butler, JJ Fredberg. Bird lung models show that convective inertia effects inspiratory aerodynamic valving. *Respiration Physiology.* 73:111-124, 1988.
36. Federspiel, WJ, JJ Fredberg. Axial Dispersion in Alveolar Ducts and Respiratory Bronchioles, *J. Appl. Physiol.* 64(6):2614-2621, 1988.
37. Ludwig, M.S., S.A. Shore, J.J. Fredberg, J.M. Drazen. Differential responses of tissue viscance and collateral resistance to histamine and leukotriene C₄. *J. Appl. Physiol.* 65(3):1424-1429, 1988.
38. Martin, T.R., H.A. Feldman, J.J. Fredberg, R.G. Castile, J. Mead, M.E.B. Wohl. The relationship between maximum expiratory flows and lung volumes during growth in normal humans. *J. Appl. Physiol.* 65(2): 822-828, 1988.
39. Lyttle, BD, C.Duvivier, GM Glass, MEB Wohl, JJ Fredberg. Thoracic gas volume in rabbits by low frequency ambient pressure change. *J. Appl. Physiol.* 65(3):1444-1448, 1988.

40. Bates, J.H.T., M. Ludwig, P.D. Sly, K. Brown, J.G. Martin, J.J. Fredberg. Interrupter resistance elucidated by alveolar pressure measurement in open-chested normal dogs. *J. Appl. Physiol.* 65(1):408-414, 1988
41. Ludwig, M.S., J.J. McNamara, R.G. Castile, G.M. Glass, J.J. Fredberg, R.H. Ingram, Jr. Lung Inflation Does Not Increase Maximum Expiratory Flow During Induced Obstruction in the Dog. *J. Appl. Physiol.* 65(1):415-421, 1988.
42. Butler, JP, HA Feldman, JJ Fredberg. Response to "A theory of similitude may predict a metabolic mass exponent" by AA Heusner. *Am. J. Physiol.* 255: R 351-353, 1988.
43. Alleyne, C.M., I.D. Frantz, III, J.J. Fredberg. Preferential axial flow during high frequency oscillations: effects of gas density. *J. Appl. Physiol.* 66(2):542-547, 1989.
44. Boynton, B.R., M.D. Hammond, J.J. Fredberg, B.G. Buckley, D. Villanueva, I.D. Frantz III. Gas Exchange in Healthy Rabbits During High Frequency Oscillatory Ventilation. *J. Appl. Physiol.* 66(3):1343-1351, 1989.
45. Fredberg, JJ, J. Allen, A. Tsuda, B. Boynton, R. Banzett, J. Butler, J. Lehr ID Frantz, III. Mechanics of the respiratory system during high-frequency ventilation. *Acta Anaesthesiologica Scandinavica.* 33, Supplementum 90: 39-45, 1989.
46. Fredberg, JJ. Pulmonary mechanics during high-frequency ventilation. *Acta Anaesthesiologica Scandinavica.* 33, Supplementum 90:170-171, 1989.
47. Fredberg, JJ, A Tsuda. Continuum scaling for spreading drops. *Nature (Scientific Correspondence)* 340:24, 1989.
48. Ludwig, MS, S Bellofiore, SA Shore, JM Drazen, JJ Fredberg. Dynamics of collateral pathways of canine lungs after flow interruption. *J. Appl. Physiol.* 67(3): 1213-1219, 1989.
49. Boynton, BR, G Glass, ID Frantz III, JJ Fredberg. Rib cage vs. abdominal displacements in dogs during forced oscillation to 32 Hz. *J. Appl. Physiol.* 67(4):1472-1478, 1989.
50. Fredberg, JJ, D Stamenovic. On the imperfect elasticity of lung tissue. *J. Appl. Physiol.* 67(6): 2408-2419, 1989.
51. Barnas, GM, K Yoshino, J Fredberg, Y Kikuchi, SH Loring, J Mead. Total and local impedances of the chest wall up to 10 Hz. *J. Appl. Physiol.* 68(4):1409-1414, 1990.
52. Tsuda, A, JJ Fredberg. Periodic flow at airway bifurcations. Part I: Development of steady pressure differences. *J. Appl. Physiol.* 69(2):546-552, 1990.
53. Tsuda, A, RD Kamm, JJ Fredberg. Periodic flow at airway bifurcations. Part II: Flow partitioning. *J. Appl. Physiol.* 69(2):553-561, 1990.
54. Tsuda, A, JJ Fredberg. Periodic flow at airway bifurcations. Part III: Energy dissipation. *J. Appl. Physiol.* 69(2):562-569, 1990.
55. Stamenovic, D, GM Glass, GM Barnas, JJ Fredberg. Viscoplasticity of respiratory tissues. *J. Appl. Physiol.* 69(3): 973-988, 1990.
56. Ludwig, MS, PV Romero, PD Sly, JJ Fredberg, JHT Bates. Interpretation of interrupter resistance after histamine-induced constriction in the dog. *J. Appl. Physiol.* 68(4): 1651-1656, 1990.
57. Fredberg, JJ. Frontiers in pulmonary mechanics. *Japanese Journal of Medical Electronics and Biological Engineering.* 28:3-5, 1990.
58. Topulos, GP, GJ Nielan, GM Glass, JJ Fredberg. Interdependence of regional expiratory flows limits alveolar pressure differences. *J. Appl. Physiol.* 59:1924-1928, 1990.
59. Barnas, GM, D Stamenovic, JJ Fredberg (with tech. assistance of X Luo). Proportionality between chest wall resistance and elastance. *J. Appl. Physiol.* 70(2): 511-515, 1991.

60. Robatto, FM, PV Romero, JJ Fredberg, MS Ludwig. The contribution of static tissue hysteresis to the dynamic alveolar pressure-volume loop. *J. Appl. Physiol.* 70(2): 708-714, 1991.
61. Fredberg, JJ, GM Barnas, D Stamenovic. Effect of amplitude during sinusoidal forcing: nonlinearity of respiratory tissue compartments. *The European Respiratory Journal.* 1(3):188-190, 1991
62. Hoffstein, V, JJ Fredberg. The acoustic reflection technique for non-invasive assessment of upper airway area. *European Respiratory Journal.* 4(5):602-611, 1991.
63. Tsuda, A, WJ Federspiel, PA Grant, Jr., JJ Fredberg. Axial dispersion of inert species in alveolated channels: an experimental study. *Chemical Engineering Science* 46, 5/6, 1419-1426, 1991.
64. Boynton, BR, GM Barnas, J Dadmun, JJ Fredberg. Mechanical coupling of rib cage, abdomen and diaphragm through their area of apposition. *J. Appl. Physiol.* 70(3):1235-1244, 1991.
65. Banzett, RB, CS Nations, N Wang, JJ Fredberg, JP Butler. Pressure profiles show features essential to aerodynamic valving in geese. *Respiration Physiology.* 84:295-309, 1991.
66. Kharasch VS, TD Sweeney, J Fredberg, J Lehr, AI Damokosh, ME Avery, JD Brain. Pulmonary surfactant as a vehicle for delivery of technetium sulfur colloid and pentamidine in hamster lungs. *Am. Rev. Respir. Dis.* 144 (4):909-913, 1991.
67. Ludwig, MS, F Robatto, S Simard, J Sato, D Stamenovic, JJ Fredberg. Lung tissue resistance during contractile stimulation: the structural damping decomposition. *J. Appl. Physiol.* 72(4): 1332-1337, 1992.
68. Hantos, Z, B Daroczy, B Suki, S Nagy, JJ Fredberg. Input impedance and peripheral inhomogeneity of dog lungs. *J. Appl. Physiol.* 72(1):168-178, 1992.
69. Navajas, D, S Mijailovich, G Glass, D Stamenovic, J Fredberg. Dynamic response of the isolated relaxed rat diaphragm strip. *J. Appl. Physiol.* 73(6):2681-2692, 1992.
70. Louis, B, G Glass, B Kresen, JJ Fredberg. Airway area by acoustic reflection: the two-microphone method. *The Journal of Biomechanical Engineering.* 115: 278-285, 1993.
71. Fredberg, JJ, D Bunk, E Ingenito, SA Shore. Tissue resistance and the contractile state of lung parenchyma. *J. Appl. Physiol.* 74(3):1387-1397, 1993.
72. Mijailovic, SM, D Stamenovic, JJ Fredberg. Toward a kinetic theory of connective tissue micro-mechanics. *J. Appl. Physiol.*: 74(2):665-681, 1993.
73. Van Surell, C, B Louis, F Lofaso, L Beydon, L Brouchard, A Harf, J Fredberg, D Isabey. Use of an acoustic method to estimate the longitudinal area profile of endotracheal tubes. *Am. J. Respir. Crit. Care Med.* 149:28-33, 1994
74. Espinosa F, AH Shapiro, JJ Fredberg, RD Kamm. Spreading of exogenous surfactant in an airway. *J. Appl. Physiol.* 75(5):2028-2039, 1993.
75. Ingenito, EP, B Davison, JJ Fredberg. Tissue resistance in the guinea pig at baseline and during methacholine constriction. *J. Appl. Physiol.* 75(6):2541-2548, 1993.
76. McNamara, J, MS Ludwig, RG Castile, GM Glass, RH Ingram Jr., JJ Fredberg. Heterogeneous regional behavior during forced expiration before and after histamine inhalation in dogs. *J. Appl. Physiol.* 76(1):356-360, 1994.
77. Mijailovich, SM, D Stamenovic, R Brown, DE Leith, JJ Fredberg. Dynamic moduli of rabbit lung tissue and pigeon ligamentum propatagiale undergoing uniaxial cyclic loading. *J. Appl. Physiol.* 76(2): 773-782, 1994.
78. Louis B, GM Glass, JJ Fredberg. Pulmonary airway area by the 2-microphone acoustic reflection method. *J. Appl. Physiol.* 76(5): 2234-2240, 1994.

79. Tsuda, A, JP Butler, JJ Fredberg. Effects of alveolated duct structure on aerosol deposition in the pulmonary acinus. Part I: Diffusion in the absence of gravity. *J. Appl. Physiol.* 76(6): 2497-2509, 1994.
80. Tsuda, A, JP Butler, JJ Fredberg. Effects of alveolated duct structure on aerosol deposition in the pulmonary acinus Part II: gravitational sedimentation and inertial impaction in the absence of diffusion. *J. Appl. Physiol.* 76(6): 2510-2516, 1994.
81. Venegas, JG, JJ Fredberg. Understanding the pressure cost of ventilation: Why does high frequency ventilation work? *Critical Care Medicine*, 22(9), S49-S57, 1994.
82. Louis, B., J.J. Fredberg, D. Isabey. Determination non-invasive du calibre d'un conduit aerien par reflexion acoustique. *Revue Pratique de Control Industriel*, 189, 18-22, 1994.
83. Wang, N, E Planus, M Pouchelet, JJ Fredberg, G Barlovatz-Meimon. Urokinase receptor mediates mechanical force transfer across the cell surface. *A. J. Physiol* 268 (*Cell Physiol.* 37), C1062-1066, 1995
84. Kimmel, E., M Seri, JJ Fredberg. Lung tissue resistance and hysteretic moduli of lung parenchyma. *J. Appl. Physiol.* , 79(2): 461-466, 1995.
85. Hantos Z, F Petak, A Adamicza, B Daroczy, JJ Fredberg. Differential responses of global airway, terminal airway, and tissue impedances to histamine. *J. Appl. Physiol.* 79(5):1440-1488, 1995.
86. Stamenovic, D, JJ Fredberg, N Wang, JP Butler, DE Ingber. A microstructural approach to cytoskeletal mechanics. *Journal of Theoretical Biology.* 181:125-139, 1996.
87. Hubmayr, RD, SA Shore, JJ Fredberg, E Planus, R Panettieri, W. Moller, J. Heyder, Wang. Pharmacologic activation changes stiffness of cultured human airway smooth muscle cells. *Am. J. Physiol.* 271 (*Cell Physiol* 40): C1660-C1668, 1996
88. Otis, DR, F. Petak, Z Hantos, JJ Fredberg, RD Kamm. Airway closure and re-opening assessed by the alveolar capsule oscillation technique. *J. Appl. Physiol.* 80(6): 2077-2084, 1996.
89. Mijailovich, SM, JP Butler, JJ Fredberg. On the theory of muscle contraction: filament extensibility and the development of isometric force and stiffness. *Biophysical Journal*, 71, 1475-1484, 1996.
90. J.J. Fredberg, K.A. Jones, Madhavi Nathan, S Raboudi, Y. S. Prakash, S.A. Shore, J.P. Butler, G. C. Sieck. Friction in airway smooth muscle: mechanism, latch and implications in asthma *J. Appl. Physiol.* 81(6):2703-2712, 1996.
91. Heyer, L., B. Louis, D. Isabey, F. Lofaso, L. Brochard, J. Fredberg, A. Harf. Non-invasive estimate of work of breathing due to the endotracheal tube. *Anesthesiology.* 85:1324-33, 1996.
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Doctoral Trainees

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