

**PETER M. PINSKY**  
*Curriculum Vitae*

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## EDUCATION

Ph.D.	1981	University of California, Berkeley	Civil Engineering
M.A.Sc.	1971	University of Toronto	Civil Engineering
B.Sc.	1969	University of Wales, Swansea, UK	Civil Engineering (First Class Honors)

## ACADEMIC APPOINTMENTS

### Stanford University

1995–present Professor of Mechanical Engineering  
2005–present Member, Stanford Bio-X Program  
2001–present Professor in Institute for Computational and Mathematical Engineering  
1996–present Professor of Civil and Environmental Engineering (by courtesy)  
2001–14 Chair, Division of Mechanics and Computation  
1995–96 Associate Chair of Civil Engineering  
1993–96 Associate Professor of Ophthalmology (by courtesy), School of Medicine  
1990–95 Associate Professor of Civil Engineering  
1990–95 Associate Professor of Mechanical Engineering (by courtesy)  
1984–90 Assistant Professor of Civil Engineering  
1984–90 Assistant Professor of Mechanical Engineering (by courtesy)

### Brown University

1982-83 Assistant Professor of Engineering

### University of California at Berkeley

1981-82 Research Engineer (post-doctoral appointment)

## INDUSTRY POSITIONS

1975-76 Structural Design Engineer, Robert Halsall & Associates, Toronto, Canada  
1971-75 Structural Design Engineer, Rankine and Hill, Sydney, Australia

## CURRENT RESEARCH

Theory and practice of computational mechanics with a particular interest in multiphysics and multiscale problems in biomechanics.

**Ocular mechanics:** Computational modeling for biomechanics of the human eye with a primary interest in the cornea: structural modeling of the collagen architecture based on x-ray diffraction and second harmonic-generated images; electrolyte properties of the corneal stroma; active ionic transport and stromal hydration; collagen-swelling interaction; molecular-level mechanics of glycosaminoglycans (GAGs) and the mechanics of corneal transparency; nutrient transport and metabolic processes; modeling of disease; applications to corneal

implants and laser surgery for vision correction; experimental studies in the mechanical behavior of corneal tissue; vitreous kinetics and retinal drug delivery.

**Mechanics of hearing:** Finite element modeling of acousto-mechanical coupling in the middle ear; mechanics of the tympanic membrane; multiscale modeling of hair-cell mechanics in the inner ear including physical mechanisms for the activation of mechanically-gated ion channels; mechanics of lipid bilayer cell membranes and their interaction with the cytoskeleton.

## OTHER RESEARCH

**Multiscale modeling of transdermal drug delivery:** Molecular-to-macroscopic computational framework for the study of passive transdermal drug diffusion; theory of homogenization for effective diffusivity of the stratum corneum; finite element modeling of transdermal drug transport; drug delivery platform design.

**Computational acoustics:** Space-time finite element method for transient acoustics; Galerkin least-squares methods for time-harmonic acoustics; exterior problems and radiation boundary conditions; multifrequency iterative solvers for fluid-structure interaction; shape sensitivity by the adjoint method and application to shape optimization and inverse problems; medical applications of high intensity focused ultrasound.

**Mechanics of connective tissue:** Multiphasic modeling for interactions between solid, fluid and ionic species in biological tissues; hyperelastic models in connective tissue and muscle; elastic modulus recovery in elastography.

**Finite element and boundary element methods:** Modeling electrostatic force microscopy for conductive and dielectric materials using the boundary element method; mixed finite element methods for plates and shells.

## AWARDS AND HONORS

1969-70	Open Fellowship of the University of Toronto
1969-71	Residential Fellowship of Massey College (University of Toronto)
1976-79	National Research Council of Canada Postgraduate Scholarship
1980-81	Popert Fellowship, University of California, Berkeley
1983-85	NSF Research Initiation Award
1998	Elected Fellow, American Society of Mechanical Engineers
2002	Elected Fellow, International Association of Computational Mechanics
2003-13	Editorial Board, <i>Computer Methods in Applied Mechanics and Engineering</i>
2002-15	Editorial Board, <i>Engineering Computations – International Journal for Computer-Aided Engineering and Software</i>
2008	Elected to executive committee of the US Association for Computational Mechanics as Member-At-Large
2015-	Editorial Board Member, <i>International Biomechanics</i>
2016-	Editorial Board Member, <i>Journal for Modeling in Ophthalmology</i>

## PROFESSIONAL AFFILIATIONS

Fellow, American Society of Mechanical Engineers.

Fellow, International Association for Computational Mechanics.

Member, U.S. Association for Computational Mechanics.  
 Member, American Academy of Mechanics.  
 Member, The Association for Research in Vision and Ophthalmology  
 Member, American Society of Cataract and Refractive Surgery  
 Member, European Mechanics Society  
 Member, European Society of Cataract & Refractive Surgeons  
 Associate Member, American Society of Civil Engineers.  
 Member, Society for Industrial and Applied Mathematics.  
 Member, Society of Engineering Science.

## **PUBLICATIONS**

### **Refereed Journal Articles**

1. PM Pinsky and X Cheng, 2017 "A Constitutive Model for Swelling Pressure and Volumetric Behavior of Highly-Hydrated Connective Tissue," *Journal of Elasticity*, doi: 10.1007/s10659-016-9616-zX
2. X Cheng and PM Pinsky, 2016 "A numerical model for metabolism, metabolite transport and edema in the human cornea," *Computer Methods in Applied Mechanics and Engineering*, 314, SI, 323-344
3. X Cheng, SJ Petsche and PM Pinsky, "A structural model for the in vivo human cornea including collagen-swelling interaction," *Journal of The Royal Society Interface*, 12(109), No. 20150241, Aug. 2015
4. X Cheng and PM Pinsky, "The Balance of Fluid and Osmotic Pressures across Active Biological Membranes with Application to the Corneal Endothelium," *PLOS ONE* 10(12), No. e0145422, Dec. 2015
5. PM Pinsky, "Three-Dimensional Modeling of Metabolic Species Transport in the Cornea with a Hydrogel Intrastromal Inlay," *Investigative Ophthalmology & Visual Science*, 55 (5), 3093-3106, 2014
6. X Cheng, PM Pinsky, "Mechanisms of self-organization for the collagen fibril lattice in the human cornea," *Journal of The Royal Society Interface*, 10 (87), DOI 20130512, 2013.
7. SJ Petsche, PM Pinsky, "The role of 3-D collagen organization in stromal elasticity: a model based on X-ray diffraction data and second harmonic-generated images," *Biomechanics and Modeling in Mechanobiology*, 12 (6), 1101-1113, 2013
8. M Winkler, G Shoa, Y Xie, SJ Petsche, PM Pinsky, T Juhasz, DJ Brown, "Three-Dimensional Distribution of Transverse Collagen Fibers in the Anterior Human Corneal Stroma," *Investigative Ophthalmology & Visual Science*, 54 (12), 7293-7301, 2013.
9. J Kim, PM Pinsky, CR Steele, S Puria, AJ Ricci, "The elusive hair cell gating spring, a potential role for the lipid membrane," *The Journal of the Acoustical Society of America* (2013) 133 (5), 3509-3519
10. S.J. Petsche, D. Chernyak, J. Martiz, M.E. Levenston and P.M. Pinsky, "Depth-Dependent Transverse Shear Properties of the Human Corneal Stroma," *Investigative Ophthalmology and Visual Science*, Vol. 53, No. 2, pp. 873-880, 2012

11. Long-yuan Li and Peter M. Pinsky, "A nonlinear macroscopic multi-phasic model for describing interactions between solid, fluid and ionic species in biological tissue materials," *Philosophical Magazine*, Vol. 91 Issue 2, 2010.
12. Haw-Ling Liew and Peter M. Pinsky, "Matrix-Padé via Lanczos solutions for vibrations of fluid-structure interaction," *International Journal for Numerical Methods in Engineering*, Vol 84, pp. 1183–1204, 2010.
13. Jee E. Rim, Peter M. Pinsky and William W. van Osdol, "Multiscale Modeling of Transdermal Drug Delivery," *Annals of Biomedical Engineering*, Vol. 37, Issue 6, pp: 1217-1229, June 2009.
14. YX Shen, Yongxing, DM Barnett, and PM Pinsky, "Modeling electrostatic force microscopy for conductive and dielectric samples using the boundary element method," *Engineering Analysis with Boundary Elements*, Vol. 32, No. 8, pp. 682-691, August 2008.
15. Y. Shen, D.M. Barnett and P.M. Pinsky, "Analytic perturbation solution to the capacitance system of a hyperboloidal tip and a rough surface," *Applied Physics Letters*, vol. 92, no. 13, article 134105, 2008.
16. Y. Shen, D.M. Barnett and P.M. Pinsky, "Simulating and interpreting Kelvin probe force microscopy images on dielectrics with boundary integral equations," *Review of Scientific Instruments*, vol. 79, no. 2, article 023711, Part 1, 2008.
17. J.E. Rim, P.M. Pinsky and W.W. van Osdol, "Using the Method of Homogenization to Calculate the Effective Diffusivity of the Stratum Corneum with Permeable Corneocytes," *Journal of Biomechanics*; vol.41, no.4, p.788-796, 2008.
18. Y. Shen, M. Lee, W. Lee, D.M. Barnett, P.M. Pinsky and F.B. Prinz, "Resolution study for electrostatic force microscopy on bimetallic samples using the boundary element method," *Nanotechnology*, vol.19, no.3, 2008.
19. J.P. Tuck-Lee, P.M. Pinsky, C.R. Steele and S. Puria, "Finite element modeling of acousto-mechanical coupling in the cat middle ear," *Journal of the Acoustical Society of America*, vol. 124, no. 1, pp. 348-362, 2008.
20. J.P. Tuck-Lee and P.M. Pinsky, "Adaptive frequency windowing for multifrequency solutions in structural acoustics based on the matrix Pade via Lanczos algorithm," *International Journal for Numerical Methods in Engineering*, v. 73, no. 5, pp 728-746, 2008.
21. J.E. Rim, P.M. Pinsky and W.W. van Osdol, "Using the method of homogenization to calculate the effective diffusivity of the stratum corneum," *Journal of Membrane Science*, vol. 293, no. 1-2, pp. 174-182, 2007.
22. J.E. Rim, P.M. Pinsky and W.W. van Osdol, "Finite element modeling of coupled diffusion with partitioning in transdermal drug delivery", *Annals of Biomedical Engineering*, vol. 33, no.10, pp. 1422-1438, October, 2005.
23. P.M. Pinsky, D. van der Heide and D. Chernyak, "Computational modeling of mechanical anisotropy in the cornea and sclera," *Journal of Cataract and Refractive Surgery*, v.31, no.1, pp.136-145, Jan. 2005.

24. S.S. Blemker, P.M. Pinsky and S.L. Delp, "A 3D model of muscle reveals the causes of nonuniform strains in the biceps brachii," *Journal of Biomechanics*, v. 38, pp. 657-665, 2005.
25. H.W Liew and P.M. Pinsky, "Recovery of shear modulus in elastography using an adjoint method with B-spline representation," *Finite Elements in Analysis and Design*, v.21, pp. 778-799, 2005.
26. G.R. Feijoo, P.M. Pinsky and A.A. Oberai, "An Application of Shape Optimization for the Solution of Inverse Acoustic Scattering problems," *Inverse Problems*; v. 20, pp. 199-228, 2004.
27. M.M. Wagner, P.M. Pinsky, M. Malhotra and Assad Oberai "A Krylov subspace projection method for simultaneous solution of Helmholtz problems at multiple frequencies," *Computer Methods in Applied Mechanics and Engineering*; 2003; v.192, no.41-42, p.4609-4640.
28. M.M. Wagner, P.M. Pinsky and M. Malhotra, "Application of Pade via Lanczos approximations for efficient multifrequency solution of Helmholtz problems," *Journal of The Acoustical Society of America*; JAN 2003; v.113, no.1, p.313-319.
29. G.R. Feijoo, M. Malhotra, A.A. Oberai and P.M. Pinsky, "Shape Sensitivity Calculations for Exterior Acoustics Problems," *Engineering Computations*, Vol. 18, No. 3/4, pp. 376-391, 2001.
30. Assad A. Oberai and P.M. Pinsky, "A Residual-Based Finite Element Method for the Helmholtz Equation," *International Journal for Numerical Methods in Engineering*, Vol. 49, pp. 399-419, 2000.
31. Assad A. Oberai and P.M. Pinsky, "A Numerical Comparison of Finite Element Methods for the Helmholtz Equation," *Journal of Computational Acoustics*, Vol. 8, No. 1, pp. 211-221 2000.
32. M. Malhotra and P.M. Pinsky, "Efficient Computation of Multi-Frequency Far-Field Solutions of the Helmholtz Equation Using Padé Approximation, *Journal of Computational Acoustics*, Vol. 8, No. 1, pp. 223-240, 2000.
33. Assad A. Oberai, M. Malhotra and P.M. Pinsky, "On the Implementation of the Dirichlet-to-Neumann Radiation Condition for Iterative Solution of the Helmholtz Equation," *Applied Numerical Mathematics*, Vol. 27, No. 4, pp. 443-464, 1998.
34. Assad A. Oberai and P.M. Pinsky, "A Multiscale Finite Element Method for the Helmholtz Equation," *Computer Methods in Applied Mechanics and Engineering*, Vol. 154, pp. 281-297, 1998.
35. M. Malhotra and P.M. Pinsky, "Parallel Preconditioning Based on h-Hierarchical Finite Elements with Application to Acoustics," *Computer Methods in Applied Mechanics and Engineering*, Vol. 155, pp. 97-117, 1998.
36. M. Malhotra, R.W. Freund and P.M. Pinsky, "Solution of Multiple Radiation and Scattering Problems in Structural Acoustics Using a Block Quasi-Minimal Residual Iterative Method," *Computer Methods in Applied Mechanics and Engineering*, Vol. 146, pp. 173-196, 1997.

37. K. Grosh and P.M. Pinsky, "Galerkin Generalized Least Squares Finite Element Methods for Time-Harmonic Structural Acoustics," *Computer Methods in Applied Mechanics and Engineering*, Vol. 154 (3-4), pp. 299-318, 1998.
38. K. Grosh and P.M. Pinsky, "Design of Galerkin Generalized Least Squares Finite Element Methods for Timoshenko Beams," *Computer Methods in Applied Mechanics and Engineering*, Vol. 132, pp. 1-16, 1996.
39. A.N. Agarwal and P.M. Pinsky, "Stabilized Element Residual Method (SERM): A Posteriori Error Estimation for the Advection-Diffusion Equation," *Journal of Computational and Applied Mathematics*, Vol. 74, pp. 3-17, 1996.
40. M. Malhotra and P.M. Pinsky, "A Matrix-Free Interpretation of the Nonlocal Dirichlet-to-Neumann Radiation Boundary Condition," *International Journal for Numerical Methods in Engineering*, Vol. 39, pp. 3705-3713, 1996.
41. I. Harari, K. Grosh, T.J.R. Hughes, M. Malhotra, P.M. Pinsky, J. Stewart and L.L. Thompson, "Recent Developments in Finite Element Methods for Structural Acoustics," *Archives of Computational Methods in Engineering*, Vol. 3, pp. 131-311, 1996
42. L.L. Thompson and P.M. Pinsky, "A Space-Time Finite Element Method for the Exterior Acoustics Problem," *Journal of the Acoustical Society of America*, Vol. 99 (6), pp. 3297-3311, 1996.
43. L.L. Thompson and P.M. Pinsky, "A Space-Time Finite Element for Structural Acoustics in Infinite Domains, Part II: Exact Time-Dependent Non-Reflecting Boundary Conditions," *Computer Methods in Applied Mechanics and Engineering*, Vol 132, pp. 229-258, 1996.
44. L.L. Thompson and P.M. Pinsky, "A Space-Time Finite Element Method for Structural Acoustics in Infinite Domains, Part I: Formulation, Stability and Convergence," *Computer Methods in Applied Mechanics and Engineering*, Vol 132, pp. 195-227, 1996.
45. P.M. Pinsky and L.L. Thompson, "A Space-Time Finite Element Method for the Exterior Structural Acoustics Problem: Time-Dependent Radiation Boundary Conditions in Two Space Dimensions," *International Journal for Numerical Methods in Engineering*, Vol. 39, pp. 1635-1657, 1996.
46. N.R. Aluru, K.H. Law, P.M. Pinsky and R.W. Dutton, "An Analysis of the Hydrodynamic Semiconductor Device Model - Boundary Conditions and Simulations," *International Journal for Computation and Mathematics in Electrical and Electronics Engineering (COMPEL)*, Vol. 14, No. 2/3, pp. 157-185, 1995.
47. L.L. Thompson and P.M. Pinsky, "A Galerkin Least Squares Finite Element Method for the Two-Dimensional Helmholtz Equation," *International Journal for Numerical Methods in Engineering*, Vol. 38, No. 3, pp. 371-397, 1995.
48. N.R. Aluru, K.H. Law, A. Raefsky, P.M. Pinsky and R.W. Dutton, "Numerical Solution of the Two-Carrier Hydrodynamic Semiconductor Device Equations Employing a Stabilized Finite Element Method," *Computer Methods in Applied Mechanics and Engineering*, Vol. 125, Nos. 1-4, pp. 187-220, 1995.

49. K. Grosh, P.M. Pinsky, M. Malholtra and V. Rao, "Finite Element Formulation for a Baffled, Fluid-Loaded, Finite Cylindrical Shell," *International Journal for Numerical Methods in Engineering*, Vol. 37, No. 17, pp. 2971-2985, 1994.
50. N.R. Aluru, K.H. Law, P.M. Pinsky, A. Raefsky, R.J.G. Goosens and R.W. Dutton, "Space-Time Galerkin/Least-Squares Finite Element Formulation for the Hydrodynamic Device Equations," *IEICE Transactions on Electronics*, Vol. E77-C, No. 2, pp. 227-235, February, 1994.
51. K. Grosh and P.M. Pinsky, "Complex Wave-Number Dispersion Analysis of Galerkin and Galerkin Least-Squares Methods for Fluid-Loaded Plates," *Computer Methods in Applied Mechanics and Engineering*, Vol. 113, pp. 67-98, 1994.
52. L.L. Thompson and P.M. Pinsky, "Complex Wavenumber Fourier Analysis of the p-Version Finite Element Method," *Computational Mechanics*, Vol. 13, No. 4, pp. 255-275, January, 1994.
53. Chang, SS; Hjortdal, JO; Maurice, DM; Pinsky, PM "Corneal Deformation By Indentation And Applanation Forces," *Investigative Ophthalmology & Visual Science* ; Mar 15 1993; v.34, no.4, p.1241-1241
54. N.R. Aluru, A. Raefsky, P.M. Pinsky, K.H. Law, R.J.G. Goosens and R.W. Dutton, "A Finite Element Formulation for the Hydrodynamic Semiconductor Device Equations," *Computer Methods in Applied Mechanics and Engineering*, Vol. 107, pp. 269-298, 1993.
55. P.M. Pinsky and D.V. Datye, "Numerical Modeling of Radial, Astigmatic and Hexagonal Keratotomy," *Journal of Refractive and Corneal Surgery*, Vol. 8, No. 2, pp. 164-172 March/April 1992.
56. P.M. Pinsky, L.L. Thompson and N.N. Abboud, "Local High Order Radiation Boundary Conditions for Two-Dimensional Time-Dependent Structural Acoustics," *Journal of the Acoustical Society of America*, Vol. 91, No. 3, pp. 1320-1335, March, 1992.
57. N.N. Abboud and P.M. Pinsky, "Finite Element Dispersion Analysis for the Three-Dimensional Second-Order Scalar Wave Equation," *International Journal for Numerical Methods in Engineering*, Vol. 35, pp. 1183-1218, 1992.
58. P.M. Pinsky and D.V. Datye, "A Microstructurally-Based Finite Element Model of the Incised Human Cornea," *Journal of Biomechanics*, Vol. 24, No. 10, pp. 907-922, 1991.
59. P.M. Pinsky and R.V. Jasti, "On the Use of Lagrange Multiplier Bubble Modes for Controlling Accuracy and Stability of Mixed Shell Finite Elements," *Computer Methods in Applied Mechanics and Engineering*, Vol. 85, pp. 151-182, 1991.
60. P.M. Pinsky and N.N. Abboud, "Finite Element Solution of the Transient Exterior Structural Acoustics Problem Based on the Use of Radially Asymptotic Boundary Operators," *Computer Methods in Applied Mechanics and Engineering*, Vol. 85, pp. 311-348, 1991.
61. N.N. Abboud and P.M. Pinsky, "Finite Element Solution and Dispersion Analysis for the Transient Structural Acoustics Problem," *Applied Mechanics Reviews*, Vol. 43, Supplement, 1990.

62. P.M. Pinsky and N.N. Abboud, "Transient Finite Element Analysis of the Exterior Structural Acoustics Problem," *Journal of Vibration and Acoustics*, Vol. 112, No. 2, pp. 245-256, 1990.
63. P.M. Pinsky and R.V. Jasti, "A Mixed Finite Element Formulation for Laminated Composite Plates Based on the Use of Bubble Functions," *Engineering Computations*, Vol. 6, No. 4, pp. 316-330, 1989.
64. P.M. Pinsky and N.N. Abboud, "Two Mixed Variational Principles for Exterior Fluid-Structure Interaction Problems," *Computers and Structures*, Vol. 33, No. 3, pp. 621-635, 1989.
65. P.M. Pinsky and R.V. Jasti, "A Mixed Finite Element Formulation for Reissner-Mindlin Plates Based on the Use of Bubble Functions," *International Journal for Numerical Methods in Engineering*. Vol. 28, No. 7, pp. 1677-1702, 1989.
66. P.M. Pinsky and J. Jang, "Curved Shell Elements Based on Assumed Covariant Strain Interpolations for Elastoplastic Analysis," *Journal of Engineering Mechanics, ASCE*, Vol. 114, No. 6, pp. 1045-1062, 1988.
67. J. Jang and P.M. Pinsky, "Convergence of Curved Shell Elements Based on Assumed Covariant Strain Interpolations," *International Journal for Numerical Methods in Engineering*, Vol. 26, No. 2, pp. 329-347, 1988.
68. P.M. Pinsky, "A Finite Element Formulation for Elastoplasticity Based on a Three-Field Variational Equation," *Computer Methods in Applied Mechanics and Engineering*, Vol. 61, pp. 41-60, 1987.
69. J. Jang and P.M. Pinsky, "An Assumed Covariant Strain Based 9-Node Shell Element," *International Journal for Numerical Methods in Engineering*, Vol. 24, pp. 2389-2411, 1987.
70. P.M. Pinsky and K.O. Kim, "A Multi-Director Formulation for Nonlinear Elastic-Viscoelastic Layered Shells," *Computers and Structures*, Vol. 24, No. 6, pp. 901-913, 1986.
71. P.M. Pinsky and K.O. Kim, "A Multi-Director Formulation for Elastic-Viscoelastic Layered Shells," *International Journal for Numerical Methods in Engineering*, Vol. 23, No. 12, pp. 2213-2244, 1986.
72. M. Ortiz, P.M. Pinsky and R.L. Taylor, "Operator Split Methods for the Numerical Solution of the Elastoplastic Dynamic Problem," *Computer Methods in Applied Mechanics and Engineering*, 39, pp. 137-157, 1983.
73. M. Ortiz, P.M. Pinsky and R.L. Taylor, "Unconditionally Stable Element-by-Element Algorithms for Dynamic Problems," *Computer Methods in Applied Mechanics and Engineering*, 36, pp. 223-239, 1983.
74. P.M. Pinsky, M. Ortiz and R.L. Taylor, "Operator Split Methods in the Numerical Solution of the Finite Deformation Elastoplastic Dynamic Problem," *Computers and Structures*, 17(3), pp. 345-359, 1983.
75. P.M. Pinsky, M. Ortiz and K.S. Pister, "Numerical Integration of Rate Constitutive Equations in Finite Deformation Analysis," *Computer Methods in Applied Mechanics and Engineering*, Vol. 40, pp. 137-158, 1983.



**Book Chapters**

1. Thompson LL and Pinsky PM, "Acoustics," a chapter in **Encyclopedia of Computational Mechanics**, 2nd Edition, Editors: Stein E, de Borst R and Hughes TJR, Wiley, ISBN-13: 978-1119003793, to appear 2017
2. Pinsky PM and Cheng X, "The electrochemical basis of corneal hydration, swelling and transparency," a chapter in **Biomechanics of the Eye**, Editors: Roberts CJ, Dupps WJ and Downs JC, Kugler, to appear in 2017
3. X Cheng, H Hatami-Marbini, PM Pinsky, "Modeling collagen-proteoglycan structural interactions in the human cornea," Chapter 2 in **Computer Models in Biomechanics**, G.A. Holzapfel, E. Kuhl (eds.), DOI 10.1007/978-94-007-5464-5-2, pp. 11-24, Springer 2013.
4. Kim, Jichul; Pinsky, Peter M.; Ricci, Anthony J. "Elastostatic Analysis of the Membrane Tenting Deformation of Inner-Ear Stereocilia, Proceedings of the 11th International Mechanics of Hearing Workshop Eds. Shera, CA; Olson, ES Book Series: AIP Conference Proceedings, Vol. 1403, 2011.
5. Y.X. Shen, D.M. Barnett and P.M. Pinsky, "Integral equation modeling of electrostatic interactions in atomic force microscopy," In: C. Constanda and S. Potapenko (Eds.), **Integral Methods in Science and Engineering: Techniques and Applications**, Birkhäuser, Boston, pp 237-246, 2008.
6. J. Tuck-Lee, P.M. Pinsky and H.L. Liew, "Multifrequency Analysis Using Matrix Pade-via-Lanczos," in **Computational Acoustics of Noise Propagation in Fluids**, Editors S. Marburg and B. Nolte, Springer-Verlag, pp. 89-114, 2008.
7. PM Pinsky and LL Thompson, "Acoustics," in the **Encyclopedia of Computational Mechanics**, Editors: E. Stein, R. de Borst and T.J.R.Hughes, John Wiley & Sons, 2004.
8. A.A. Oberai, M. Malhotra and P.M. Pinsky, "Implementing Highly Accurate Non-Reflecting Boundary Conditions for Large-Scale Problems in Structural Acoustics," Chapter in **Computational Methods for Unbounded Domains** (Proceedings of the IUTAM Symposium, Boulder. Colorado, July 1997), Kluwer Academic Publishers, pp. 255-264, 1998.
9. P.M. Pinsky and R.V. Jasti, "On the Use of Bubble Modes in Mixed Plate and Shell Finite Elements for Laminated Composites," in **Computational Mechanics of Nonlinear Response of Shells**, (W.B. Kraetzig and E. Onate, Eds.), Springer-Verlag Publishers, pp. 282-304, 1990.
10. P.M. Pinsky and K.O. Kim, "A Finite Element Formulation for Nonlinear Elastic-Viscoelastic Multi-Layered Shells," in **Finite Element Methods for Plate and Shell Structures**, Vol. 2: Formulations and Algorithms, (T.J.R. Hughes and E. Hinton, Eds.), Ch. 12, pp. 263-284, Pineridge Press, 1986.
11. P.M. Pinsky, R.L. Taylor and K.S. Pister, "A Numerical Formulation for Finite Deformation Elastoplasticity," in **Numerical Methods in Coupled Systems**, (R.W. Lewis, P. Bettess and E. Hinton, Eds.), John Wiley and Sons Ltd., Chapter 4, pp. 127-146, 1984.

**Recent Plenary/Keynote Invited Conference Presentations**

1. P.M. Pinsky, "Mechanisms of self-organization for the collagen fibril lattice in the human cornea," Keynote lecture, Symposium on ocular mechanics, 7th World Congress of Biomechanics, Boston, July 6-11, 2014.
2. PM Pinsky, "Structural models of the human cornea: from molecular to macroscopic scales," Opening plenary lecture, Euromech Colloquium on Biomechanics of the Eye, University of Genoa, Italy, July 22-24, 2013.
3. PM Pinsky, "The Role of 3-D Collagen Organization in Stromal Elasticity," Symposium on Predicting, Measuring and Treating Changes in Corneal Biomechanics, Annual Meeting of the Association for Research in Vision and Ophthalmology (ARVO), Seattle, WA, May 5-9, 2013.
4. P.M. Pinsky, "Structural modeling of the human cornea: from molecular to macroscopic scales," Plenary lecture, Second international Conference on Computational Design in Engineering, Jeju, Korea, Nov. 13-16, 2012.
5. P.M. Pinsky, "Structural models of the human cornea: from molecular to macroscopic scales," Gordon Research Conference on Cornea, Biology and Pathology, Ventura, California, March 25-30, 2012.

**Selected Recent Symposia Publications and Presentations**

1. Khongar PD, Cheng X, Pralits JO, Repetto R, Soleri P and Pinsky PM, "Numerical investigation of glucose transport and corneal metabolism in the anterior chamber in the presence of an iris-fixated intraocular lens," Annual Meeting of the Association for Research in Vision and Ophthalmology, Seattle WA, May 1-5, 2016
2. Pinsky PM and Cheng X, "A computational model for collagen-swelling interaction in the in vivo human cornea," Annual Meeting of the Association for Research in Vision and Ophthalmology, Seattle WA, May 1-5, 2016
3. X. Cheng and P.M. Pinsky, "Modeling metabolic transport and edema in connective tissue," 13th U.S. National Congress on Computational Mechanics (USNCCM13), San Diego, CA, July 26-30, 2015.
4. X. Cheng, S.J. Petsche and P.M. Pinsky, "An Energy-Based Approach for Finite Element Modeling of Collagen-Swelling Interaction," 13th U.S. National Congress on Computational Mechanics (USNCCM13), San Diego, CA, July 26-30, 2015.
5. P.M. Pinsky and K. Holliday, "Finite element modeling of metabolic species transport in the cornea with a hydrogel intrastromal inlay," Annual Meeting of the Association-for-Research-in-Vision-and-Ophthalmology, Denver, CO, June 2015.
6. X. Cheng, S.J. Petsche and P.M. Pinsky, "A computational model for collagen-swelling interaction in the in vivo human cornea," Annual Meeting of the Association-for-Research-in-Vision-and-Ophthalmology, Denver, CO, June 2015.

7. P.M. Pinsky and K. Holliday, "Finite element modeling of metabolic species transport in the cornea with a hydrogel intrastromal inlay," Annual Meeting of the Association-for-Research-in-Vision-and-Ophthalmology (ARVO), INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE 56(7), Meeting Abstract:1131, June 2015
8. X. Cheng, S.J. Petsche and P.M. Pinsky, "A computational model for collagen-swelling interaction in the in vivo human cornea," Annual Meeting of the Association-for-Research-in-Vision-and-Ophthalmology (ARVO), INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE 56(7), Meeting Abstract:1109, June 2015  
P.M. Pinsky, "Three-Dimensional Modeling of Glucose and Oxygen Transport in the Cornea with a Hydrogel Intrastromal Inlay" Annual Meeting, American Society of Cataract and Refractive Surgery, Boston, April 25-29, 2014
9. PM Pinsky, "Three-dimensional modeling of glucose and oxygen transport in the cornea with an intrastromal inlay," XXXI Congress of the European Society of Cataract and Refractive Surgeons (ESCRS), Amsterdam, Oct 5-9, 2013
10. PM Pinsky, "Computational modeling of the human cornea: transparency, metabolism, strength and shape, Bio-X Frontiers in Interdisciplinary Biosciences series, Stanford University, Oct. 31, 2013
11. J. Kim, P.M. Pinsky, C.R. Steele, S. Puria, and A.J. Ricci, "Stereocilia lipid membrane: Non-linear hair-bundle mechanics and channel activation" Association for Research in Otolaryngology Midwinter Meeting, Baltimore, MD, Feb. 2012.
12. X. Cheng and P.M. Pinsky, "A Molecular-Level Model of Collagen-Proteoglycan Structural Interactions in the Cornea Stroma: A New Theory for Swelling Pressure," European Solid Mechanics Conference, Graz, Austria, July 9-13, 2012
13. S.J. Petsche and P.M. Pinsky, "The Role of Collagen Interweaving in Stromal Elasticity: A Model Based on the 3-D Collagen Architecture," Association for Research in Vision and Ophthalmology Annual Meeting, Fort Lauderdale, Florida, May 6 – 10, 2012
14. X. Cheng and P.M. Pinsky, "A molecular-level model for swelling pressure in the corneal stroma," Association for Research in Vision and Ophthalmology Annual Meeting, Fort Lauderdale, Florida, May 6 – 10, 2012
15. J. Kim, P.M. Pinsky, A.J. Ricci, S. Puria, and C.R. Steele "Elastostatic Analysis of the Membrane Tenting Deformation of Inner-Ear Stereocilia," Proceedings of the 11th International Mechanics of Hearing Workshop, Williamstown, MA, July 16–22, 2011
16. J Kim, PM Pinsky, C Steele, S Puria, AJ Ricci, "Role of the lipid bilayer in hair-bundle mechanics," Acoustical Society of America, Proceedings of Meetings on Acoustics, 19 (1), 050138, 2013
17. P.M. Pinsky, X. Cheng and H. Hatami-Marbini, "Modeling Collagen-Proteoglycan Structural Interactions in the Human Cornea," International Union of Theoretical and Applied Mechanics (IUTAM) Symposium on Computer Models in Biomechanics: from Nano to Macro, Aug 29 - Sept 2, 2011, Palo Alto, CA.
18. Peter M. Pinsky, "Connective Tissue Elasticity: Bridging the Scales between Chemical Morphology and Engineering Models," Bio-X Interdisciplinary Initiatives Symposium, Stanford, California, August 25, 2010.

19. Peter M. Pinsky and Steven Petsche, "Measuring and Modeling the Depth-Dependent Shear Properties of the Human Corneal Stroma," 6th World Congress on Biomechanics, Singapore, August 1-6, 2010.
20. Peter M. Pinsky and Hamed Hatami-Marbini, "Proteoglycan-collagen structural interactions in the human cornea," 6th World Congress on Biomechanics, Singapore, August 1-6, 2010.
21. Steven Petsche and Peter M. Pinsky, "Modeling the Shear Properties of the Human Cornea Based on Direct Measurement," World Congress on Computational Mechanics; Sydney, Australia. July 27, 2010.
22. Steven Petsche, Peter M. Pinsky, Dimitri Chernyak and Jaime Martiz, "Depth Dependent In-plane Shear Properties of the Corneal Stroma," SBC2010 - 19302. ASME Summer Bioengineering Conference; Naples, Florida. June 19, 2010.
23. Hamed Hatami-Marbini and Peter M. Pinsky, "Corneal Stroma Elasticity; the Electrostatic Contribution of Proteoglycans," 16th U.S. National Congress of Theoretical and Applied Mechanics, State College, PA, June 27, 2010.
24. Hamed Hatami-Marbini and Peter M. Pinsky, "Electrostatic Contribution of the Proteoglycans to the In-Plane Shear and Compressive Stiffness of Corneal Stroma," ASME Summer Bioengineering Conference, Naples, FL, June 16, 2010.
25. Hamed Hatami-Marbini and Peter M. Pinsky, "The Contribution of Proteoglycans to the Mechanical Properties of the corneal Stroma," ASME First Global Congress on Nano-Engineering for Medicine and Biology, Houston, TX, Feb. 7, 2010.
26. Hamed Hatami-Marbini and Peter M. Pinsky, "The Role of Proteoglycans in Corneal Stroma Elasticity," Poster, Gordon Research Conference, Ventura, CA, 2010.
27. Hamed Hatami-Marbini and Peter M. Pinsky, "On Mechanics of Connective Tissues," Material Research Society meeting, Boston, MA, Nov. 30, 2009.
28. Hamed Hatami-Marbini and Peter M. Pinsky, "The Role of Proteoglycans in Corneal Stroma Elasticity," Gordon Research Conference, Ventura, CA, Mar. 7, 2010.
29. Peter M. Pinsky, "Connective Tissue Elasticity: Bridging the Scales between Chemical Morphology and Engineering Models," Bio-X Interdisciplinary Initiatives Symposium, Stanford, California, August 25, 2010.
30. Peter M. Pinsky and Steven Petsche, "Measuring and Modeling the Depth-Dependent Shear Properties of the Human Corneal Stroma," 6th World Congress on Biomechanics, Singapore, August 1-6, 2010
31. Peter M. Pinsky and Steven Petsche, "Proteoglycan-collagen structural interactions in the human cornea," 6th World Congress on Biomechanics, Singapore, August 1-6, 2010
32. Petsche, S; Hatami-Mardini, H; and Pinsky, P. "Modeling the Shear Properties of the Human Cornea based on Direct Measurement." Poster. Bio-X Interdisciplinary Initiatives Symposium; Stanford, California. August 25, 2010.
33. Petsche, S and Pinsky, P. "Modeling the Shear Properties of the Human Cornea Based on Direct Measurement." Presentation. World Congress on Computational Mechanics; Sydney, Australia. July 27, 2010.

34. Petsche, S; Pinsky, P; Chernyak, D; and Martiz, J. "Depth Dependent In-plane Shear Properties of the Corneal Stroma." Presentation SBC2010 - 19302. ASME Summer Bioengineering Conference; Naples, Florida. June 19, 2010.
35. Hamed Hatami-Marbini and Peter M. Pinsky, "Corneal Stroma Elasticity; the Electrostatic Contribution of Proteoglycans," 16th U.S. National Congress of Theoretical and Applied Mechanics, State College, PA, 2010
36. Hamed Hatami-Marbini and Peter M. Pinsky, "Electrostatic Contribution of the Proteoglycans to the In-Plane Shear and Compressive Stiffness of Corneal Stroma," ASME Summer Bioengineering Conference, Naples, FL, 2010
37. Hamed Hatami-Marbini and Peter M. Pinsky, "The Contribution of Proteoglycans to the Mechanical Properties of the corneal Stroma," ASME First Global Congress on Nano-Engineering for Medicine and Biology, Houston, TX, 2010
38. Hamed Hatami-Marbini and Peter M. Pinsky, "The Role of Proteoglycans in Corneal Stroma Elasticity," Poster, Gordon Research Conference, Ventura, CA, 2010
39. Peter M. Pinsky, "Measuring and Modeling the Elasticity of the Living Human Cornea," Distinguished Scientist Seminar Series, University of Oxford, Oxford, UK, June 29, 2009
40. Hamed Hatami-Marbini and Peter M. Pinsky, "On Mechanics of Connective Tissues," Material Research Society meeting, Boston, MA, 2009
41. P.M. Pinsky and S. Petsche "Hyperelastic modeling of the human cornea and application to tonometric measurement of intraocular pressure," 10 th National Congress of US Association for Computational Mechanics, Columbus OH, July 16-19, 2009
42. Hamed Hatami-Marbini and Peter M. Pinsky, "The Electrostatic Contribution of Proteoglycans to the Elasticity of the Corneal Stroma," Poster. Bio-X Interdisciplinary Initiatives Symposium; Stanford, California. August 25, 2010.
43. P.M. Pinsky "Modeling the optical performance of the human cornea following keratoplasty" ASME 2008 Summer Bioengineering Conference, June 25-29, Marco Island, Florida, USA
44. Y Shen, DM Barnett and PM Pinsky, "Integral Equation Modeling of Electrostatic Interaction in Atomic Force Microscopy," Ninth International Conference on Integral Methods in Science and Engineering, Niagara Falls, Ontario, Canada, July 23-27, 2006.
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## RESEARCH CONTRACTS AND GRANTS

- 01/09 – 12/11 Connective tissue elasticity: bridging the scales between chemical morphology and engineering models, Stanford Bio-X Interdisciplinary Initiative Program (IIP), PI \$225K
- 01/05 – 12/07 Modeling, Simulation and Characterization of Atomic Force Microscopy Measurements for Ionic Transport and Impedance in PEMFCs Global Climate and Energy Project, Stanford Global Climate and Energy project (GCEP), PI \$531K
- 03/05 – 02/08 Three-Dimensional and Multiscale Organ of Corti Biomechanics, NIH: 8490334, Co-PI, \$420,000
- 04/02-03/05 Multiscale Modeling of Transdermal Drug Delivery, ALZA Inc., PI, \$180K
- 01/04-12/05 Biomechanical Modeling of the Human Cornea, VISX Inc., PI, \$120K
- 10/98-9/01 Theoretical and Computational Studies on Coupling Solver and Numerical Optimization techniques for Structural Acoustics, U.S. Office of Naval Research, PI, \$431K

- 03/98 Integrated Computing Environment for Large-Scale Simulations in Structural Acoustics, DOD Defense University Research Instrumentation Program (DURIP), PI, \$88K
- 01/98-12/98 Office of Technology Licensing (OTL) Research Incentive Award "A Simulation-based Ultrasound Technique for Imaging in Medical Diagnostics," PI, \$25K
- 10/95-9/98 Fundamental Studies in the Theory of Finite Element Discretization, U.S. Office of Naval Research (ONR), PI, \$897K
- 1/92-10/95 Computational Methods for Structural Acoustics, U.S. Office of Naval Research (ONR), PI, \$894K
- 7/91-6/95 Mechanical Modeling of Keratoplasty, National Institutes of Health (NEI): PI, \$462K
- 1/91-12/92 Finite Element Methods for Structural Acoustics, U.S. Office of Naval Research (ONR), PI, \$275K
- 7/91-6/94 Parallel Adaptive Finite Element Software for Semiconductor Device Simulation Defense Advanced Research Projects Agency (DARPA), Co-PI, \$1,556K
- 9/90-8/91 A Microstructurally-Based Computer Model for Simulating Surgical Procedures on the Human Cornea, Stanford University OTL Research Incentive Fund, PI, \$24K
- 1/89-12/90 Finite Element Methods for Structural Acoustics, U.S. Office of Naval Research (ONR), PI, \$275K
- 1/89-12/91 Research in Analytical and Numerical Methods for Structural Acoustics, Defense Advanced Research Projects Agency (DARPA) / U.S. Office of Naval Research (ONR), PI, \$968K
- 8/88 Computer Equipment Grant, U.S. Office of Naval Research (ONR), PI, \$22K
- 8/86-12/88 Theoretical and Computational Formulations for the Dynamic Analysis of Nonlinear Elastic-Viscoelastic Multi-Layered Shells, U.S. Office of Naval Research (ONR), PI, \$248K
- 8/84-7/86 Nonlinear Dynamic Finite Element Analysis of Elastic Shells with Compliant Coatings, U.S. Office of Naval Research, ONR), PI, \$146K
- 5/84-10/86 Finite Element Formulations for Nonlinear Plates and Shells Based on the Hu-Washizu Variational Principle, National Science Foundation (NSF), PI, \$48K