

## Gerald H. Pollack

Professor of Bioengineering  
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### EDUCATION

Ph.D. Biomedical Engineering, University of Pennsylvania 1968  
B.S.E.E. Electrical Engineering, Polytechnic Institute of Brooklyn (now NYU) 1961

### PROFESSIONAL EXPERIENCE

Professor of Bioengineering, University of Washington 1981-present  
Executive Director, [The Institute for Venture Science](#) 2013-present  
Co-founder, 4<sup>th</sup>-Phase Inc. 2016-present  
Consultant, Whitaker Foundation 1996-2006  
Associate Professor, Anesthesiology & Bioengineering, University of Washington 1973-1977  
Assistant Professor, Dept. Anesthesiology & Div. Bioengineering, University of Washington 1968-1973

### INSTITUTIONAL SERVICE

Founding Chair, [Annual Conference on the Physics, Chemistry, and Biology of Water](#) 2006; 2008-present  
Founding Editor-in-Chief, [WATER: A Multidisciplinary Research Journal](#) 2010-present  
Scientific Advisory Board, Hippocrates Health Institute 2016-present  
Honorary Board member, Weston Price Foundation 2018-present  
Board member, Omni Aqua Foundation 2018-present  
Board member, Hydration Foundation 2018-present  
Editorial Board member, Molecular and Cellular Biomechanics 2007  
Editorial Board member, Cell Biology International 2005-2014  
Advisor, National Science Board Task Force for Transformative Research 2005-2006  
Chair (joint, founding), Gordon Research Conference on *Interfacial Water in Cell Biology* 2004  
Editorial Board member, Circulation Research 1982-1989  
NIH Cardiovascular-Pulmonary Study Section 1979, 1980  
Board of Directors, Bioengineering Society 1977-1979  
Editorial Board member, Am. J. Physiol. (Heart and Circ. Physiol.) 1975-1980  
Editorial Board member, J. Mol. & Cell Cardiology 1975-1980

## HONORS & AWARDS

Mary Enig Integrity in Science Award, Weston Price Foundation, 2021

[Crown Prince Mohammed bin Zayed Majlis Presentation](#), Al Bateen Palace, UAE, 2020

[Water Science Award](#), Hydration Foundation, 2020

#83, [The World's 100 Most Inspiring People](#), OOOM Magazine, 2019

Lifetime Achievement Award, Chappell Natural Philosophy Society, 2019

Laureate, Living Agriculture, Agriculture du Vivant, 2019

Honorary Board, Weston Price Foundation, 2018-

Emoto Peace Prize, Inaugural Prize 2016

Fellow, International Academy of Medical and Biological Engineering, 2016

[TEDx talk](#), NewYorkSalon, 2016

Appearance in Travis Rice's 2016 sports-action movie, [The Fourth Phase](#), named after the book: *The Fourth Phase of Water*.

International BrandLaureate Foundation Personality Award, 2015

Dinsdale Prize, Society for Scientific Exploration, 2014

Scientific Excellence Award, World Academy of Neural Science, 2014

International Summit Award, Award of Excellence, Society of Technical Communication for book: *The Fourth Phase of Water*, 2014

Distinguished Award, Society of Technical Communication Puget Sound Chapter, for book: *The Fourth Phase of Water*, 2014

Academician and Foreign Member, Academy of Science, Srpska, 2012

[TEDx talk](#), Guelph U, 2012

Prigogine Medal, for thermodynamics and physical chemistry, 2012

Martin Hellsten Surface-Chemistry Award, AkzoNobel Chalmers, 2011

Chair, US-Israel Binational Science Foundation Panel on Transformative Research, 2011

NIH Director's Transformative Research Award, 2009

University of Washington Annual Faculty Lecturer, 2008

Fellow, Biomedical Engineering Society, 2005

Honorary Professor, Russian Academy of Sciences, 2005

Merit Award, Society for Technical Communication International Summit Awards, for book: *Cells, Gels and the Engines of Life*, 2003

Distinguished Award, Society for Technical Communication Puget Sound Chapter, for book: *Cells, Gels and the Engines of Life*, 2003

Honorary Doctorate, Ural State University, Ekaterinburg Russia, 2002

International Scientist of the Year (Int'l Biogr. Center), 2002

Distinguished Lecturer Award, Biomedical Engineering Society, 2002

Invited Scholar, Institut des Hautes Etudes Scientifiques, 2002

Fellow, American Heart Association, 2001

Inaugural Fellow, Council on Basic Cardiovascular Sciences, AHA, 2001

JSEM Scientific Paper Award (Japan Society for Electron Microscopy), 1998

Established Investigator, American Heart Association 1974-79

Polytechnic Institute Merit Key; Engineering Honor Societies (Eta Kappa Nu, Tau Beta Pi), 1961

Kulka Award (Tau Beta Pi, Eta Kappa Nu), 1961

## PLENARY / KEYNOTE / MAIN 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. '04; Single Cell Mechanics, MIT, Oct. '04; 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. Biochm 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, Ninham Symp. Canberra, Dec. '08; CIBEC, Cairo, Dec. '08; Int'l Mtg. 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; Wetsus 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; Sitges 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 '13; Symmetry Festival, Aug '13; Structure of water: Physical and Chemical Aspects, St. Petersburg, Sept. '13; 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; DIPP Vision, Dresden, Feb 16; Emoto Symp, March 16; Dreamers Conf, Helsinki May '16; Galactic Wisdom, Lacey WA, May '16; World Cong. Materials Sci & Eng. Alicante, June '16; Froelich Symp, Prague, June '16; Real Truth About Health, Orlando, Aug. '16; Bulletproof Conf, Pasadena, Sept. '16; Biophys Aspects Complexity, Lugano, Oct. '16; Int'l Conf. Unif. Sci. Seoul Jan. '17; Breath of Life London, May '17; Soc. Sci. Inv. New Haven, June '17; Water Environ. Fed, NY, Aug '17; Electr. Univ. Phoenix, Aug '17; Light and Architecture of Life, Siracusa, Oct. '17; Energy Medicine, Konstanz, Oct. '17; Chemistry 2017, Rome, Oct '17; Sutherland Cran. Coll. Osteopathy, London, Dec '17; Gal. Wisdom, Lacey, Feb '18; Korean Water Ind. Assoc., Incheon, Mar. '18; Energy Science, Hayden, Idaho, June '18; Water Science, House of Lords/Roy Soc. Med, London, July '18; Doctors for Disast. Prep. Las Vegas, Sept '18; Cranio-sacral therapy, Rome, Oct, '18; Water, Le Puy en Velay, Nov '18; Medstar, Bethesda, Nov '18; Soil and Nutrition, Southbridge, Nov '18; Aquaphotomics, Kobe, Dec '18; Living Agriculture, Paris Jan '19; Environmental Conf., Inst fur Neurobiologie, Frankfurt, March '18; Chapelle Natural Philosophy, Seattle, June 2019; NOW Assembly, Delphi, October '19; Association for Medicine and Complexity, Trieste, Oct '19; World Brotherhood Union, Istanbul, Oct. '19; Osteopathy 2019, Berlin, Nov '19; Messages from Water, Tokyo, Dec '19; Sustainability, Abu Dhabi, Jan 2020; ICUS, Seoul, Feb 2020; World of Wisdom, virtual, Aug 2020; World Water Unity Day, virtual, Aug 2020; Materials Summit, virtual, Aug 2020. --- PANDEMIC --

## BOOKS (since 1990)

Pollack, G.H.: [The Fourth Phase of Water: Beyond Solid, Liquid and Vapor](#). Ebner & Sons, 2013.

Chinese translation, published by 化学工业出版社 Chemical Industry, 2015.

German translation, *Wasser – viel mehr als H<sub>2</sub>O*, published by VAK Verlags GmbH, 2014.

Italian translation, *La Quarta Fase dell'Acqua*, published by Sapio, 2018.

Korean translation, East Asia Publishing, 2018.

Portuguese translation, *A Quarta Fase da Água: Além de Sólido, Líquido e Vapor*, IST Press, 2017.

Audiobook version in English. Tantor Media, 2019.

French translation, SAS Editions Extraordinaires, 2019.

Japanese translation, Natural Spirit Inc., 2020.

Russian translation, DMK Press, 2021.

Spanish translation, in progress.

- Pollack, G.H. and Chin, W.-C.: *Phase Transitions in Cell Biology*, Springer, 2008.
- Pollack, G.H., Cameron, I., and Wheatley, D.: *Water and the Cell*. Springer, 2006.
- Pollack, G.H.: [Cells, Gels and the Engines of Life: A New, Unifying Approach to Cell Function](#). Ebner & Sons, 2006.  
 Korean translation, published by CommunicationBooks, Inc. (ZMANZ).  
 Spanish translation, in progress.
- Granzier, H., and Pollack, G.H.: *Elastic Filaments of the Cell*. Kluwer/Plenum, 2000.
- Sugi, H., and Pollack, G.H.: *Mechanism of Work Production and Work Absorption in Muscle*. Plenum Press, NYC, 1998.
- Sugi, H. and Pollack, G.H.: *Mechanism of Sliding Muscle Contraction*. Plenum Press, NYC, 1993.
- Pollack, G.H.: [Muscles and Molecules: Uncovering the Principles of Biological Motion](#). Ebner & Sons, Seattle, 1990.

## RECENT PAPERS (Selected from >300)

- Rad, I, Stahlberg, R, Kung, K., Pollack GH: Low frequency weak electric fields can induce structural changes in water. PLOS One. 2 Dec. 2021 <https://doi.org/10.1371/journal.pone.0260967> .
- Wang, A. and Pollack, GH: Effect of infrared radiation on interfacial water at hydrophilic surfaces. Colloid and Interface Science Communications 42 (2021) 100397
- Kowacz, M. and Pollack, GH: Propolis-induced exclusion of colloids: Possible new mechanism of biological action. Colloid and Interface Science Communications 38 (2020) 100307.
- Sharma, A and Pollack, GH: Healthy Fats and Exclusion-Zone Size. Food Chemistry, 316,126305, 2020.
- Kowacz, M., Pollack, GH: Moving Water Droplets: The Role of Atmospheric CO<sub>2</sub> and Incident Radiant Energy in Charge Separation at the Air–Water Interface. J. Phys. Chem B. 2019. DOI: 10.1021/acs.jpcc.9b09161
- Ye, T., Kowacz, M. Pollack, GH: Unexpected Effects of Incident Radiant Energy on Evaporation of Water Condensate. *in press*, Colloids and Surfaces A: Physicochemical and Engineering Aspects. 2019.
- Pedregal-Cortes, R., Toriz, G., Delgado, E. and Pollack, GH: Interfacial water and its potential role in the function of sericin against biofouling. Biofouling DOI: 10.1080/08927014.2019.1653863. 2019.
- Pollack, GH. The Fourth Phase of Water: Implications for Energy, Life, and Health, in Nutrition and Integrative Medicine. ed. Aruna Bakhru CRC Press, 2019, pp 439 - 448, 2019.
- Sharma A, et al., Abha Sharma, Colby Adams, Benjamin D. Cashdollar, Zheng Li, Nam V. Nguyen, Himasri Sai, Jiachun Shi, Gautham Velchuru, Kevin Z. Zhu, and Gerald H. Pollack Effect of Health-Promoting Agents on Exclusion-Zone Size. Dose-Response DOI: 10.1177/1559325818796937, 2018.
- Rad, I and Pollack GH Cooling of Pure Water at Room Temperature by Weak Electric Currents. J Phys. Chem B 2018 122 (31), 7711-7717 DOI: 10.1021/acs.jpcc.7b12689.
- Vo, T, and Pollack, GH Surprising attraction of non-magnetic materials to magnets. J. Adv. Physics 14 (2), 2018 DOI: 10.24297/jap.v14i2.7368.
- Stahlberg, R, Yoo, H. and Pollack GH: Origin of the infra-red emission peak in freezing water. In. J. Physics, <https://link.springer.com/article/10.1007%2Fs12648-018-1265-6>, 2018.
- Pollack, GH. The Fourth Phase of Water: Implications for Energy, Life, and Health. in *Biological, Physical and Technical Basics of Cell Engineering*. ed. Artmann, GM, Artmann, A., Zhubanova, AA, Digel, I. Springer 2018 pp 309-320.
- Hwang, SG, Hong, JK, Sharma, A, Pollack, GH and Bahng GW: Exclusion zone and heterogeneous water structure at ambient temperature. PLoS ONE 13(4): e0195057. <https://doi.org/10.1371/journal.pone.0195057> 2018.

- Schwartz, AJ and Pollack, GH: Ice-melting dynamics: The role of protons and interfacial geometry. *Langmuir* DOI: 10.1021/acs.langmuir.7b00317, 2017.
- Sharma, A, Toso, DT, Kung, K., Bahng, GW, Pollack GH: QELBY-induced Enhancement of Exclusion Zone Buildup and Seed Germination. *Advances in Materials Science and Engineering*. Article ID 2410794, <https://doi.org/10.1155/2017/2410794>, 2017.
- S.A. Skopinov, SA, Bodrova MV, Jablon MPR, Pollack, GH, Blyakhman, FA "Exclusion zone" formation in mixtures of ethanol and water. *Solution Chemistry*, DOI 10.1007/s10953-017-0591-1, 2017.
- Kundacina N, Shi M, Pollack GH: Effect of Local and General Anesthetics on Interfacial Water, PLOS, 2016. PLoS ONE 11(4): e0152127. doi:10.1371/journal.pone.0152127.
- Burgo, T, Galembeck, F, Pollack, GH: Where is water on the triboelectric series? J. Electrostatics, 30-33,2016 doi: 0.1016/j.elstat.2016.01.002.
- Kimura, K. and Pollack, GH: Particle displacement in aqueous suspension arising from incident radiant energy. *Langmuir*, 2015, 31 (38), pp 10370–10376 DOI: 10.1021/la5048535.
- 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.
- Kung, K and Pollack GH: Effect of Atmospheric Ions on Interfacial Water. *Entropy* 2014, 16, 6033-6041; doi:10.3390/e16116033.
- Pollack, GH: Cell electrical properties: reconsidering the origin of the electrical potential. 2014 Cell Biology International ISSN 1065-6995 doi: 10.1002/cbin.10382.
- 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.
- 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.
- 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.
- 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.
- Das R and Pollack GH: Charge-based forces at the Nafion-water interface. *Langmuir* 29(8):2651-8 (2013) PMID 23311934.
- 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*.
- 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: Unexpected Presence of Solute-Free Zones at Metal-Water Interfaces. *Contemporary Materials, III-I, 1-12, 2012*.
- Musumeci F and Pollack GH: Influence of water on the work function of certain metals. *Chem Phys Lett*. 536: 65-67. 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.
- 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*.
- Ienna, F, Yoo, H. and Pollack GH: Spatially Resolved Evaporative Patterns from Water *Soft Matter*, 8 (47), 11850 – 11856, 2012.

- 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.
- Figueroa, X and Pollack, GH, Exclusion-Zone Formation From Discontinuous Nafion Surfaces. In press, *Design and 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.
- Nhan, DT and Pollack, GH: Effect of particle diameter on exclusion-zone size. In press *Int'l J Design Nature*, 2011.
- Bhalerao, A and Pollack, GH: Light-induced effects on Brownian displacements. *J Biophotonics* 4(3) 172-177, 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.
- 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.
- Yoo, H, Paranjli, R and Pollack, GH: Impact of hydrophilic surfaces on interfacial water dynamics probed with NMR spectroscopy. *J. Phys. Chem Letters* 2: 532- 536, 2011.
- 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.
- 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.
- 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.
- 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.
- Zhao Q, Coult J and Pollack GH: Long-range attraction in aqueous colloidal suspension. *Proc SPIE* 7376: 73716C1-C13, 2010.
- Pollack, GH: Water, Energy and Life: Fresh Views from the Water's Edge. *Int'l J. Design & Nature*, 5(1): 27-29, 2010.
- Chai, B, Pollack GH: Solute-free Interfacial Zones in Polar Liquids. *J Phys. Chem B* 114: 5371-5375, 2010.
- Chai, B, Yoo, H. and Pollack, GH: Effect of Radiant Energy on Near-Surface Water. *J. Phys. Chem B* 113: 13953-13958, 2009.
- Nagornyak, E, Yoo, H and Pollack, GH: Mechanism of attraction between like-charged particles in aqueous solution. *Soft Matter*, 5, 3850 – 3857, 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.
- 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.
- 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.
- Ovchinnikova, K, Pollack GH: Cylindrical phase separation in colloidal suspensions. *Phys. Rev. E* 79 (3)036117 2009.
- 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.

- 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.
- 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.
- Ovchinnikova, K and Pollack, GH: Can water store charge? *Langmuir*, 25: 542-547, 2009.
- 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.
- 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.
- 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.
- Chai, B, Zheng, JM, Zhao, Q, and Pollack, GH: Spectroscopic studies of solutes in aqueous solution. *J. Phys. Chem.*,A 112 2242-2247, 2008.
- Zhao, Q, Zheng, JM, Chai, B., and Pollack, GH: Unexpected effect of light on colloid crystal Spacing. *Langmuir*, 24: 1750-1755, 2008.
- Klimov, A and Pollack, GH: Visualization of charge-carrier propagation in water. *Langmuir* 23(23): 11890-11895, 2007.
- 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.
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