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CURRICULUM VITAE

Professor Arie Y. Ben-Naim

- Born:** July 11, 1934 in Jerusalem, Israel
- School:** Elementary and high school in Jerusalem
- Studies:**
- 1957 Studies in Chemistry at the Hebrew University of Jerusalem
- 1961 M.Sc. degree in Physical Chemistry
- 1961-64 Research toward the degree of Ph.D. under the supervision of Prof. G. Stein and Prof. S. Baer at the Dept. of Physical Chemistry, The Hebrew University of Jerusalem.
- 1964 Ph.D. subject of thesis: "Thermodynamics of Aqueous Solutions of Noble Gases."
- Oct. 1964 Instructor in the Dept. of Physical Chemistry, The Hebrew University of Jerusalem; participated in teaching and research.
- Nov. 1965-Jan. 1967 Postdoctoral Fellow at the State of the University of New York at Stony Brook, New York; worked with Prof. H.L. Friedman on theoretical aspects of aqueous solutions of electrolytes and transport phenomena.
- Jan. 1967-Sept. 1968 Research Fellow at the Chemical Physics Dept., Bell Telephone Laboratories, Murray Hill, New Jersey; Collaborated with Dr. F.H. Stillinger, Jr., on statistical

- aspects of the theory of liquid water.
- Oct. 1968 Senior lecturer at the Dept. of Inorganic and Analytical Chemistry, The Hebrew University of Jerusalem.
- Summer 1971 Visiting Scientist, Institute of Electrochemistry, The University of Karlsruhe, West Germany.
- April 1972 Associate Professor, The Hebrew University of Jerusalem
- Aug. 1973-Aug. 1975 Visiting Scientist at the Theoretical Molecular Biology Section, LMB, NIAMDD, NIH, Bethesda, Maryland, USA.
- Oct. 1974 Professor of Physical Chemistry, The Hebrew University of Jerusalem
- Sept. - Oct. 1977 Visiting Professor, Dept. of Chemistry, Ørsted Institute, University of Copenhagen, Denmark.
- 1977 - Sept. 1978 Head of the Dept. of Physical Chemistry, The Hebrew University of Jerusalem.
- Aug. - Sept. 1978 Visiting Professor, Dept. of Applied Mathematics, Institute of Advanced Studies, Australian National University, Canberra, Australia.
- March - Sept. 1979 Visiting Professor, Dept. of Physical Chemistry, Denmark Technical University, Lyngby, Denmark.
- Sept. 1979-Sept. 1980 Visiting Scientist, Bell Telephone Laboratories, Murray Hill, New Jersey, USA.
- Sept. 1980-July 1994 Professor of Chemistry, Dept. of Physical Chemistry, The Hebrew University of Jerusalem
- July 1984- March 1985 Visiting Professor, University of La Plata and Institute of Physics of Liquids and Biological Systems, La Plata, Argentina
- April 1985-Nov. 1985 Visiting Professor, Dept. of Chemistry, University of the Philippines, Diliman, Quezon City, Philippines.
- Nov. 1985-Nov. 1986 Visiting Scientist, Laboratory of Mathematical Biology, National Institutes of Health, Bethesda, Maryland, USA.
- July 1987 -Nov. 1987 Visiting Scientist, Laboratory of Mathematical Biology, National Institutes of Health, Bethesda, Maryland, USA
- July 1990-Nov. 1990 Visiting Scientist, Laboratory of Mathematical Biology,

- National Institutes of Health, Bethesda, Maryland, USA
- March 1991 - July 1991 Visiting Professor, Institute of Theoretical Science,
University of Oregon, Eugene, Oregon, USA
- July 1991 - Oct. 1991 Visiting Scientist, Laboratory of Mathematical Biology,
National Institutes of Health, Bethesda, Maryland, USA
- Oct. 1995 - Feb. 1996 Visiting Professor, Dept. of Chemistry, University
of the Philippines, Quezon City, Philippines
- July - Sept. 1998 Visiting Professor, Dept. of Physical Chemistry,
Westfälische Universität, Münster, Germany.
- Feb - Sept. 1999 Visiting Professor, Center for Polymer Studies
Boston University, Boston, MA. USA
- Mar.- July 2002 Visiting Professor, Institute of Chemical Process
Fundamentals, Academy of Sciences of Czech Republic,
Prague 6, Czech Republic.
- July - Sept 2002 Visiting Professor, Dept. of Physics and Astronomy,
University College, London, England.
- March- July 2003 Visiting Professor, Dept. of Biochemistry,
Kansas State University, Manhattan, Kansas, 66506, USA
- July- Nov 2003 Visiting Professor, Dept. of Chemistry,
Duquesne University, Pittsburgh, PA, 15282, USA
- December 2003 Visiting Professor, Dept. of Chemistry,
Australian Defense Forces Academy, Canberra, Australia.
- Jan-Mar 2004 Visiting Professor, Dept. of Chemistry,
University of the Philippines, Quezon City, Philippines.
- Sept 2004 – July 2006 Visiting Professor, Dept. of Physical Chemistry
Universidad de Burgos, Burgos, Spain
- Summer 2006 Visiting Professor, Dept. of Computational Molecular
Biophysics, University of Heidelberg, Heidelberg, Germany
- Oct 2006 to Oct 2007 Visiting scholar, Center of Theoretical Biological Physics,
University of California San Diego (UCSD), La Jolla CA
- Oct 2007 to June 2008 Visiting researcher, National Institute of Standards and
Technology (NIST), Maryland, USA
- July 2008 to June 2009 Division of Physical Chemistry, Stockholm University,
Stockholm, Sweden

July 2008-June 2009 Visiting professor, Division of Physical Chemistry, Stockholm University, Stockholm, Sweden

Sept 2013- March 2014 Visiting professor, the department of Chemistry and biological chemistry, Indiana University IUPUI, Indianapolis, Indiana

March-June 2014: Visiting professor, Department of Chemistry and Department of pharmacology, The University of Minnesota, Minneapolis.

Sept-December 2014: Visiting professor, the Institute of computational physics, the University of Stuttgart, Stuttgart, Germany.

Present: The Hebrew University of Jerusalem,
 Givat Ram, Jerusalem, Israel

Present fields of interest:

Theoretical and experimental aspects of the structure of water, aqueous solutions and hydrophobic hydrophilic interactions.

General theory of liquids and solutions.

Theoretical problems in biochemistry and biophysics.

Theoretical Biology and theory of evolution.

Entropy and Information Theory.

New formulation of the Second Law of Thermodynamics

Books written:

1. A. Ben-Naim, *Water and Aqueous Solutions, Introduction to a Molecular Theory*, Plenum Press, New York (1974).
2. A. Ben-Naim, *Hydrophobic Interactions*, Plenum Press, New York (1980),
3. A. Ben-Naim, *Solvation Thermodynamics*, Plenum Press, New York (1987).
4. A. Ben-Naim, *Statistical Thermodynamics for Chemists and Biochemists*, Plenum Press (1992).
5. A. Ben-Naim, *Cooperativity and Regulation in Biochemical Systems*, Kluwer /Plenum Publications, New-York (2001).
6. A Ben-Naim, *Molecular Theory of Solutions*, Oxford University Press, Oxford, (2006)
7. A. Ben-Naim, *Entropy-Demystified, the Second Law of Thermodynamics Reduced to Plain Common Sense*, World Scientific, Singapore (2007).
8. A. Ben-Naim, *A Farewell to Entropy. Statistical Thermodynamics Based on Information*, World Scientific, Singapore (2008).
9. A. Ben-Naim, *Molecular Theory of Water and Aqueous Solutions. Part I: Understanding Water*, World scientific, Singapore (2009).
10. A. Ben-Naim, *Molecular Theory of Water and Aqueous Solutions, Part II: The role of Water in Protein Folding, Self assembly and Molecular Recognition*, World Scientific, Singapore (2011).
11. A. Ben-Naim, *Discover Entropy and the Second Law of Thermodynamics*, World Scientific (2010).
12. A. Ben-Naim and R. Ben-Naim, *Alice's Adventures in Water-Land*, World Scientific, Singapore (2011).
13. A. Ben-naim, *Entropy and the Second Law, Interpretation and Misss-Interpretationsss*, World Scientific, Singapore (2012)
14. A. Ben-Naim, *The Protein Folding Problem and its Solutions*, World

- Scientific, Singapore (2013)
15. A. Ben-Naim and R. Ben-Naim, *Alice's Adventures in Molecular Biology*, World Scientific, Singapore (2013).
 16. A. Ben-Naim, *Statistical Thermodynamics, with Applications to Life Sciences*, World Scientific, Singapore (2014)
 17. A. Ben-Naim, *Discover Probability; How to Use it, How to Avoid Misusing it and How it Affects Every Aspect of Your Life*, World Scientific, Singapore (2014).
 18. A. Ben-Naim, *Information, Entropy, Life and the Universe. What we know and what we do not know*, World Scientific, Singapore (2015)
 19. A. Ben-Naim, *Myths and Verities in Protein Folding Theories*, World Scientific, Singapore (2016).
 20. A. Ben-Naim, *The Briefest History of Time: The History of Histories of Time, And the misconstrued association between Entropy and Time*, World Scientific, Singapore (2016).
 21. A. Ben-Naim, *Entropy, The Truth, the Whole Truth and Nothing but the Truth*, World Scientific, Singapore (2016)
 22. A. ben-Naim, and D Casadei, *Modern Thermodynamics*, World Scientific, Singapore (2016)
 23. A. Ben-Naim, *Information Theory, An Introduction to the fundamental concepts*, World Scientific, (2017)
 24. A. ben-Naim, *The Four Laws that do not Drive the Universe, For the Curious and intelligent*, World Scientific, Singapore (2017)
 25. A. Ben-Naim, Z. Kirson and Jose Angel Sordo, *Water in Life, and Life in Water*, World Scientific, in preparation, 2017

1. A. Ben-Naim, A new method of defining the activity functions of non-ideal gases and solutions, J. Chem. Ed., 39, 242-245 (1962).
2. A. Ben-Naim and S. Baer, Method of measuring solubilities of slightly soluble gases in liquids, Trans. Faraday Soc., 59, 2735-2738 (1963).
3. A. Ben-Naim and S. Baer, Solubility and thermodynamics of solution of argon in water + ethanol system, Trans. Faraday Soc., 60, 1736-1741 (1964).
4. A. Ben-Naim, Thermodynamics of solution of gases in aqueous solutions, Ph.D. Thesis, Hebrew University, Jerusalem, Israel (1964).
5. A. Ben-Naim, Solubility of noble gases in water and the relation to the structure of water, Israel J. Chem., 2, 278-279 (1964).
6. A. Ben-Naim, On the difference between the thermodynamic behavior of argon in D₂O and H₂O, J. Chem. Phys., 42, 1512-1514 (1965).
7. A. Ben-Naim and G. Moran, Solubility and thermodynamics of solution of argon in water + p-dioxane system, Trans. Faraday Soc., 61, 821-825 (1965).
8. A. Ben-Naim, On the origin of the stabilization of the structure of water by non-electrolytes, J. Phys. Chem., 69, 1922-1927 (1965).
9. A. Ben-Naim, Thermodynamics of aqueous solutions of noble gases, J. Phys. Chem., 69, 3240-3245 (1965).
10. A. Ben-Naim, Thermodynamics of aqueous solutions of noble gases Part II: Effect of non-electrolytes, J. Phys. Chem., 69, 3245-3250 (1965).
11. A. Ben-Naim and M. Egel-Thal, Thermodynamics of aqueous solutions of noble gases Part III: Effect of electrolytes, J. Phys. Chem., 69, 3250-3253 (1965).
12. Baer and A. A. Ben-Naim, On the second order rate equation (letter to the editor), J. Chem. Ed., 43, 680 (1966).
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14. A. Ben-Naim, Structural shifts in water and their influence on the solubility of gases, J. Chem. Phys., 45, 2706-2707 (1966).
15. A. Ben-Naim, Thermodynamics of aqueous solutions of noble gases Part IV: Effect of tetraalkylammonium salts, J. Chem. Phys., 71, 1137-1138 (1967).
16. A. Ben-Naim and H.L. Friedman, On the application of the scaled particle theory to aqueous solutions of non-polar gases, J. Phys. Chem., 71, 448-449 (1967).
17. A. Ben-Naim, Solubility and thermodynamics of solutions of argon in water-methanol system, J. Phys. Chem., 71, 4002-4007 (1967).
18. F.H. Stillinger, Jr., and A. A. Ben-Naim, Liquid vapor interface potential for water, J. Phys. Chem., 47, 4431-4437 (1967).
19. H.L. Friedman and A. Ben-Naim, Calculation of the effect of non-Brownian motion on some DC transport coefficients in solutions, J. Chem. Phys., 48, 120-127 (1968).

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21. F. H. Stillinger, Jr., and A. Ben-Naim, Relation between local structure and thermodynamic properties in aqueous fluids, *J. Phys. Chem.*, 73, 900-907 (1969).
22. A. Ben-Naim, Hole and particle distribution in water, *J. Chem. Phys.*, 50, 404-407 (1969).
23. R.A. Lovett and a. Ben-Naim, One dimensional model for aqueous solutions of inert gases, *J. Chem. Phys.*, 7, 3108-3119 (1969)
24. A. Ben-Naim, Statistical Mechanical Theory of Liquid Water, Proceedings of a Symposium on "Structure and Physical-Chemical Properties of Water," Florence, Italy (1969).
25. A. Ben-Naim, Application of an approximate Percus-Yevick equation for liquid water, *J. Chem. Phys.*, 52, 5531-5541 (1970).
26. A. Ben-Naim, On the partial molar heat capacity of non-polar gases in aqueous solutions, *Trans Faraday Soc.*, 66, 2749-2760 (1970).
27. A. Ben-Naim, Statistical mechanical study of hydrophobic interaction, Part I: Interaction between two identical non-polar solute particles, *J. Chem. Phys.*, 54, 1387-1404 (1971).
28. A. Ben-Naim, Statistical Mechanics of "water-like" particles in Two Dimensions, Part I: Interaction between two identical non-polar solute particles, *J. Chem. Phys.*, 54, 3682-2695 (1971).
29. A. Ben-Naim, Statistical mechanical study of hydrophobic interaction, Part II: Interaction among a set of M identical spherical and non-polar solute particles, *J. Chem. Phys.*, 54, 3696-3711 (1971).
30. A. Ben-Naim and F.H. Stillinger, Jr., Aspects of the statistical-mechanical theory of water, in: Water and Aqueous Solutions (R.A. Horne, ed.), chapter 8, pp. 295-330, Wiley Sons, New York (1972).
31. A. Ben-Naim, Thermodynamics of dilute aqueous solutions of non-polar solutes, in: Water and Aqueous Solutions (R.A. Horne, ed.), Chapter 11, pp. 425-467, Wiley Sons, New York (1972).
32. A. Ben-Naim, Simulation of hydrophobic interaction in a two dimensional system, *Chem. Phys. Letters*, 11, 389-392 (1971).
33. A. Ben-Naim, Can hydrogen bonds be formed by the addition of a solute to a hydrogen-bonded solvent? *Chem. Phys. Letters*, 13, 406-408 (1972).
34. A. Ben-Naim, Mixture-model approach to the theory of classical fluids, Part I,

- J. Chem. Phys., 56, 2865-2859 (1972).
35. A. Ben-Naim, Mixture-model approach to the theory of classical fluids, Part II: Application to liquid water, J. Chem. Phys., 57, 3605-3612 (1972).
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 38. A. Ben-Naim, Application of statistical mechanics in the study of liquid water, in: Water: A Comprehensive Treatise, the Physics and Physical Chemistry of Water, (F. Franks, ed.), Vol. I, Chapter 11, Plenum Press, New York (1972).
 39. A. Ben-Naim, Molecular theories and models of water and dilute aqueous solutions in: Water: A Comprehensive Treatise, the Physics and Physical Chemistry of Water, (F. Franks, ed., Vol. 11, Chapter II, Plenum Press, New York (1972).
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 41. A. Ben-Naim, Statistical mechanics of "water-like" particles in two dimensions, Part II: One component system, Molecular Physics, 24, 705-721 (1972).
 42. A. Ben-Naim, Statistical mechanics of "water-like particles in two dimensions, Part III: Two component system, hydrophobic interactions, Molecular Physics, 24, 723-733 (1972).
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- 6535-6555 (1973).
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 53. A. Ben-Naim, Aspect of molecular theories of water, a lecture in the 8th International Conference on the Properties of Water and Steam, Hyeres-Giens, France, pp. 911-917 (September 1974).
 54. A. Ben-Naim, Solubility, hydrophobic interaction and structural changes in the solvent, in: Chemistry and Physics of Aqueous Gas Solutions, (W. Adams. ed.), Electrochemical Society (1975).
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- to the water-ethanol system, J. Chem. Phys., 67, 4884-4890 (1977).
63. A. Ben-Naim, Hydrophobic interaction, Phys. Chem. Liq., 7, 375-385 (1977).
 64. A. Ben-Naim, Statistical mechanics of aqueous fluids, in: Progress in Liquid Physics (C.A. Croxton, ed.) pp. 429-453, Wiley, New York (1978).
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 66. A. Ben-Naim, A simple model for demonstrating the relation between solubility, hydrophobic interaction and structural changes in the solvent, J. Phys. Chem., 82, 874-885 (1978).
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 70. J. Wilf and A. Ben-Naim, Intramolecular hydrophobic interaction in light and heavy water, J. Chem. Phys., 70, 3079-3081 (1979).
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 75. A. Ben-Naim, Hydrophobic interactions and structural changes in the solvent, Proceedings of the V International Symposium on Solute-Solute-Solvent Interactions, Florence, Italy, 1980, Inorg. Chem. Acta Letters, 40, 35 (1980).
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- International Symposium on Solution Behavior of Surfactants, June 1980 in Potsdam, New York (E.J. Fendler and K.L. Mittal., eds.), Plenum Press, New York (1982).
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8. Thermodynamics and Statistical Mechanics based on Information Theory.