

# Curriculum Vitae of David Halpern

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## PERSONAL INFORMATION:

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## EDUCATION:

Ph.D. (1989) in Applied Mathematics, University of Arizona.

Certificate of Advanced Study in Mathematics (also known as Part III of the tripos) (1985), MAST (2012), University of Cambridge, Cambridge, England.

B.Sc. (First Class Hons.) (1984) in Mathematics, University of Bristol.

## APPOINTMENTS:

### Permanent:

2015-Present Director of Graduate Programs, Department of Mathematics, University of Alabama, Tuscaloosa AL.

1993-1998, 1998-2004, 2004-Present Assistant, Associate, Full Professor, Department of Mathematics, University of Alabama, Tuscaloosa, AL.

1989-1990, 1990-1993 Postdoctoral Research Fellow, Research Assistant Professor, Department of Biomedical Engineering, Northwestern University, Evanston, IL.

1985-1989 Graduate Research Assistant in Physiology and Arizona Research Laboratories, University of Arizona, Tucson, AZ.

### Temporary:

January 2008-Present, Adjunct Professor, Department of Biomedical Engineering, Tulane University, New Orleans, LA.

Summers 2008-2011, Visiting Scholar, Department of Biomedical Engineering, University of Michigan, Ann Arbor MI.

Fall 2007, Visiting Scholar, Department of Biomedical Engineering, University of Michigan, Ann Arbor MI.

June 2005, June 2006, Visiting Scholar,  
Department of Biomedical Engineering, Tulane University, New Orleans, LA.

July 2005, Visiting Scholar,  
Department of Biomedical Engineering, University of Michigan, Ann Arbor MI.

July 2004, Visiting Associate Professor,  
Department of Biomedical Engineering, University of Michigan, Ann Arbor MI.

June 2004, Visiting Associate Professor,  
Department of Biomedical Engineering, Tulane University, New Orleans, LA.

August 2003-December 2003 Visiting Associate Professor,  
Department of Biomedical Engineering, Tulane University, New Orleans, LA.

January 2003-July 2003 Visiting Associate Professor,  
Department of Biomedical Engineering, University of Michigan, Ann Arbor MI.

Fall 1999-Spring 2000 Visiting Scholar, Department of Applied Mathematics  
and Theoretical Physics, University of Cambridge, Cambridge, UK.

Summers 98-02 Visiting Scholar, Department of Biomedical Engineering,  
University of Michigan, Ann Arbor MI.

Summers 96-02 Consultant, Biomedical Engineering Department, Tulane  
University, New Orleans, LA.

Summers 94-97 Visiting Scholar, Department of Biomedical Engineering,  
Northwestern University, Evanston, IL.

## **SOCIETIES:**

American Physical Society.

## **HONORS:**

1984 First Class Honors (University of Bristol).

1990 Biological Fluid Dynamics: Supercomputing Workshop, April 18-20, Pittsburgh  
Supercomputing Center, sponsored by NIH.

2006 The Lewis-Parker Lecture: Core-Annular Film Flows: A Model of Airway  
Closure 56<sup>th</sup> Annual Meeting of the Alabama Association of College Teachers of  
Mathematics, Jacksonville, Alabama, February 11, 2006.

## LIST OF PUBLICATIONS:

1. **Halpern, D.** and Secomb, T.W. The squeezing of red blood cells through capillaries with near-minimal diameters. *J. Fluid Mech.* **203**: 381-400, 1989.
2. **Halpern, D.** and Secomb, T.W. Viscous motion of disc-shaped particles through parallel-sided channels with near minimal widths. *J. Fluid Mech.* **231**: 545-560, 1991.
3. Elad, D., **Halpern, D.** and Grotberg, J.B. Gas bolus dispersion in volume-cycled tube flow. Part I: Theory. *J. Applied Physiology* **72**: 312-320, 1992.
4. **Halpern, D.** and Grotberg, J.B. Dynamics and transport of a localized soluble surfactant on a thin film. *J. Fluid Mech.* **237**: 1-11, 1992.
5. **Halpern, D.** and Secomb, T.W. The squeezing of red blood cells through parallel-sided channels with near-minimal widths. *J. Fluid Mech.* **244**: 307-322, 1992.
6. **Halpern, D.** and Grotberg, J.B. Fluid-elastic instabilities of liquid lined flexible tubes: *J. Fluid Mech.* **244**: 615-632, 1992.
7. **Halpern, D.** and Grotberg, J.B. Surface-tension instabilities of liquid lined elastic tubes. *Contemporary Mathematics* **141**: 295-316, 1993. In Fluid Dynamics in Biology, proceeding of an AMS-IMS-SIAM Joint Research Conference held July 6-12, 1991, edited by A.Y. Cheer and C.P. van Dam.
8. **Halpern, D.** and Grotberg, J.B. Surfactant effects on fluid elastic instabilities of liquid lined flexible tubes: a model of airway closure. *J. Biomech. Eng.* **115**: 271-277, 1993.
9. Jensen, O.E., **Halpern, D.** and Grotberg, J.B. Transport of a passive solute by surfactant-driven flows. *Chem. Eng. Sci.* **49** (8): 1107-1117, 1994.
10. **Halpern, D.** and Gaver, D.P. Boundary element analysis of the time-dependent motion of a semi-infinite bubble in a channel. *J. Comp. Phys.* **115** (2): 366-375, 1994.
11. Grotberg, J.B., **Halpern, D.** and Jensen, O.E. The interaction of exogenous and endogenous surfactant: spreading-rate effects. *J. Applied Physiology* **78**: 750-756, 1995.
12. Gaver, D.P., **Halpern, D.**, Jensen, O.E. and Grotberg, J.B. The motion of a semi-infinite bubble through a flexible-walled channel. *J. Fluid Mech.* **319**: 25-45, 1996.
13. **Halpern, D.**, Jensen, O.E. and Grotberg, J.B. A theoretical study of surfactant and liquid delivery into the lung. *J. Applied Physiology* **85**: 333-352, 1998.
14. Jensen, O.E. and **Halpern, D.** The stress singularity in surfactant-driven-film flows. Part 1. Viscous effects. *J. Fluid Mech.* **372**: 273-300, 1998.
15. Cassidy, K.J., **Halpern, D.**, Ressler, B.G. and Grotberg, J.B. Surfactant effects in model airway closure experiments. *J. Applied Physiology* **87**: 415-427, 1999.

16. **Halpern, D.** Jiang, Y. and Himm, J.F. Mathematical modeling of gas bubble evolution in a straight tube. *J. Biomech. Eng.* **121** (5): 505, 1999.
17. Faybishenko, B., Babchin, A.J., Frenkel, A.L., **Halpern, D.** and Sivashinsky, G.I. A model of chaotic evolution of an ultrathin film down an inclined plane. *Colloids & Surfaces* **192**: 377-385, 2001.
18. Ghadiali, S.N., **Halpern, D.** and Gaver, D.P. A dual-reciprocity boundary element method for evaluating bulk convective transport of surfactant in free surface flows. *J. Comp. Phys.* **171**: 534-559, 2001.
19. **Halpern, D.** and Frenkel, A.L. Saturated Rayleigh-Taylor instability of an oscillating Couette film flow. *J. Fluid Mech.* **446**: 67-93, 2001.
20. **Halpern, D.** and Jensen, O.E. A semi-infinite bubble advancing into a planar tapered channel. *Phys. Fluids.* **14**(2): 431-442, 2002.
21. Jensen, O.E., Horsburgh, M.K., **Halpern, D.** & Gaver, D.P. III The steady propagation of a bubble in a flexible-walled channel: asymptotic and computational models. *Phys. Fluids.* **14**(2): 443-457, 2002.
22. Frenkel, A.L. and **Halpern, D.** Stokes-flow instability due to interfacial surfactant. *Phys. Fluids.* **14** (7): L45-L48, 2002.
23. Wei, H.H., Benintendi, S.W., **Halpern, D.** and Grotberg, J.B. Cycle-induced flow and transport in a model of alveolar liquid lining. *J. Fluid Mech.* **483**: 1-36, 2003.
24. **Halpern, D.** and Frenkel, A.L. Destabilization of a creeping flow by interfacial surfactant: Linear theory extended to all wavenumbers. *J. Fluid Mech.* **485**: 191-220, 2003.
25. **Halpern, D.** and Grotberg, J.B. Nonlinear Saturation of the Rayleigh instability in a liquid-lined tube due to oscillatory flow. *J. Fluid Mech.* **492**: 251-270, 2003.
26. **Halpern, D.**, Bull, J.L. and Grotberg The effect of airway wall motion on surfactant delivery. *J. Biomech. Eng.* **126**(4): 410-419, 2004.
27. Frenkel, A.L. and **Halpern, D.** Effect of inertia on the insoluble surfactant instability of a shear flow. *Phys. Rev. E* **71**, 016302, 2005.
28. **Halpern, D.**, Naire, S., Jensen, O.E. and Gaver, D.P. Unsteady bubble propagation in a flexible channel: predictions of a viscous stick-slip instability. *J. Fluid Mech.* **528**, 53-86, 2005.
29. Wei, H.-H., **Halpern, D.** and Grotberg, J.B. Interfacial Stability of a Time-Periodic Core-Annular Flow in the Presence of Surfactant. *J. Colloid and Interface Science*, **28**, 769-780, 2005.
30. Frenkel, A.L. and **Halpern, D.** Strongly nonlinear nature of interfacial-surfactant instability of Couette flow. *Int. J. Pure Appl. Math.*, **29**(2), 205-224, 2006.

31. **Halpern, D.** Core-annular film flows: a model of airway closure. *Alabama Journal of Mathematics*, **31(2)**, 1-13, 2007.
32. **Halpern, D.** and Wei, H. H. Electroosmotic flow in a non-uniformly charged cavity. *Langmuir*, **23(18)**, 9505-9512, 2007.
33. **Halpern, D.** and Frenkel, A. L. Nonlinear evolution, travelling waves, and secondary instability of sheared-film flows with insoluble surfactants. *J. Fluid Mech.*, **594**, 125-156, 2008.
34. **Halpern, D.**, Fujioka, H. and Grotberg, J.B. Liquid and surfactant delivery into pulmonary airways. *Respiratory Physiology & Neurophysiology*, 163, 222-231, 2008.
35. **Halpern, D.**, Fujioka, H. and Grotberg, J. B. The effect of viscoelasticity on the stability of a pulmonary airway liquid layer. *Phys. Fluids* **22**, 011901, 2010.
36. Bian, S., Tai, C.-F., **Halpern, D.**, Zheng, Y. and Grotberg, J.B. Experimental Study of Flow Fields in an Airway Closure Model. *J. Fluid Mech.* **647**, 391-402, 2010.
37. Tai, C.-F., Bian, S., **Halpern, D.**, Zheng, Y., Filoche, M. and Grotberg, J.B. Numerical Study of Flow Fields in an Airway Closure Model. *J. Fluid Mech.* **677**, 483-502, 2011.
38. **Halpern, D.** and Gaver, D.P. The influence of surfactant on the propagation of a semi-infinite bubble through a liquid filled compliant channel. *J. Fluid Mech.* **698**, 125-159, 2012.
39. Zierenberg, J.R., **Halpern, D.**, Filoche, M., Sapoval, B., and Grotberg, J.B. An asymptotic model of particle deposition at an airway bifurcation. *Mathematical Medicine and Biology*.doi:10.1093/imammb/dqs002, 2012.
40. Fujioka, H., **Halpern, D.**, and Gaver, D.P. A model of surfactant-induced surface tension effects on the parenchymal tethering of pulmonary airways. *J. Biomechanics* **46**, 319-328, 2013.
41. **Halpern, D.**, Li, Y.-C. and Wei, H.-H. Slip-induced suppression of Marangoni film thickening in surfactant-retarded Landau-Levich-Bretherton flows. *J. Fluid Mech.* 781, 578-594, 2015.
42. Ryans, J., Fujioka, H., **Halpern, D.** and Gaver, D.P. Reduced-dimension modeling of recruitment/de-recruitment dynamics of the lung. *Ann. Biomed. Eng.* doi:10.1007/s10439-016-1672-9, 2016.
43. Fujioka, H., **Halpern, D.**, Ryans, J. and Gaver, D.P. Reduced-dimension model of liquid plug propagation in tubes. *Phys. Rev. Fluids*, **1(5)**, 053201, doi: 10.1103/PhysRevFluids.1.053201, 2016.
44. **Halpern, D.** and Wei, H.-H. Slip-enhanced in a liquid falling down a vertical fiber. *J. Fluid Mech.* 820, 42-60, 2017.
45. Frenkel, A.L. and **Halpern, D.** Surfactant and gravity dependent instability of two-layer Couette flows and its nonlinear saturation. *J. Fluid Mech.*, 826, 158-204, 2017.

46. Frenkel, A.L., **Halpern, D.** and Schweiger, A.J. Surfactant and gravity dependent instability of two-layer channel flows: Linear theory covering all wave lengths. Part 1: "Long-wave" regimes. Accepted *J. Fluid Mech.*, 2018.
47. Frenkel, A.L., **Halpern, D.** and Schweiger, A.J. Surfactant and gravity dependent instability of two-layer channel flows: Linear theory covering all wave lengths. Part 2: Mid-wave regimes. Accepted *J. Fluid Mech.*, 2018.

## BOOKS:

- 1 Wilson, H.B., Turcotte, L.H. and **Halpern D.** (2002) *Advanced Mathematics and Mechanics Applications Using MATLAB*, Third Edition, CRC press.

## BOOK CHAPTERS:

1. Gaver, D.P., Jensen, O.E. and **Halpern, D.** (2003) Surfactant and airway liquid flows. To appear in "Recent research developments in lung surfactant and its dysfunction" Editor: K. Nag. Publisher Marcel-Dekker.

## REFEREED PROCEEDINGS:

1. **Halpern, D.**, B. Hamer and J.B. Grotberg. Capillary-elastic instabilities of liquid-lined flexible tubes: a model of airway closure. In *Advances in Bioengineering*, ed. Tarbell, J.M., Proceedings of the ASME, BED-Vol. 26:223-226, 1993.
2. Jensen, O.E., **Halpern, D.** and Grotberg, J.B. (1993) Surfactant-driven flows on thin viscous films: pulmonary drug delivery. In *Surface-tension-driven flows*, ed. Neitzel, G.P. and Smith, M.K. Proc. ASME, AMD 170, 47-55.
3. **Halpern, D.**, Moriarty, J.A. and Grotberg, J.B. (1999) Capillary-Elastic Instabilities with an Oscillatory Forcing Function. In *IUTAM Symposium on Non-linear Singularities in Deformation and Flow*. Editors, Durban, D. and Pearson, J.R.A., pp. 243-255. Publishers: Kluwer Academic, Dordrecht, The Netherlands.
4. Mai, T.Z., Chen, X. and **Halpern, D.** (1999) SJSOR Additive Iterative Methods for solving Linear Systems. In *Iterative Methods in Scientific Computation IV*. Editors, David Kincaid and Anne Elster, Volume 5, pp. 73-84. Publishers: IMACS (International Association for Mathematics and Computers in Simulation).
5. **Halpern, D.** and Grotberg, J.B. (2000) Oscillatory shear stress induced stabilization of thin film instabilities. In: *IUTAM Symposium on Nonlinear Waves in Multiphase Flow*. Editor,

Chang, H.-C, Volume 57, pp. 33-43. Publishers: Kluwer Academic, Dordrecht, The Netherlands.

6. Frenkel, A.L. and **Halpern, D.** (2000) On saturation of Rayleigh-Taylor instability. In: IUTAM Symposium on Nonlinear Waves in Multiphase Flow. Editor, Chang, H.-C, Volume 57, pp. 69-79. Publishers: Kluwer Academic, Dordrecht, The Netherlands.

## TECHNICAL REPORTS:

1. Babchin, A.J., Faybishenko, B., Sivashinsky, G.I., Frenkel, A.L., and **Halpern, D.** (2000) A model of chaotic evolution of slow liquid film on an inclined plane: one dimension solution. Lawrence Berkeley National Laboratory Tech. Report No. 42884.

## PRESENTATIONS AT NATIONAL AND INTERNATIONAL MEETINGS

1. **Halpern, D.** and Secomb, T.W. Flow of axisymmetric red blood cells in very narrow capillaries, Third Arizona Fluid Mechanics Conference, University of Arizona, Tucson, AZ, February 20-21, 1987.
2. **Halpern, D.** and Secomb, T.W. Flow of red blood cells in capillaries with near-minimal diameters. Society of Industrial and Applied Mathematics Annual Meeting, Minneapolis, Minnesota, July 11-15, 1988.
3. **Halpern, D.** and Secomb, T.W. The squeezing of red blood cells through parallel sided channels of near-minimal widths. Society of Industrial and Applied Mathematics Annual Meeting, San Diego, California, July 17-21, 1989.
4. Secomb, T.W., Hsu, R. and **Halpern, D.** Mechanics of symmetric and asymmetric red blood cell motion in capillaries. Eleventh U.S. National Congress of Applied Mechanics, Tucson, Arizona, May 21-25, 1990.
5. **Halpern, D.** and Grotberg, J.B. Pulmonary dynamics. Society of Industrial and Applied Mathematics Annual Meeting, Chicago, Illinois, July 15-20, 1990.
6. **Halpern, D.** and Grotberg, J.B. The dynamics of a localized soluble surfactant on a thin film. First World Congress of Biomechanics, San Diego, California, August 30-September 4, 1990.
7. **Halpern, D.** and Grotberg, J.B. Dynamics and transport of a localized soluble surfactant on a thin film. American Physical Society, Division of Fluid Dynamics Annual Meeting, Ithaca, New York, November 18-20, 1990.
8. Grotberg, J.B. and **Halpern, D.** Fluid-elastic instability of a thin-film coating a cylinder. American Physical Society, Division of Fluid Dynamics Annual Meeting, Ithaca, New York, November 18-20, 1990.



9. **Halpern, D.** and Grotberg, J.B. Surface-tension instabilities of liquid-lined elastic tubes. AMS-IMS-SIAM Joint Summer Research Conference in Biofluidynamics, University of Washington, Seattle, Washington, 7-11, 1991.
10. Gaver, D.P., Solway, J., Elad, D., **Halpern, D.**, Grotberg, J.B. and Gavriely, N. Rapid local evaluation of gas dispersion in volume cycled tube flow. *Annals of Biomedical Engineering*, Vol. 19 (5): 583, 1991. Annual Fall Meeting of the Biomedical Engineering Society, University of Virginia, October 12-14, 1991.
11. Grotberg, J.B., **Halpern, D.** and Jensen, O.E. Surfactant spreading on thin liquid films. *Annals of Biomedical Engineering*, Vol. 19 (5): 574, 1991. Annual Fall Meeting of the Biomedical Engineering Society, University of Virginia, October 12-14, 1991.
12. **Halpern, D.** and Grotberg, J.B. Surface-tension instabilities of liquid lined flexible tubes. American Physical Society, Division of Fluid Dynamics Annual Meeting, Scottsdale, Arizona, November 24-26, 1991.
13. Grotberg, J.B., **D. Halpern**, M. Glucksberg and O.E. Jensen. A model of surfactant spreading and drug delivery on thin liquid films. Federation of American Societies for Experimental Biology, 76th Annual Meeting, Anaheim, CA, April, 1992.
14. **Halpern, D.**, O.E. Jensen and J.B. Grotberg. A model of surfactant spreading and drug delivery on thin liquid films. Annual Fall Meeting of the Biomedical Engineering Society, University of Utah, October 16-18, 1992.
15. Grotberg, J.B. and **D. Halpern**. Theoretical models for airway closure and post-closure filling flows. Annual Fall Meeting of the Biomedical Engineering Society, University of Utah, October 16-18, 1992.
16. **Halpern, D.**, O.E. Jensen and J.B. Grotberg. Transport of a passive solute by surfactant-driven flows. American Physical Society, Division of Fluid Dynamics Annual Meeting, Tallahassee, Florida, November 22-24, 1992.
17. **Halpern, D.**, D.P. Gaver, O.E. Jensen and J.B. Grotberg. The effects of surface-tension and wall compliance on airway reopening. *Experimental Biology 93*, New Orleans, LA, March 28-April 1, 1993.
18. Jensen, O.E., **D. Halpern** and J.B. Grotberg. The effect of surfactant spreading on the transport of a drug throughout the human lung. *Experimental Biology 93*, New Orleans, LA, March 28-April 1, 1993.
19. **Halpern, D.**, D.P. Gaver, O.E. Jensen and J.B. Grotberg. Steady bubble flow through a liquid-filled compliant channel: a model of airway reopening. American Physical Society, Division of Fluid Dynamics Annual Meeting, Albuquerque, New Mexico, November 21-23, 1993.
20. Jensen, O.E., **D. Halpern** and J.B. Grotberg. Solute transport by surfactant-driven flows in a simple lung model. Second World Congress of Biomechanics, Amsterdam, Holland, July 10-15, 1994.

21. Gaver, D.P., **D. Halpern**, O.E. Jensen and J.B. Grotberg. A theoretical model analysis of pulmonary airway reopening. Second World Congress of Biomechanics, Amsterdam, Holland, July 10-15, 1994.
22. **Halpern, D.**, O.E. Jensen and J.B. Grotberg. Surface-tension driven flows in the lung. American Physical Society, Division of Fluid Dynamics Annual Meeting, Atlanta, Georgia, November 20-22, 1994.
23. Gaver, D.P., **D. Halpern**, O.E. Jensen and J.B. Grotberg. A theoretical study of pulmonary airway reopening. American Physical Society, Division of Fluid Dynamics Annual Meeting, Atlanta, Georgia, November 20-22, 1994.
24. Gaver, D.P., III and **D. Halpern**. A boundary element model of pulmonary airway reopening. Boundary Elements XVII. Madison, WI., July 17-18, 1995.
25. Gaver, D.P., Perun, M.L. and **D. Halpern**. The influence of airway wall mechanical properties on airway reopening pressures and wall stresses. Annual Fall Meeting of the Biomedical Engineering Society, Boston, Massachusetts, October 6-8, 1995.
26. Moriarty, J.A., **Halpern, D.** and J.B. Grotberg. Capillary-elastic instabilities in liquid lined flexible tubes with an external forcing function. Annual Fall Meeting of the Biomedical Engineering Society, Boston, Massachusetts, October 6-8, 1995.
27. **Halpern, D.**, Jensen, O.E. and J.B. Grotberg. Surfactant spreading in the lung. Annual Fall Meeting of the Biomedical Engineering Society, Boston, Massachusetts, October 6-8, 1995.
28. **Halpern, D.**, O.E. Jensen and J.B. Grotberg. Surfactant spreading in a simple lung model. American Physical Society, Division of Fluid Dynamics Annual Meeting, Irvine, California, November 19-21, 1995.
29. **Halpern, D.**, Jensen, O.E. and J.B. Grotberg. Surfactant spreading and uptake in the lung. Annual Fall Meeting of the Biomedical Engineering Society, The Pennsylvania State University, University Park, Pennsylvania, October 3-6, 1996.
30. **Halpern, D.** and J.B. Grotberg. Capillary-elastic instabilities with an oscillatory forcing function. American Physical Society, Division of Fluid Dynamics Annual Meeting, Syracuse, New York, November 22-24, 1996.
31. Himm, J.F. and **D. Halpern** A computational model of gas bubble evolution in liquid filled straight tubes. American Physical Society, Division of Fluid Dynamics Annual Meeting, Syracuse, New York, November 22-24, 1996.
32. **Halpern, D.**, Moriarty, J.A. and Grotberg, J.B. Capillary-elastic instabilities with an oscillatory function. IUTAM symposium on non-linear singularities in deformation and flow, Technion, Haifa, March 17-21, 1997.
33. Cassidy, K., **D. Halpern**, B. Ressler, P. Howell and J.B. Grotberg. Surfactant effects on the stability of a viscous fluid lining a capillary tube. Experimental Biology '97, New Orleans, LA, April 6-9, 1997.

34. Grotberg, J.B., **D. Halpern** and O.E. Jensen. A computational model of surfactant drug delivery. Experimental Biology '97, New Orleans, LA, April 6-9, 1997.
35. Frenkel, A.L., **Halpern, D.** & J.B. Grotberg Regular time-modulation of KS-like chaotic evolutions of a film interface. American Physical Society, Division of Fluid Dynamics Annual Meeting, San Francisco, California, November 23-25, 1997.
36. Jensen, O.E. & **Halpern, D.** The stress singularity in surfactant-driven flows of thin fluid layers. American Physical Society, Division of Fluid Dynamics Annual Meeting, San Francisco, California, November 23-25, 1997.
37. **D. Halpern** & J.B. Grotberg Shear stress induced stabilization of capillary-elastic instabilities. Thirteenth U.S. National Congress of Applied Mechanics, University of Florida, June 21-26, 1998.
38. J.B. Grotberg, **D. Halpern** & O.E. Jensen Surfactant and liquid delivery into the lung. Thirteenth U.S. National Congress of Applied Mechanics, University of Florida, June 21-26, 1998.
39. **D. Halpern**, O.E. Jensen & J.B. Grotberg A theoretical study of surfactant and liquid delivery into the lung. Third World Congress of Biomechanics, Sapporo, Japan, August 2-8, 1998.
40. **D. Halpern** & J.B. Grotberg Oscillatory shear stress induced stabilization of capillary-elastic instabilities. Third World Congress of Biomechanics, Sapporo, Japan, August 2-8, 1998.
41. **D. Halpern**, J.A. Moriarty and J.B. Grotberg. Perturbed Capillary Instabilities: Keeping Lung Airways Open. Annual Fall Meetings of the Center for Interfacial Engineering, University of Minnesota, Minneapolis, Sept. 14-17, 1998.
42. J.L. Bull, **D. Halpern**, J.B. Grotberg. A Model of the Effects of Breathing on Surfactant Spreading. American Physical Society, Division of Fluid Dynamics Annual Meeting, Philadelphia, PA November 22-24, 1998 .
43. **D. Halpern**, A.L. Frenkel. Nonlinear effects of oscillatory forcing on the Rayleigh-Taylor instability. American Physical Society, Division of Fluid Dynamics Annual Meeting, Philadelphia, PA November 22-24, 1998.
44. J.B. Grotberg, **D. Halpern**. Perturbed airway closure. American Physical Society, Division of Fluid Dynamics Annual Meeting, Philadelphia, PA November 22-24, 1998.
45. A.L. Frenkel and **D. Halpern** Alabama Saturation of Rayleigh-Taylor Instability and Nonlinear Wave Patterns in Closed Flow of Viscous Films. IUTAM Symposium on Nonlinear Waves in Multiphase Flow, University of Notre Dame, South Bend, Indiana, July 7-9, 1999.
46. **D. Halpern** and J.B. Grotberg Oscillatory Shear Stress Induced Stabilization of Capillary-Elastic Instabilities. IUTAM Symposium on Nonlinear Waves in Multiphase Flow, University of Notre Dame, South Bend, Indiana, July 7-9, 1999.

47. J.L. Bull, **D. Halpern**, and J.B. Grotberg The Effects of Breathing on Surfactant Transport in the Lung. Biomedical Engineering Society, Annual Meeting, Atlanta, Georgia, October 1999.
48. J.L. Bull, **D. Halpern**, and J.B. Grotberg The Effects of Periodic Wall Stretch on Surfactant and Liquid Transport. 52<sup>nd</sup> American Physical Society Annual Meeting of the Division of Fluid Dynamics, New Orleans, Louisiana, November 21-23, 1999.
49. Benintendi, S. W., **Halpern, D.**, Grotberg, J.B., Fluid Flow and Transport in a Thin Liquid Film on a Stretchable Membrane, 52<sup>nd</sup> American Physical Society Annual Meeting of the Division of Fluid Dynamics, New Orleans, Louisiana, November 21-23, 1999.
50. Benintendi, S. W., **Halpern, D.**, and Grotberg, J.B. Cycle-induced flow and transport in a model of alveolar liquid lining. Annals of Biomedical Engineering 2000 Annual Fall Meeting of the Biomedical Engineering Society Oct 12-Oct 14 2000 v28 nSUPPL. 1 2000 Washington, WA, USA, Am Inst Phys Woodbury NY USA p S-46.
51. Benintendi, S.W., **D. Halpern** and J.B. Grotberg. Cycle-induced flow and transport in a model of alveolar liquid lining. International Mechanical Engineering Conference and Exposition, November, 2000, Orlando, FL.
52. Jensen, O.E., Horsburgh, M.K. and **Halpern, D.** Unsteady bubble propagation in convergent and flexible channels: modeling the reopening of collapsed lung airways. 4<sup>th</sup> Euromech Fluid Mechanics Conference, Nov 19-23 2000, Eindhoven, NL.
53. Williams, H., Zimmer IV, M., **Halpern, D.** and Gaver III, D.P. Dynamics of an oscillating semi-infinite bubble in a horizontal channel, 53<sup>rd</sup> American Physical Society Annual Meeting of the Division of Fluid Dynamics, Washington, DC, November 19-21, 2000.
54. **Halpern, D.**, Gaver III, D.P. and Jensen, O.E. Time-dependent bubble motion through a liquid filled compliant channel, 53<sup>rd</sup> American Physical Society Annual Meeting of the Division of Fluid Dynamics, Washington, DC, November 19-21, 2000.
55. Benintendi, S.W., **Halpern, D.** and Grotberg, J.B. Cycle-Induced Flow in a Surfactant Model of Alveolar Liquid Lining, 53<sup>rd</sup> American Physical Society Annual Meeting of the Division of Fluid Dynamics, Washington, DC, November 19-21, 2000.
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82. Hamlington, K., **Halpern, D.**, Pillert, J. and Gaver, D. Computational Model of a Microfluidic Mixing Chamber for Miniaturized Immunosensor Devices. Biomedical Engineering Society Annual Fall Meeting, October 2-4, 2008, St Louis, MO.
83. **Halpern, D.**, Tai, C.-F., Fujioka, H. and Grotberg, J. B. The effect of viscoelasticity on the stability of the lung's liquid layer. 61st Annual Meeting of the American Physical Society Division of Fluid Dynamics, Sunday–Tuesday, November 23–25, 2008, San Antonio, Texas.
84. Tai, C.-F., **Halpern, D.** and Grotberg, J. B. Stress Analysis in Lung's Airway with Moving Semi-Infinite Liquid Plug and Porous Wall. 61st Annual Meeting of the American Physical Society Division of Fluid Dynamics, Sunday–Tuesday, November 23–25, 2008, San Antonio, Texas.

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88. Tai, C.-F., **Halpern, D.** and Grotberg, J. B. Two layer fluid stress analysis during airway closure. 62nd Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 22–24, 2009; Minneapolis, Minnesota.
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91. **Halpern, D.** and Grotberg, J.B. Stability analysis of the pulmonary liquid bilayer. 63rd Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 21-23, 2010, Long Beach, California.
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94. Pillert, J.E., Fujioka, H., **Halpern, D.** and Gaver, D.P. A Computational Investigation of Surfactant Transport During Pulsatile Airway Reopening. Biomedical Engineering Society 2011 Annual Meeting, October 12-15, 2011, Hartford, Connecticut.
95. Tai, C.-F., **Halpern, D.** and Grotberg, J.B. Stress Analysis During Post Closure Filling Flow in an Airway Model. Biomedical Engineering Society 2011 Annual Meeting, October 12-15, 2011, Hartford, Connecticut.
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97. **Halpern, D.** and Gaver, D.P. The influence of surfactant on the propagation of a semi-infinite bubble through a liquid- filled compliant channel. 64th Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 20–22, 2011; Baltimore, Maryland.

98. Schweiger, A.J., Frenkel, A.L. and **Halpern, D.** Surfactants and the Rayleigh-Taylor instability of Couette type flows. 64th Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 20–22, 2011; Baltimore, Maryland.
99. Tai, C.-F., **Halpern, D.** and Grotberg, J.B. Particle Deposition During Airway Closure. 64th Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 20–22, 2011; Baltimore, Maryland.
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101. **Halpern, D.**, Frenkel, A.L. and Schweiger, A.J. Gravity, surfactants and interfacial instabilities of shear flows. 65<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 18-20, 2012; San Diego, California.
102. Pillert, J.E., Fujioka, H., **Halpern, D.** and Gaver, D.P. Simulations to identify optimal mechanical ventilation parameters for surfactant uptake in occluded pulmonary airways. Biomedical Engineering Society Annual Meeting, September 25-28, 2013; Seattle, Washington.
103. Wei, H.H. and **Halpern, D.** Modification of the local electric field around a sharp corner due to surface conductance. 66<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 24-26, 2013; Pittsburgh, Pennsylvania.
104. Song, Y., **Halpern, D.** and Grotberg, J.B. The influence of surfactant on the stability of a liquid bilayer inside a rigid tube. 66<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 24-26, 2013; Pittsburgh, Pennsylvania.
105. Ryans, J., Fujioka, H., **Halpern, D.** and Gaver, D.P. Dynamic Multi-scale Model of the Lung. BMES 2014 Annual Meeting, October 22-25, 2014; San Antonio, Texas.
106. Pillert, J., Fujioka, H., **Halpern, D.** and Gaver, D.P. Investigation into the enhancement of surfactant transport and sorption in a model of airway reopening. BMES 2014 Annual Meeting, October 22-25, 2014; San Antonio, Texas.
107. Song, Y., **Halpern, D.** and Grotberg, J.B. Nonlinear analysis of the influence of surfactant on the stability of a liquid bilayer inside a tube. 67<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 23-25, 2014; San Francisco, California.
108. Wei, H.-H. and **Halpern, D.** Slip-accelerated falling drop along a vertical fiber. 67<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 23-25, 2014; San Francisco, California.
109. **Halpern, D.** and Wei, H.-H. Reentry to the two-thirds power law for the surfactant-laden Bretherton problem in a slippery tube. 67<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 23-25, 2014; San Francisco, California.



110. Ryans, J., Fujioka, H., **Halpern, D.** and Gaver, D.P. Multi-scale model of liquid obstruction formation and clearance in the lung. Computational Fluid Dynamics (CFD) in Medicine and Biology II, August 30-September 4, 2015; Albufeira, Portugal.
111. Ryans, J., Fujioka, H., **Halpern, D.** and Gaver, D.P. Multi-scale model of liquid obstruction formation and clearance in the lung. Annual Meeting of the Biomedical Engineering Society, October 7-10, 2015; Tampa, Florida.
112. Fujioka, H., Ryans, J., **Halpern, D.** and Gaver, D.P. Effect of non-uniform acinar pressures on the parenchymal tethering airways. Annual Meeting of the Biomedical Engineering Society, October 7-10, 2015; Tampa, Florida.
113. **Halpern, D.** and Frenkel, A.L. Long wave evolution of a two-fluid channel flow with surfactant. 68<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 22-24, 2015; Boston, Massachusetts.
114. Ryans, J., Fujioka, H., **Halpern, D.** and Gaver, D.P. Multi-scale Modeling of Parenchymal/Airway Interactions. Annual Meeting of the Biomedical Engineering Society, October 5-8, 2016; Minneapolis, Minnesota.
115. **Halpern, D.**, Fujioka, H., Ryans, J. and Gaver, D.P. A reduced-dimension model of liquid plug propagation in tubes. 69<sup>th</sup> Annual Meeting of the American Physical Society Division of Fluid Dynamics, November 20-22, 2016; Portland, Oregon.
116. Ryans, J., Krasovec, L., Fujioka, H., **Halpern, D.** and Gaver, D. A Computationally Tractable Model of Alveolar/Airway Interactions in the Entire Lung. 2017 BMES Annual Meeting, October 11-14, 2017; Phoenix, Arizona.