

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.
Follow the sample format for each person. **DO NOT EXCEED FOUR PAGES.**

| NAME | POSITION TITLE | | |
|--|---------------------------|---------|-----------------|
| Gerald H. Pollack | Professor | | |
| EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.) | | | |
| INSTITUTION AND LOCATION | DEGREE (if applicable) | YEAR(s) | FIELD OF STUDY |
| Polytechnic Institute of Brooklyn (Now NYU) | B.S.E.E. | 1961 | Electrical Eng. |
| University of Pennsylvania | Ph.D. | 1968 | Biomedical Eng. |

Professional Experience:

1968-73 Assistant Professor, Dept. Anesthesiology and Div. Bioengineering, University of Washington, Seattle
 1973-77 Associate Professor, Anesthesiology & Bioengineering
 1977-81 Professor, Anesthesiology & Bioengineering
 1981- Professor of Bioengineering

Honors and Awards:

Tau Beta Pi Kulka Award, 1961; Eta Kappa Nu Kulka Award, 1961
 Polytechnic Institute Merit Key; Engineering Honor Societies (Eta Kappa Nu, Tau Beta Pi)
 Established Investigatorship, American Heart Association, 1974-79
 Who's Who in America; American Men and Women in Science; Who's Who in the World
 Board of Directors, Bioengineering Society, 1977-79; NIH Cardiovascular-Pulmonary Study Section, March, 1979, 1980
 Editorial Boards: J. Mol. & Cell Cardiol., 1975-80, Am. J. Physiol. (Heart and Circ Physiol), 1975-80; Circ. Research, 1982-1989;
 and Cell Biology International, 2005-2014; Molecular and Cellular Biomechanics, 2007-
 Honorary member, Romanian Muscle Society, 1992
 Excellence Award, Society for Technical Communication, 1992 (for book, Muscles & Molecules)
 Founding Fellow, American Institute of Medical and Biological Engineering, 1993
 Consultant, Whitaker Foundation, 1996-2006
 JSEM Scientific Paper Award, 1998
 Fellow, American Heart Association, 2001; Inaugural Fellow, Council on Basic Cardiovascular Sciences, AHA, 2001
 Invited Scholar, Institut des Hautes Etudes Scientifiques, Paris, 2002
 Distinguished Lecturer Award, Biomedical Engineering Society, 2002
 International Scientist of the Year (IBC), 2002
 Honorary Doctorate, Ural State University, Ekaterinburg Russia, 2002
 Distinguished Award, Society for Technical Communication (for book, Cells, Gels and the Engines of Life), 2003
 Merit Award, International STC competition for book, above, 2003.
 Chair (joint, founding), Gordon Research Conference on "Interfacial Water in Cell Biology" 2004.
 Honorary Professor, Russian Academy of Sciences, 2005
 Fellow, Biomedical Engineering Society, 2005
 National Science Board Task Force for Transformative Research, Advisor, 2005-2006
 Annual Conference on the Physics, Chemistry, and Biology of Water, Inaugural Chair 2006; Chair, 07, 09, 10, 11,12, 13, 14, 15.
 University of Washington Annual Faculty Lecturer 2008. Selected uniquely from all UW faculty
 Founding Editor-in-Chief, *WATER: A Multidisciplinary Research Journal* <www.waterjournal.org>
 NIH Director's Transformative Research Award, 2009
 Chair, US-Israel Binational Science Foundation Panel on Transformative Research, 2011
 Martin Hellsten Surface-Chemistry Award, AkzoNobel Chalmers 2011
 Prigogine Medal, 2012
 TEDx talk, 2012
 Academy of Science, Srpska, Academician and Foreign Member, 2012
 Director, Institute for Venture Science, 2013
 Distinguished Award, Society for Technical Communication (for book, The Fourth Phase of Water), 2014
 Scientific Excellence Award, World Academy of Neural Science, 2014
 International Summit Award of Excellence, STC 2014.

Dinsdale Prize, Society for Scientific Exploration, 2014

International BrandLaureate Foundation Personality Award 2015

1st Emoto Peace Prize, 2016

Fellow, International Academy of Medical and Biological Engineering (2016).

Plenary/Keynote Lectures since 2001: *Int'l MEMS Workshop, Singapore July '01; Electroactive Polymers and Biomimetics, Lucca, It., Aug. '01; Int'l Symp. on Biological Motility, Puschino, Aug. '01; Tasaki Symp. Electrophysiol., Bethesda, Jan '02; Sz-Gyorgyi Symposium on Living State, Sumeg, Hungary, May, '02; Int'l Controlled Release Society, Seoul, July '02; Int'l Conf. Mechanics in Med. And Biol. Limnos, Sept. '02; Biomedical Engineering Society, Houston, Oct. '02 Nat'l Biochem Congress, Mexico, Nov '02; World Congress, Biomimetics and Artificial Muscles, Albuquerque, NM, Dec '02; Consciousness, Quantum Physics and the Brain, Tucson March '03; Canad. Cong. Appl. Mechanics, Calgary, June. 03; World Congress of Med Phys. & Bioeng., Sydney, Aug. 03; Int'l Cong. Cell Eng. Australia, Aug 03; Interfacial Water, Velen, Sept, 03; Bio-nanostructures, Orlando, Oct 03 Asia Pacific Eng. Med. Biol, Tokyo, Oct. 03; IC Mech Med. Biol, Tainan, Nov '03; Free Radical Society, Seattle, Nov 03; IASTED Biomed. 04, Innsbruck; IEEE EMBS Symp Emerging Technologies in BME, May, 04, Istanbul; Design & Nature, Rhodes, June 04; World Cong. Biomimetics and Nano-Bio, Williamsburg, VA, July. 04; Computational Physics 2004, Genoa, Sept. 04; Electrochemical Society, Honolulu, Oct 2004; Single Cell Mechanics, MIT, Oct 2004; ICEM Mechanics, Singapore, Nov, 04. 1st Int'l Nanofluidics Wkshp, Entschede, Apr.05. GRC Elastomers Networks and Gels, NH. July 05. GRC Chronobiology, RI, Aug. 05; IASTED Biomechanics, Benidorm Sept. 05; West African Cong. Biochem and Mol. Biol, Lagos, Nov. 05; Physiol/Pharm of Temperature Regulation, Phoenix, March 06; Mechanotransduction in Liv. Cells, Yerevan, Aug 06; World Congr. Biomed E and Med Physics, Seoul, Aug 06; Int'l Sol-gel Science, Guanajuato Sept 06; GEMSEC Mol Biomimetics, Friday Harbor WA, Sept 06 Fed. Afr Soc. Biochem Mol Biol, Abuja, Nov 06, Int'l Congr Biomed / Pharmaceut Eng Singapore Dec 06; Int'l Conf. Robotics and Biomimetics, Kunming, Dec 06; JST Surface Forces, Sendai, March 07; ESF Biosurfaces and Interfaces, St Feliu, July 07; Cold Hardiness, Saskatoon, Aug 07; ISOPOW Food Science, Bangkok, Sept 07; BioHydrogels, Viareggio, Nov 07; Fostering Innovation (NIH), Bethesda, Dec 07; Trends in Surface Chem. Antigua, Jan 08; Paul Levy Ann. Lecture, Johannesburg, May 08; Int'l Symp. on Nanotech, Jeddah, June 08. Int'l Conf Bionic Eng'ng, Changchun, Oct 08. Ann Conf on Phys, Chem, and Biol of Water, Mt. Snow, Vt, Oct 08, Niham Symp. Canberra, Dec 08; CIBEC, Cairo, Dec 08; Int'l Mig. Mat. Sci, Nanotech, Health Tech, Cairo, Jan 09. GUNA Symp. on high dilution, Rome May, 09; Ischia Workshop on water, Italy, May 09. Ultraweak Fields on Biol, & Med., St Petersburg, Russia June 09; Int'l Symp Bioelectrography, St. Petersburg, July 09; Symmetry, Budapest, Aug. 09; CHESS, Saskatoon, Aug 09; Weisus Water Conf, Leeuwarden, Oct 09; Biohydrogels, Viareggio, Nov 09; Wise Traditions Nutrition, Chicago, Nov 09; Data Visualization, Hilo Nov. 09 WINPTech, Kobe, Dec 09; Adv Particle Handling, Kyoto, Dec 09; Annual Art/Sci Lecture, Akron Univ, Mar 10; SITES Energy Conversion, Barcelona, June '10; Laser Appl. Life Sci, Oulu, Jun '10; Design in Nature, Pisa, Jun '10; Int'l Conf Applied Kinesiology, Vladivostok, Aug '10; Schauburger Symp, Vienna, Aug '10; Nanomaterials, Banja Luka, Aug '10; Yucomat Materials, Herceg Novi, Sept '10; Water and Biol Function, Buenos Aires, Nov '10; Nerenberg Lecture, U West. Ont. London, March '11; NEBEC Northeast BioE Conf Albany, April 11; Hellsten Lecture, Gothenburg, April 11; Ann. Biomed Eng. Lecture, Eindhoven, May 11; Int'l Food Science, New Orleans, June 11; Science, Information, Spirit, St. Petersburg July 11; Electrodynamic Activity of Living Cells, Prague July 11; Natural Philos. Alliance, College Park, MD, July 11; Maximum Entropy, Waterloo, Canada, July 11; Kraft Food Workshop, Madison WI, July 11; IWONE, Hoor, Sweden, Aug 11; Water and Nanomedicine, Banja Luka, Sept 11; Yukawa Symp: Synthesis of Knowledge, Kyoto, Oct 11; Biohydrogels, Florence, Nov 11; Water and Society, WIT, Las Vegas, Dec 11; Fourth Phase of Water, LA, March 12; Int'l Fascia Research Congr. Vancouver, March 12; Sustainable City, Ancona, May 12; Porous Media, Purdue, May 12; Biophys Aspects Complexity in Health, Disease; Lugano, May 12; From Solid State to Biophys, Dubrovnik, June 12; Phloem, Pullman WA, July 12; Proton Dynamics in Cancer, Kyoto, Oct 12; AIMCAL Myrtle Beach, Oct 12. Electric Universe Albuquerque Jan 13; Water and Health, Pasadena Feb 13; Colours of Water, London March 13; Electroactive Polymers, Zurich (Dubendorf) June 13; Contemporary Materials, Banja Luka, July 13; Nat'l Phil. Alliance Rockville, July 2013; Symmetry Festival, Aug 2013; Structure of water: Physical and Chemical Aspects, St. Petersburg, Sept 2013; Energy Medicine, Lindau, Oct 13; Combined Orthopedic Research Societies (CORS), Venice, Oct 13; Neural Therapy Society, Buenos Aires, Nov. 13; IMCOL, Valencia, Dec 13. MDS Biological Motion Vancouver Feb 14; Cong. Neural Therapy Manta, Ecuador, March 14; Electric Universe, Albuquerque, March 14; Leonhard Ventures, May 14; Soc. Sci. Explrtn, June 14; Human Photosynthesis, Aguascalientes, Mex, June '14; Science and Ideology, Quito, July 14; Int'l Cell Eng'ng, Aachen, Sept 14; Biophys Aspects Complexity, Lugano, Oct 14; Bouchet Symp, Vancouver Feb 15; Emerging Sci of Life, Kuala Lumpur, March 15; 7th World Water Forum, Daegu April 15; Int'l Light Association, Tallinn, May 15; Electric Universe, Phoenix, June 15; Int'l Bodytalk Assoc. Vancouver Aug 15; Chemistry and Life, Brno, Sept 15; Math. & Physiol. of Muscle, Pisa, Oct 15; Waternet, Amsterdam Oct 15; SWIG Incheon, Nov 15; Ann Colloq. ChE, Rio de Janeiro, Nov 15;*

Books (since 1990)

Pollack, G.H.: *Muscles and Molecules: Uncovering the Principles of Biological Motion*. Ebner & Sons, Seattle, 1990.

Sugi, H. and Pollack, G.H.: *Mechanism of Sliding Muscle Contraction*. Plenum Press, New York, 1993.

Sugi, H., and Pollack, G.H.: *Mechanism of Work Production and Work Absorption in Muscle*. Plenum Press, New York, 1998.

Granzier, H., and Pollack, G.H.: *Elastic Filaments of the Cell*. Kluwer/Plenum, 2000.

Pollack, G.H.: *Cells, Gels and the Engines of Life: A New, Unifying Approach to Cell Function*. Ebner & Sons, 2001.

Pollack, G.H., Cameron, I., and Wheatley, D., *Water and the Cell*. Springer, 2006.

Pollack, G.H. and Chin, W.-C. *Phase Transitions in Cell Biology*, Springer, 2008.

Pollack, G.H.: *The Fourth Phase of Water: Beyond Solid, Liquid and Vapor*. Ebner & Sons, 2013 <www.ebnerandsons.com>.

Pollack, G. H: What Makes the Earth Turn? Surprising New Ideas About Our Physical World (title tentative – expected 2017)

Recent Papers (Selected from >300)

- Blyakhman, F., Tourovskaia, A. and Pollack G. H.: Intact connecting filaments change length in 2.3-nm quanta. pp 305-318 In: *Elastic Filaments of the Cell*. Ed: H. Granzier and G. H. Pollack, Kluwer, 2000.
- Pollack, G. H.: Muscle contraction and polymer gel phase transitions. In *Electroactive Polymer Actuators and Devices*, Ed. Y. Bar-Cohen, SPIE 3987, pp. 232-242, 2000.
- Pollack, G. H.: MEMS and the cell: How nature creates microscale motion. In: *Smart Sensors and Devices*, eds. D. Sood, R Lawes and V. Varadan, SPIE Vol. 4235, pp. 21-40, 2001.
- Pollack, G. H. and Reitz, F. B.: Phase Transitions and Molecular Motion in the Cell. *In Cell Water*, ed. P. Mentre. *Cellular and Molecular Biol.* 47(5): 885-900, 2001.
- Blyakhman, T., Tourovskaia, A., and Pollack, G. H.: Quantal sarcomere length changes in relaxed single myofibrils. *Biophys J* 81:1093-1100, 2001.
- Pollack, GH: Is the cell a gel—and why does it matter? Invited review, *Japanese Journal of Physiology*. 51(6):649-60 2001.
- Pollack, GH and Reitz, F. Micro- and nano-scale motion in the cell. in: *Int'l iMEMS Wkshp.*, ed. F. Tay Eng Hock, pp. 114, 2001.
- Reitz, F., Fauver, M., and Pollack, GH: Fluorescence anisotropy near-field scanning optical microscopy (FANSOM): a new technique for nanoscale microviscometry. *Ultramicroscopy*, 90: 259-264, 2002.
- Dunaway, D., Fauver, M. and Pollack, GH: Direct measurement of single synthetic vertebrate thick filament elasticity using nanofabricated cantilevers. *Biophys. J.* 82(6):L 3128-3133, 2002.
- Yakovenko, O., Blyakhman, F. and Pollack, G. H. Fundamental step size in single cardiac and skeletal sarcomeres. *Am J. Physiol (Cell)* 283(9): C735-C743, 2002.
- Pollack, GH: The Cell as a Biomaterial. Invited Review. *J. Mat. Sci: Mat. In Medicine* 13: 811-821, 2002.
- Liu, X and Pollack GH: Mechanics of F-actin Characterized using Nanofabricated Cantilevers. *Biophys. J.* 83: 2705-2715, 2002.
- Gao, F., Reitz, F. and Pollack GH: Potentials in anionic polyelectrolyte hydrogels, *J. Appl. Polymer Sci.* 89(5) 1319-1321, 2003.
- Pollack, GH: The role of aqueous interfaces in the cell. Invited review. *Adv. Colloid and Interface Sci.* 103/2: 173 – 196, 2003.
- Sokolov, S., Grinko, A., Tourovskaia, A., Reitz, F., Yakovenko, O., Pollack, GH and Blyakhman, F. “Minimum average risk” as a new peak detection algorithm applied to myofibrillar dynamics. *Comput. Meth and Prog. in Biomed.* 72(1): 21-26, 2003.
- Pollack, G.H.: Sub-cellular basis of biological motion. *Biological Membranes* 20(1): 5-15, 2003.
- Rassier, D.E., Herzog, W., Pollack, G.H.: Dynamics of individual sarcomeres during and after stretch in activated myofibrils. *Proc. Royal Soc. (Lond)* 270: 1735-1740, 2003
- Pollack, G. H., Liu, X., Yakovenko, O. and Blyakhman, F. A.. Translation step size measured in single sarcomeres and single filament pairs. In: “*Molecular and Cellular Aspects of Muscle Contraction*. Ed. H. Sugi. Kluwer/Plenum 2003, pp 129-142
- Zheng, J.M. and Pollack, G. H.: Long range forces extending from polymer surfaces. *Phys Rev E.*: 68: 031408, 2003
- Reitz, F.B. and Pollack, G.H.: Labview virtual instruments for calcium buffer calculations. *Comput. Meth. Progr. Biomed:* 70(1): 61-69, 2003.
- Liu, X. and Pollack, G. H.: Stepwise sliding of single actin and myosin filaments. *Biophys. J.* 86: 353-358, 2004.
- Nagornyak, E., Blyakhman, F. and Pollack, G.H.: Effect of sarcomere length on step size in relaxed psoas muscle. *J. Mus. Res. Cell Motil.* 25: 37-43, 2004.
- Safronov, A. P. Smirnova, Y. A., Pollack, G. H. and Blyakhman, F. A. Enthalpy of Swelling of Potassium Poly(acrylate) and Poly(methacrylate) Hydrogels. Evaluation of Excluded-Volume Interaction. *Macromol. Chem Phys* 205: 1431-1438, 2004
- Hao, Y. Bernstein, S. I. And Pollack, G. H. Passive stiffness of Drosophila IFM myofibrils: a novel high accuracy measurement method. *J. Mus Rs Cell Motil* 25 359-366, 2004.
- Zubarev, A. Yu. Blyakhman, F. A., Pollack, G. H., Gusev, P. and Safronov, A. P. Self-similar wave of swelling/collapse phase transition along polyelectrolyte gel. *Macromo. Theory Simul.* 13: 697-701, 2004
- Nagornyak, E. M., Blyakhman F. A. and Pollack, G. H.: Step size in activated rabbit sarcomeres is independent of filament overlap. *J. Mechanics in Med. And Biol* 4(4) 1-14, 2004.
- Pollack, G.H.: Cells and Gels: Implications for Mechanics. *SPIE 5852 . Exp. Mechanics*. Ed. C. Quan et al., 10-13, 2005.
- Trevors, J. T. and Pollack, G. H.: The origin of life in a hydrogel environment. *Prog. Biophys. Mol. Biol.* 89 (1) 1-8, 2005.
- Pollack, G. H., Blyakhman, F. A., Liu, X., Nagornyak, E.: Sarcomere dynamics, stepwise shortening, and the nature of contraction. In: *Sliding Filament Mechanism after 50 Years*, ed. H. Sugi., Plenum, 113-126, 2005.
- Pollack, G. H.: Cells, Gels and Electrochemistry. *In Nanoscale Devices, Materials, and Biological Systems*, Electrochemical Society, pp. 495-508, Editors: M. Cahay, M. Urquidi-Macdonald, S. Bandyopadhyay, P. Guo, H. Hasegawa, N. Koshida, J.P. Leburton, D.J. Lockwood, S. Seal, and A. Stella, 2005
- Pollack, G. H. Revitalizing science in a risk-averse culture: Reflections on the syndrome and prescriptions for its cure. *Cellular and Mol. Biol.* 51: 815-820, 2005.
- Nagornyak, E. M., Blyakhman, F. A. and Pollack, G. H. Stepwise length changes in single invertebrate thick filaments. *Biophys J.* 89: 3269-3276, 2005.
- Nagornyak, E. M., and Pollack, G. H. Connecting filament mechanics in the relaxed sarcomere. *J. Mus Res Cell Motil* 26: 303-306, 2005.



Principal Investigator/Program Director (Last, first, middle):

- Zheng, J.-M. and Pollack, G. H. Solute Exclusion and potential distribution near hydrophilic surfaces. *in* Water and the Cell, ed. GH Pollack, IL Cameron, and DN Wheatley, Springer, 2006, pp. 165 – 174.
- Safronov, A. P., Shklyar, T. F., Borodin, V. S., Smirnova, Ye A., Sokolov, S. Yu., Pollack, G. H. and Blyakhman, F. A. Donnan potential in hydrogels of poly(methacrylic acid) and its potassium salt. *in* Water and the Cell, ed. GH Pollack, IL Cameron, and DN Wheatley, Springer, 2006, pp 273 - 284.
- Zheng, J.-M., Chin, W. –C, Khijniak, E., Khijniak, E., Jr., Pollack, G. H. Surfaces and Interfacial Water: Evidence that hydrophilic surfaces have long-range impact. *Adv. Colloid Interface Sci.* 127: 19-27, 2006.
- Hao, Y., , Miller, M. S., Swank, D. M., Liu, H., Bernstein, S. I., Maughan, D. L., and Pollack, G. H. Passive stiffness in Drosophila indirect flight muscle reduced by disrupting paramyosin phosphorylation but not by embryonic myosin S2 hinge substitution. *Biophys. J.* 91: 4500-4506, 2006.
- Pollack, G. H. Cells, Gels and Mechanics. *In: Models of Cytoskeletal Mechanics*, ed. M. Kaazempur-Mofrad and R. D. Kamm. Cambridge University Press., 2006, pp 129 – 151.
- Klimov, A and Pollack, GH: Visualization of charge-carrier propagation in water. *Langmuir* 23(23): 11890-11895, 2007.
- Zhao, Q, Zheng, JM, Chai, B., and Pollack, GH: Unexpected effect of light on colloid crystal Spacing. *Langmuir*, 24: 1750-1755, 2008.
- Chai, B, Zheng, JM, Zhao, Q, and Pollack, GH: Spectroscopic studies of solutes in aqueous solution. *J. Phys. Chem.,A* 112 2242-2247, 2008.
- Pollack, GH and Clegg, J: Unsuspected Linkage Between Unstirred Layers, Exclusion Zones, and Water. *In: Pollack, G.H. and Chin, W.-C. Phase Transitions in Cell Biology*, Springer, pp 143 – 152, 2008.
- Wang, C, Nagornyak, E, Das, R and Pollack GH: Automatic step detection algorithm for analysis of sarcomere dynamics. *Comput Methods Biomech Biomed Engin* 11(6):609-614, 2008.
- Klyuzhin, I, Symonds, A, Magula, J and Pollack, GH: A new method of water purification based on the particle-exclusion phenomenon. *Environ. Sci and Techn*, 42(16) 6160-6166, 2008.
- Ovchinnikova, K and Pollack, GH: Can water store charge? *Langmuir*, 25: 542-547, 2009.
- Shklyar, TF, Safronov, A, Klyuzhin, IS, Pollack, GH and Blyakhman, FA: Relationship between mechanical and electrical properties of a synthetic hydrogel chosen as experimental model of the cytoskeleton. *Biofizika*, 53(6): 1000-1007, 2008.
- Pollack, GH: Water and Surfaces: A Linkage Unexpectedly Profound. *In: Hydrogels: Biological Properties and Applications*. Springer-Verlat, Milan, 2009, Ed: R. Barbucci, pp 145 – 147.
- Zheng, J.-M., Wexler, A, Pollack, GH: Effect of buffers on aqueous solute-exclusion zones around ion-exchange resins. *J. Colloid Interface Sci.* 332: 511-514, 2009.
- Ovchinnikova, K, Pollack GH: Cylindrical phase separation in colloidal suspensions. *Phys. Rev. E* 79 (3) 036117 2009.
- Pollack, GH, Figueroa, X and Zhao, Q: Molecules, Water, and Radiant Energy: New Clues for the Origin of Life. *Int'l J. Mol Sci* 10: 1419 – 1429, 2009.
- Safronov, AP, Blyakhman F.A., Shklyar T.F., Terziyan T.V., Kostareva M.A., Tchikunov S.A., Pollack G.H. The influence of counterion type and temperature on Flory-Huggins binary interaction parameter, its enthalpy and entropy parts in poly(acrylic acid) and poly(methacrylic acid) hydrogels polyelectrolyte *J. Macromol Chem Phys*, 210(7), 511-519. 2009.
- Zhao, Q, Ovchinnikova, K, Chai, B., Yoo, H, Magula, J and Pollack, GH. Role of proton gradients in the mechanism of osmosis. *J. Phys Chem B* 113: 10708-10714, 2009.
- Nagornyak, E, Yoo, H and Pollack, GH: Mechanism of attraction between like-charged particles in aqueous solution. *Soft Matter*, 5, 3850 – 3857, 2009.
- Chai, B, Yoo, H. and Pollack, GH: Effect of Radiant Energy on Near-Surface Water. *J. Phys. Chem B* 113: 13953-13958, 2009.
- Chai, B, Pollack GH: Solute-free Interfacial Zones in Polar Liquids. *J Phys. Chem B* 114: 5371-5375, 2010.
- Pollack, GH: Water, Energy and Life: Fresh Views from the Water's Edge. *Int'l J. Design & Nature*, 5(1): 27-29, 2010.
- Zhao Q, Coult J and Pollack GH: Long-range attraction in aqueous colloidal suspension. *Proc SPIE 7376: 73716C1-C13*, 2010
- Pollack, GH: Scientific orthodoxies: Moving challenge toward revolution. *In: Proc First Int'l CHESS Conf.* ed: C Rangacharyulu and E Haven, World Sci. pp. 297-305, 2010.
- Shklyar, TF, Safronov, AP, Toropova, OA, Pollack GH and Blyakhman, FA: Mechanoelectric Potentials in Synthetic Hydrogels: Possible Relation to Cytoskeleton. *Biophysics*, Vol. 55, No. 6, pp. 931–936, 2010,
- Klyuzhin, IS, Ienna, F, Roeder B, Wexler, A and Pollack GH: Persisting Water Droplets on Water Surfaces. *J. Phys Chem B* 114:14020-14027, 2010.
- Yoo, H, Baker, DR, Pirie, CM, Hovakeemian, B and Pollack GH: Characteristics of water adjacent to hydrophilic interfaces. *IN: Water: the Forgotten Molecule*, ed. Denis LeBihan and Hidenao Fukuyama, Pan Stanford, pp 123 -136, 2011.
- Yoo, H, Paranj, R and Pollack, GH: Impact of hydrophilic surfaces on interfacial water dynamics probed with NMR spectroscopy. *J. Phys. Chem Letters* 2: 532- 536, 2011.
- Pollack, GH, Figueroa, X, Zhao, Q: The Minimal Cell and Life's Origin: Role of Water and Aqueous Interfaces. *In: P.L. Luisi and P. Stano (eds.), The Minimal Cell: The Biophysics of Cell Compartment and the Origin of Cell Functionality*, DOI 10.1007/978-90-481-9944-0_7, Springer, 2011.
- Safronov, AP, Shakhnovich, M, Kalganov, A, Kamalov, IA, Shklyar, TF, Blyakhman, FA and Pollack, GH: DC electric fields produce periodic bending of polyelectrolyte gels. *Polymer* 52: 2430-2436, 2011.
- Bhalerao, A and Pollack, GH: Light-induced effects on Brownian displacements. *J Biophotonics* 4(3) 172-177, 2011.



Principal Investigator/Program Director (Last, first, middle):

- Nhan, DT and Pollack, GH: Effect of particle diameter on exclusion-zone size. In press *Int'l J Design Nature* 2011.
- Shklyar, TF, Toropova, OA, Safronov, AP, Pollack, GH and Blyakhman, FA: Mechanical Characteristics of Synthetic Polyelectrolyte Gel as a Physical Model of the Cytoskeleton. *Biophysics*, 56(1) 68-73, 2011.
- Figuroa, X and Pollack, GH, Exclusion-Zone Formation From Discontinuous Nafion Surfaces. In press, *Design and Nature* 2011.
- O'Rourke, C, Klyuzhin, IS, Park, JS and Pollack, GH: Unexpected water flow through Nafion-tube punctures. *Phys. Rev. E*. 83(5) DOI:10.1103/PhysRevE.83.056305 2011.
- Ienna, F, Yoo, H. and Pollack GH: Spatially Resolved Evaporative Patterns from Water *Soft Matter*, 8 (47), 11850 – 11856, 2012
- Trevors, JT and Pollack GH Origin of microbial life hypothesis: A gel cytoplasm lacking a bilayer membrane with infrared radiation producing exclusion zone (EZ) water, hydrogen as an energy source and thermosynthesis for bioenergetics. *Biochimie, Volume 94 (1), 258 – 262, 2012.*
- So E, Stahlberg R, and Pollack GH: Exclusion zone as an intermediate between ice and water. in: *Water and Society*, ed. DW Pepper and CA Brebbia, WIT Press, pp 3-11, 2012.
- Musumeci F and Pollack GH: Influence of water on the work function of certain metals. *Chem Phys Lett*. 536: 65-67. 2012.
- Chai B, Mahtani AG and Pollack GH: Unexpected Presence of Solute-Free Zones at Metal-Water Interfaces. *Contemporary Materials*, III-I, 1-12, 2012.
- Pollack, GH: Comment on “A Theory of Macromolecular Chemotaxis” and “Phenomena Associated with Gel–Water Interfaces. Analyses and Alternatives to the Long-Range Ordered Water Hypothesis” <http://pubs.acs.org/doi/abs/10.1021/jp312686x>, 2013.
- Chai B, Mahtani AG and Pollack GH: Influence of electrical connection between metal electrodes on contiguous solute-free zones. *Contemporary Materials IV-I – 1-8, 2013.*
- Das R and Pollack GH: Charge-based forces at the Nafion-water interface. *Langmuir* 29(8):2651-8 (2013) PMID 23311934.
- Yu, A, Carlson P, and Pollack GH: Unexpected axial flow through hydrophilic tubes: Implication for energetics of water. *Eur. Physical J. Special Topics* 2013 DOI 10.1140/epjst/e2013-01837-8.
- Rohani M and Pollack GH: Flow through horizontal tubes submerged in water in the absence of a pressure gradient: Mechanistic considerations. *Langmuir* 2013 29(22):6556-61. doi: 10.1021/la4001945.
- Yoo, H., Nagornyak, E, Das, R., Wexler, AD, Pollack, GH: Contraction-induced changes of muscle hydration water. 2014: *J. Phys. Chem. Letters*. dx.doi.org/10.1021/jz5000879 | *J. Phys. Chem. Lett.* 2014, 5, 947–952.
- Sulbaran, B, Toriz, G, Allan, GG, Pollack, GH and Delgado E: The dynamic development of exclusion zones on cellulosic surfaces. *Cellulose* 2014 DOI 10.1007/s10570-014-0165-y .
- Pollack, GH: Cell electrical properties: reconsidering the origin of the electrical potential. 2014 *Cell Biology International* ISSN 1065-6995 doi: 10.1002/cbin.10382.
- Kung, K and Pollack GH: Effect of Atmospheric Ions on Interfacial Water. *Entropy* 2014, 16, 6033-6041; doi:10.3390/e16116033 .
- Ypma, R and Pollack, GH: Effect of hyperbaric oxygen conditions on the ordering of interfacial water. *Undersea and Hyperbaric Medicine* 42(3): 257-264, 2015.
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