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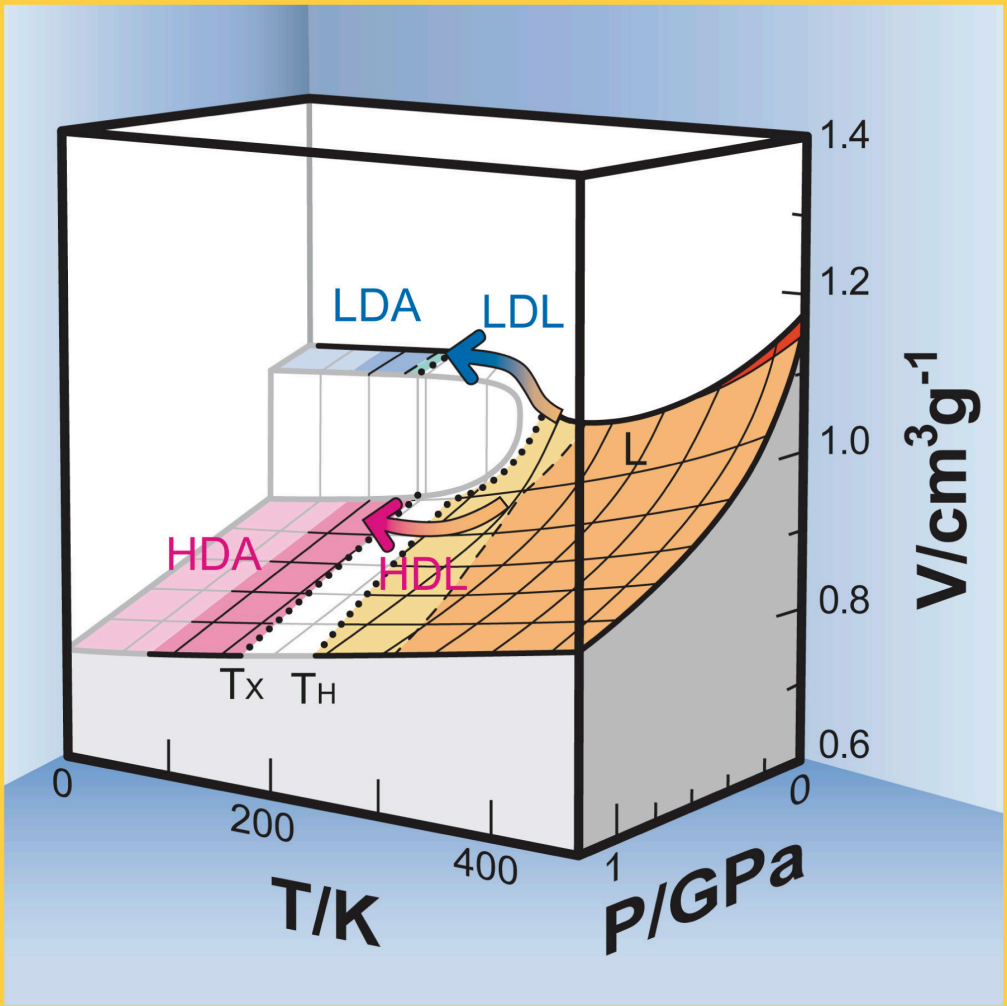

Pressure–Volume–Temperature Equation of State of H_2O from Decompression-Induced Melting of Ice IV
(see page 5A)

H. Eugene Stanley Festschrift

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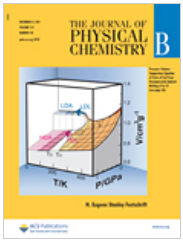

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About the Cover:
Pressure-volume-temperature equation of state of H_2O from decompression-induced melting of ice IV. The cover—courtesy of Dr. Osamu Mishima, National Institute for Materials Science, Tsukuba—shows the complete pressure-volume-temperature equation of state obtained from experiments. The region displaying a liquid-liquid phase transition, terminating at a liquid-liquid critical point, was obtained from decompression-induced melting of ice IV (*Nature* **1998**, *392*, 164). This special issue was organized by Guest Editors Pablo G. Debenedetti and Sharon C. Glotzer.

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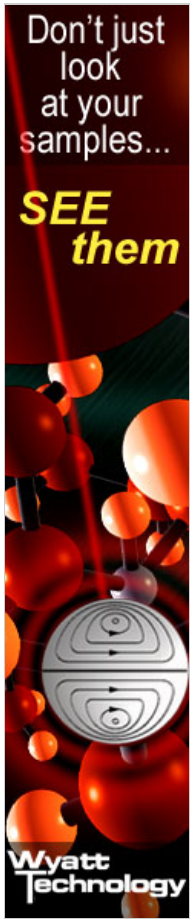

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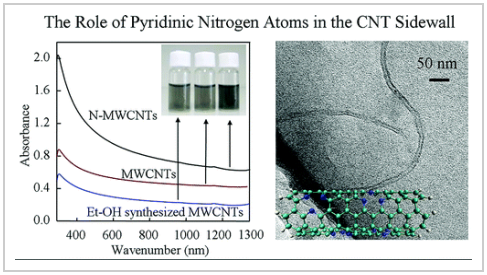

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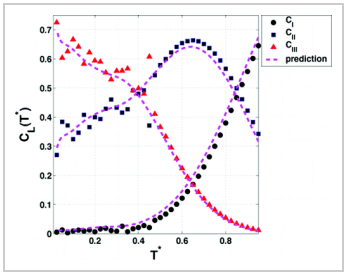

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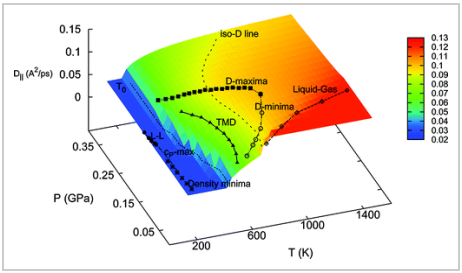

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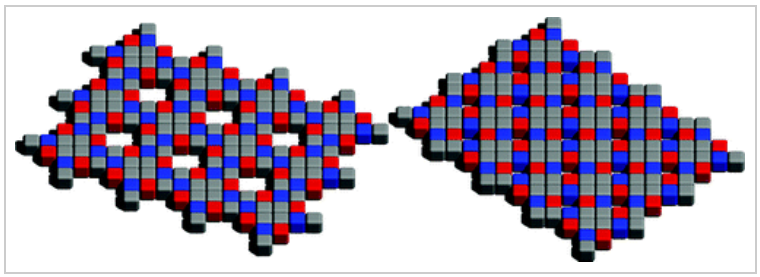

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THE JOURNAL OF PHYSICAL CHEMISTRY B

SPECIAL ISSUE PREFACE

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Tribute to H. Eugene Stanley

This issue of the *Journal of Physical Chemistry B* is dedicated to H. Eugene (Gene) Stanley, William Fairfield Warren Distinguished Professor and Professor of Physics, Chemistry, Biomedical Engineering, and Physiology at Boston University. The scope of Gene Stanley's research accomplishments is virtually unparalleled in the physical sciences. In more than 1000 publications, he has made groundbreaking contributions to the fundamental understanding of phase transitions, critical phenomena, polymers, biological materials, protein aggregation, the statistics of DNA sequences, econophysics, granular materials, physical and social networks, and especially supercooled and glassy water. With nearly 48,000 citations to his journal articles (109 of them with more than 109 citations) and over 8000 citations to his books, Gene's work has had enormous impact across many fields of science.

Gene's contributions in condensed matter theory include his important early work on the two-dimensional Heisenberg ferromagnet[1] and the spherical model,[2] as well as subsequent fundamental studies of percolation[3] and dendritic crystal growth.[4] He has fruitfully applied scaling concepts that underlie the theory of critical phenomena to biology, discovering long-range correlations in noncoding nucleotide sequences in DNA[5] and long-ranged anticorrelations in sequences of human heartbeats;[6] to economic systems, showing that the dynamics of the Standard & Poor's 500 economic indicator can be described as a Lévy stable process;[7] and to medicine, demonstrating scaling behavior in the size distribution of neuropathological lesions in Alzheimer disease.[8] His work on networks, both physical and social, has led to deep insights on topics ranging from the web of human sexual contacts[9] to urban growth patterns[10] and from the general scaling properties of networks[11] to the catastrophic failure of power grids.[12]

Along with a select group of scientists including Austen Angell, Osamu Mishima, and the late Erwin Mayer, Gene has helped to define the boundaries of contemporary knowledge on metastable water at low temperatures. In more than three decades of pioneering work, he has been the originator of the picture of water as a transient gel, and of the liquid−liquid phase transition hypothesis for the phase behavior of cold, metastable water. Because of water's unique importance, this body of work has far-reaching implications in biology, astrophysics, materials science, and the technology of low-temperature preservation of biological molecules. In 1979, Gene proposed a model that has had lasting impact on the understanding of supercooled water.[13] In this model, correlations between density, energy, and entropy fluctuations arising from the formation of hydrogen bonds give rise, at low temperatures, to anomalous increases in the response functions, such as those observed experimentally in supercooled water. This model, which was subsequently discussed in detail in a now-classic paper with José Teixeira,[14] provided the first molecular-based interpretation of the anomalous properties of supercooled water (sharp increase of response functions upon cooling), which had been discovered by Angell and co-workers a few years before. For more than a decade, the Stanley−Teixeira correlated site percolation model, together with Speedy's stability-limit conjecture[15] set the terms of the debate on the interpretation of supercooled water's thermodynamic behavior.

In a series of highly influential papers beginning in 1992, Gene and his co-workers proposed the fascinating hypothesis that, at sufficiently low temperatures, pure water phase-separates into two distinct forms. According to the liquid−liquid phase transition hypothesis, the two low-temperature phases are the liquid analogues of the two experimentally observed distinct glassy phases of water, known as LDA (low-density amorphous ice) and HDA (high-density amorphous ice).[16] Two papers from among this body of work deserve special mention: the 1992 molecular dynamics study of supercooled and glassy water, where the liquid−liquid transition hypothesis was first formulated,[17] and the 1998 paper with Mishima,[18] which, in a veritable experimental *tour de force* (measuring the metastable melting curve of a high-pressure polymorph of ice), provided evidence consistent with the liquid−liquid transition hypothesis.

The liquid−liquid phase transition hypothesis remains a subject of active inquiry and vigorous debate. In addition to providing a plausible (but not proved) interpretation of experimental observations on supercooled and glassy water, it has also opened up an entirely new field of research, which has come to be

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known as liquid polyamorphism. This refers to the possibility of first-order phase transitions between disordered phases in pure liquids. According to this viewpoint, the observed phase transition between LDA and HDA is the structurally arrested manifestation of an underlying equilibrium liquid−liquid transition between two distinct forms of liquid water. The implications of this hypothesis are truly far-reaching, and have had a major impact on theoreticians and experimentalists interested in the liquid and vitreous states of matter.

In addition to his influence as a creative scientist, Gene has had an enormous impact on the education of generations of physicists, chemists, and engineers, who have learned about phase transitions through his classic book "*Introduction to Phase Transitions and Critical Phenomena*".[19] Cited more than 3700 times, this book remains, forty years since its writing, an unusually clear, elegant, and informative introduction to this vast and foundational topic. Gene has coauthored several other books, on topics ranging from fractal forms to an introduction to theoretical physics, attesting to his passion for the transmission, as much as for the creation, of knowledge.

No account of Gene Stanley's accomplishments would be complete without mentioning his extraordinary qualities as a caring and supportive mentor of the more than 80 students who have completed their Ph.D. thesis under his supervision, his unique ability to establish fruitful collaborations and lasting friendships with scientists from across the world, his tireless support of women in science, and his lifelong dedication to human rights. These aspects of Gene's work were recognized through the American Physical Society's 2003 Nicholson Medal for Human Outreach.

Gene Stanley's research accomplishments have earned him numerous honors. Three among them merit special mention: the International Union of Pure and Applied Physics' Boltzmann Medal (2004), his election to the National Academy of Sciences (2004), and the American Physical Society's Lilienfeld Prize (2008). In addition, he is the recipient of *Honoris Causa* Doctorates from Bar-Ilan University, Eötvös University, the University of Dortmund, the University of Liege, Wroclaw University, Northwestern University, and the University of Messina. This volume, for which we are privileged to serve as Guest Editors, honors Gene Stanley on the happy occasion of his 70th birthday.

Pablo G. Debenedetti

Department of Chemical and Biological Engineering, Princeton University

Sharon C. Glotzer

Department of Chemical Engineering, University of Michigan

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THE JOURNAL OF PHYSICAL CHEMISTRY B

SPECIAL ISSUE PREFACE

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Autobiography of H. Eugene Stanley

Many autobiographies reveal less about the author and more about the imaginations of the author. However, an autobiography can, at the least, begin with facts. I was born 70 years ago in Norman, Oklahoma, to Ruth and Harry Stanley who, at the time, were 19 and 18, respectively. They were engaged in their undergraduate studies in physics and chemistry at the University of Oklahoma. As a consequence, while my mother was in classes, I was cared for by my maternal grandmother who had abandoned her dream of a law degree to devote herself to her husband and their four children.

A home of loving adults had a profound and lasting effect on me: I resonated to their affection, and I also responded to the stern Oklahoma values instilled in me. These can perhaps best be summed up as "obey the Ten Commandments—or else". I will not define exactly what "or else" means, but overall, I have turned out to value ethics in myself and in others.

My grandmother's father had arrived penniless from Switzerland, and became a Sooner. Let me explain. At 12 noon on April 22, 1889, 50,000 aspirants lined up along the borders of Oklahoma, each believing himself to be legally entitled to 160 acres of the only two million acres available. However, my grandmother's father knew how to perform division, and realized that the odds of his obtaining 160 acres were low. To claim the land parcel, all aspirants were to start at exactly the same time. Sooners were those who found clever ways to enter before noon —a little "too soon." A Sooner is now defined to be "an energetic individual who travels ahead of the human procession, prosperous, ambitious, competent, a can-do individual".

My grandmother's father succeeded in claiming a fertile piece of land but soon thereafter died of typhoid fever when my grandmother was only four years old. Her widowed mother and her two sisters, after running the ranch for ten years, traveled in a covered wagon to Norman—choosing Norman because Norman hosted the state university. Thus, she learned at a very young age that she was expected to earn a university degree. And I learned from this story that expressing high expectations at a young age can be of critical importance. In fact, all ten of her grandchildren earned university degrees and most earned doctorates.

My grandmother always lived up to her principles, returning to study at Oklahoma University when she became widowed at age 66, earning a law degree at 70, and then practicing law for a significant fraction of her remaining 26 years. Indeed, her mind remained perfectly sharp until age 96. She loved to ask me to explain the research questions I was addressing, and often offered me insights that none of my younger colleagues had expressed. Despite having only one functioning eye, she saw everything—especially my driving antics, such as being unable to notice that a stop light had abruptly turned from green to yellow to red. At age 90, she flew to Boston and I proudly introduced her as a practicing lawyer to my Dean. He took one look at us and exclaimed "Gene, does this mean we must keep you into your 90s?"

After my parents graduated in 1943, my father expected to be sent to fight in World War II. Fortunately, he was offered the opportunity to work for the DuPont Corporation, which had wartime contracts for many aspects of atomic bomb development. We left our stable Oklahoma nest and lived at 17 addresses in as many different cities—in every corner of the USA, from Oak Ridge, Tennessee, to Richland, Washington. I longed for my "home of four loving adults", which had abruptly been replaced by an endless sequence of meeting literally hundreds of completely new friends with drastically different accents. Often I could not understand a single word, nor could they understand my Oklahoma accent. To this day, I unconsciously imitate the accent of whomever I am talking with, so Irish-Americans sometimes imagine I am Irish and German-Americans that I am German.

Perhaps as a result of the 17 addresses, I developed my own personal strategy for success: do *not fail*—assuming that, if I did not fail, then by definition I would be succeeding. So when I failed to earn tenure at MIT after seven years of "striving to not fail", I was ashamed to tell my grandmother—or anyone else.

Then followed the best luck of my entire professional life: a tenured appointment offer at Boston University which was characterized by academic excellence spread across many more disciplines than one found at MIT, and had the additional advantage of being located in the "Athens of America". I was offered all the advantages of MIT without the disadvantages. Now I realize MIT was perhaps correct to deny me tenure: In my seven years struggling for tenure, I had failed to live up to the promise shown when I first joined the faculty at age 28.

My students and my colleagues at Boston University have treated me magnificently for 35 years, and I have come to respect, indeed to love, many of them. I now regard my MIT rejection as an example of what my grandmother called "*a blessing in disguise*", since I became determined to demonstrate that I had the Sooner talents as well as a dose of creativity. My grandmother thought in big ambitious strokes, and two of her personal mottos were *hitch your wagon to a star* and *where there is a will there is a way*. These motivated me to take maximum advantage of the benefits of a tenured appointment by thinking about potentially significant scientific questions, and more importantly, perhaps, to no longer worry so much about the consequences of failure.

I had already learned the ectasy of discovering something completely new in the course of my initial graduate research as the only student in the Cologne lab of Max Delbrück. From Max, I also learned how to "do science". Max had very high standards for everything he undertook, from scientific thinking to scientific communication. In particular, Max was internationally notorious for opening his newspaper in seminars whenever a speaker started to become unclear. In 1962, his longtime friend Niels Bohr (who had welcomed Max in his lab when he fled Nazi Germany) visited our lab to give a seminar. Bohr entered my lab the night before his presentation, restless. We discussed many topics. By far the most memorable was when Bohr expressed his anxiety that he might not get through delivering his talk before seeing Max reach for his newspaper. Max did not, although no

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one in the room seemed to understand Bohr's talk—including Max. I thereby learned another lesson: *Respect a great human being enough to set aside your own personal habits*.

After one year, my Fulbright Fellowship expired, and I returned to the USA. I matriculated at Harvard. Harvard had too many Ph.D. physics students at the time, and my official thesis adviser, John Van Vleck, did not object if I worked off-campus. I was extremely fortunate that Tom Kaplan at the MIT Lincoln Lab invited me to put my desk in his own office. And so I learned from Tom exactly as a "baby chick learns from the mother hen".

Like my grandmother, Tom incessantly asked, and encouraged me to ask, the simplest questions possible. When I discovered striking evidence that the two-dimensional Heisenberg and XY models of a magnet display a phase transition, Tom worked very closely with me to understand how that might be true—especially in light of the universally believed arguments that there is no spontaneous magnetization in two dimensions. Tom and I realized that these arguments do not rule out a phase transition but only a conventional transition to a state with nonzero magnetization. I delivered a "student seminar" on our unpublished work at the 1966 Brandeis Summer School. Immunized by the experience of Bohr, I rehearsed nonstop for several days in advance. In the audience was Freeman Dyson, who instead of pulling out his newspaper quizzed me incessantly and then that very night produced an elegant formulation of what later developed into the Berezhinskii−Kosterlitz−Thouless theory. When Freeman showed me his work the next morning, he also invited me to help write it up for publication. Respecting the Ten Commandments, I declined. It was Dyson's idea, not mine, although he almost convinced me that I could legitimately earn co-authorship by mathematically checking his argumentation and numerically confirming the results. Sadly, Dyson never published his own insightful ideas.

At that time, no one in the entire physics community, except Dyson, believed that any continuous spin system could display a phase transition in two dimensions. I wanted to spend my life as a scientist, not as a lunatic chasing rainbows. So I focused on more conventional topics for several years, and then watched with a mixture of satisfaction and dismay as the field of two-dimensional physics, which I had triggered but then cowardly abandoned, began to flourish shortly later. Thereby I learned another lesson: *Do not cave under the pressure of widespread skepticism*.

The two-dimensional magnetism experience vaccinated me against "popularity" tests for the validity—or not—of a new idea. I vowed *Never abandon a new idea until I became convinced it was rubbish*.

Some ideas over the years have been closer to rubbish than the notion of a two-dimensional phase transition. One idea—that noncoding "junk DNA" is not simply coding DNA that is no longer needed—we proved by demonstrating that the junk DNA has long-range power law correlations in its sequence of base pairs while coding DNA does not. Despite a flurry of attacks immediately after our group's 1992 *Nature* article, this hypothesis is proving to be correct and, moreover, of considerable biological significance. The jury is still out concerning our second DNA result, that the statistical properties of noncoding DNA are indistinguishable from those of a language—a tantalizing fact, since merely coding for amino acids is insufficient to pass all necessary genetic information to offspring.

A number of other hypotheses have in fact proven to be correct, in fields as diverse as econophysics, granular matter, interdependent networks, and the "first three minutes" of Alzheimer disease. One hypothesis about which there is perhaps the most current controversy is that single-component liquids with two length scales in their interaction potential—such as the tetrahedral liquids water, silicon, and silica—can display at sufficiently low temperatures a novel and unexpected "liquid−liquid" phase transition. A number of very recent experiments seem to tilt the balance in favor of this hypothesis.

Throughout my student career, I was active in protests against various injustices in the world. My physical protests ended during my postdoctoral year at Berkeley, when I instantly became a coward after being hit in the face by a buckshot from a police gun. I protested, but this time without physical violence, the treatment of those attempting to emigrate from the Soviet Union. My work reached a tipping point in 1973 when I organized the first "Sunday seminar" in the home of Sasha Voronel and as a result was declared a national *persona non grata*. A very moving event was co-organizing, after the Soviet Union collapsed, a 2001 Volga River conference on liquid water at which my Russian co-organizers presented me with a bottle of cognac with my own photograph emblazoned on the label. The Soviet experiences are over, but my activism continues. An activist never stops protesting perceived injustices. For the past 20 years, I have attempted, by various strategies and aided by generous funding from l'Oreal and UNESCO, to break down the barriers that have restricted the representation of women in professional physics to a deplorable ten percent—no better than 70 years ago when my courageous mother was the only woman physics major in her university physics department.

An autobiography would not be honest if it did not emphasize the degree to which I have been immensely dependent on many others—personally to my close family members, and professionally to over 500 collaborators for sharing their clever ideas and for doing much of the hard work necessary to develop them. Thanks to so many on whom I have depended, I have achieved a good reputation, and I always say the truth: it is the work of my collaborators, not me, that has started new fields of research. I now live by a new motto verbalized so well by Shakespeare in his play *Othello*:

Who steals my purse, steals trash

Twas mine, twas his, and will be the slave of thousands

But he who filches from me my good name

Steals that which not enriches him, but leaves me poor indeed

Successful I may be, at least in the eyes of some. However, I am not satisfied, for I continue to seek two forms of personal joy. One is to continue for the rest of my life to share in the discovery of something entirely new. The other is to meet the needs of my family and my co-workers. The greatest obstacle to my inner peace and genuine happiness is the persistent realization that I have not yet found how to consistently walk the tortuous path whereby both joys can be simultaneously experienced.

H. Eugene Stanley

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Colleagues of H. Eugene Stanley

Ph.D. Theses Supervised

Gerald Paul, 1971
Sava Milos Milošević, 1971
Koichiro Matsuno, 1971
Judith Herzfeld, 1972
Alexander Maurice Alers Hankey, 1972
Richard A. C. Krasnow, 1973
David Noel Lambeth, 1973
Fredric Ira Harbus, 1973
Douglas Karo, 1973
Chiu Shuen Hui, 1973
Kenneth J. Rothschild, 1973
Luke Lokia Liu, 1974
Rama Daga Bansil, 1975
Samuel A. Ellias, 1975 [with S. Grossberg]
Jeffrey F. Nicoll, 1975
George F. Tuthill, 1975
Sidney Redner, 1977
Peter J. Reynolds, 1978
Hisao Nakanishi, 1980
Agustin Gonzalez, 1981
Alla Margolina, 1983
Edward T. Gawlinski, 1983
Imtiaz Majid, 1984
Zorica Djordjevic, 1984
Daniel Hong, 1985
Cettina Amitrano, 1988 [with A. Coniglio]
Pierre Devillard, 1989
Robin L. Blumberg Selinger, 1989
Dimitris Stassinopoulos, 1990
Jysoo Lee, 1991
Frank Caserta, 1991
Peter H. Poole, 1992
Mariela Araujo, 1992
Greg Huber, 1992
Sharon C. Glotzer, 1993
Chung-Kang Peng, 1993
Hernan Larralde, 1993
Srikanth Sastry, 1993
Sona Prakash, 1993
Stefan Schwarzer, 1993
Albert-László Barabási, 1994
Luis A. N. Amaral, 1995
Veronica Johow, 1995
Hernan A. Makse, 1997
Gandhi Viswanathan, 1997
Steven T. Harrington, 1997
Stefano Zapperi, 1998
Reza Sadr, 1998
Plamen Ivanov, 1998
Francis W. Starr, 1999
Nikolay V. Dokholyan, 1999
Yanhui Liu, 1999
Ivo Grosse, 2000
Vivienne Plerou, 2001
Parameswaran Gopikrishnan, 2001
Antonio Scala, 2001
Emilia La Nave, 2002
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Shouyong Peng, 2005
Sameet Sreenivasan, 2006
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Dongfeng Fu, 2007
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S.M. Theses Supervised

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Marc Goldring Belfer
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John Compton
Joseph N. Fields, III
Reid H. Hansen
Michael Leon Jennings
Stephen H. Kinney, Jr.
C. C. Lo
Richard M. Lucash
David Lars Njus
Charles E. Smith
Janet Debra Stoltz
Brian Tokar

Research Associates and Visiting Scholars

M. Howard Lee
Ruth Ditzian-Kadanoff
Chikao Kawabata
Thomas C. Chang
George D. J. Phillies
Irwin M. Asher
Jos Rogiers
Vitold E. Yurkevich
William Klein
Antonio Coniglio
Alan Brown
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Pablo Jensen
Peter Ossadnik
Luis Amaral
Paul Trunfio
Arieh Ben-Naim
Thadeu Penna
Brigita Kutnjak-Urbanc
Youngki Lee
Marc Barthelémy
Dietrich Wolf
Pedro Bernaola
Giancarlo Franzese
Alessandro Chessa
Bernd Rosenow
Marcia Barbosa
Paulo Netz
Gerald Paul
Toshihiro Tanizawa
Kazuko Yamasaki
Jan Nagler
Philipp Weber
Gennady Genkin
Nelido Gonzalez-Segredo
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Fereydoon Family
Mohamed Daoud
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Zeev Alexandrowicz
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Ivan P. Fittipaldi
Roberto dos Santos
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Francois Leyvraz
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John L. Cardy
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Francisco Sales
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Lidia Braunstein
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Curriculum Vitae of H. Eugene Stanley

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Birth

March 28, 1941, in Oklahoma City, Oklahoma

Education

B.A., Physics, 1962, Wesleyan University
Ph.D., Physics, 1967, Harvard University (T. A. Kaplan and J. H. Van Vleck, advisors)

Professional Appointments

Research Associate, M.I.T., Lincoln Laboratory, 1967−1969
Miller Fellow, (Charles Kittel, Supervisor), Univ. Calif., Berkeley, 1968−1969
Assistant Professor of Physics, M.I.T., 1969−1971
Associate Professor of Physics, M.I.T., 1971−1976
Herman von Helmholtz Assoc. Prof. of Health Sciences & Tech., M.I.T., 1973−1976
Professor of Physics, Boston University, 1976−
Director, Center for Polymer Studies, Boston University, 1978−
Professor of Physiology, Boston University School of Medicine, 1978−
Joliot Curie Visiting Professor, Ecole Supérieure de Physique et Chimie, 1979
University Professor, Boston University, 1979−2011
Honorary Professor, Eötvös Loránd University, Budapest, Hungary, 1997−
Honorary Professor, Institute for Advanced Studies, University of Pavia, 2004−
Professor of Biomedical Engineering, Boston University, 2007−
Professor of Chemistry, Boston University, 2007−
Honorary Professor, East China University of Science & Technology, 2011−
Honorary Professor, Shanghai University, 2011−
William Fairfield Warren Distinguished Professor, Boston University, 2011−
Lorentz Professor, University of Leiden, 2012

Honors and Awards

D.Sc. (hon.), Bar-Ilan University (Ramat-Gan, Israel), 1994
D.Sc. (hon.), Eötvös Loránd University(Budapest, Hungary), 1997
D.Sc. (hon.), University of Liège (Belgium), 2001
D.Sc. (hon.), University of Dortmund (Germany), 2001
D.Sc. (hon.), University of Wroclaw (Poland), 2004
D.Sc. (hon.), Northwestern University (Evanston, IL), 2009
D.Sc. (hon.), University of Messina (Italy), 2009
Julius Edgar Lilienfeld Prize, American Physical Society, 2008
Zenith Fellow Award, The Alzheimer Association (with D. B. Teplow), 2005
Elected Member, National Academy of Sciences (USA), 2004
Boltzmann Medal, Int'l. Union of Pure and Applied Physics (IUPAP), 2004
Teresiana Medal in Complex Systems Research, University of Pavia, 2004
Jury Member, "Women in Science Prize" (UNESCO/L'Oreal), 2003−present
Jury Member, "Women in USA Science Prize" (L'Oreal), 2006−present
Nicholson Medal, American Physical Society, 2003

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Elected Foreign Member, Academia Brasileira de Ciencias (Brazilian Academy of Sciences), 2002
Distinguished Teacher-Scholar Award, NSF Director's Award, 2001
Memory Ride Award for Alzheimer Research (with B. T. Hyman), 2001
David Turnbull Prize, Materials Research Society, 1998
Floyd K. Richtmyer Prize, AAPT, 1997
Honorary Member, Hungarian Physical Society, 1996
Fellow, American Association for the Advancement of Science, 1994
Massachusetts Professor of the Year, 1992
BP Venture Research Award (with J. Teixeira), 1989
Fellow, American Physical Society, 1974
John Simon Guggenheim Memorial Fellowship, 1979−1980
Choice Award for Outstanding Academic Book, 1971

Professional Activities

Ramanujan Memorial Lecture, Calcutta, 2012
John G. Kirkwood Memorial Lecture, Kanpur, 2010
Platinum Jubilee Lectures, Indian Academy of Sciences, 2009
Karlheinz Schmidt Memorial Lecture, Chiemsee, Germany, 2009
Sigma Xi National Lecturer, 2002−2003
Centennial Lecturer, American Physical Society, 1999
Eötvös Lecturer, Eötvös Loránd Univ.(Budapest, Hungary), 1997
Professor at Large, Japan Society for the Promotion of Science, 1995 and 1975
Thirtieth Saha Memorial Lecture, Calcutta, India, 1992
Fourth Bose Memorial Lecture, Calcutta, India 1992
University Lecturer, Boston University, 1991
Distinguished Visiting Lecturer, Seoul National University, 1982
Distinguished Visiting Lecturer, Peking University, 1981
Appointed, Committee of Experts, NIH Heart, Lung & Blood Inst, 2011−2013
Chair, National Academy of Sciences/Keck Futures Initiative on Complexity, 2008
NAS Committee on Forefronts of Science at the Interface of Physical and Life Sciences, 2007−2009
NAS Committee on Experimentation and Rapid Prototyping in Support of Counterterrorism, 2007−2009
NAS Committee on Role of Naval Forces in the Global War on Terror, 2005−2007
Co-Director, three Enrico Fermi Schools of Physics (Varenna, Italy): 2010, 2003, 1996
Co-Director, two NATO Adv. Res. Workshops: 2001 (Moscow), 1999 (Budapest)
Chair, Gordon Research Conference (Water and Aqueous Solutions), 1998
Co-Director, three NATO Advanced Study Institutes (Cargèse): 1990, 1988, 1985
Member, NAS Research Briefing Panel on Order, Chaos, and Patterns, 1987
Chair, IUPAP Conf. on Thermo. & Stat. Mechanics (STATPHYS-16), 1986
Physica A (Elsevier), Co-Editor-in-Chief (with Dawson, Indekeu, Parisi, and Tsallis)
Graduate Texts in Contemporary Physics (Springer), Co-Editor, 1988−2005
Partially Ordered Systems (Springer Book Series), Co-Editor

Research Interests

Aggregation, Snowflakes, and Viscous Fingering
Alzheimer's Disease: Statistical Physics and Neuroscience
DNA
Econophysics
Granular Materials
Physical and Social Networks, including Animal Motion
Percolation: Geometric Phase Transitions
Phase Transitions and Critical Phenomena
Physiology and Medicine
Surface Physics and Chemistry
Water

Science Citation Index: 55,783 citations [47,772 to articles and 8011 to books]
"Hirsch Index" H = 110 (110 papers with citation count larger than rank)

THE JOURNAL OF PHYSICAL CHEMISTRY B

SPECIAL ISSUE PREFACE

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4. K. Brecher, S. V. Buldyrev, P. Garik, S. Milosevic, H. E. Stanley, E. F. Taylor, P. A. Trunfio, *Fractals in Science* (Springer Verlag, Berlin, 1994).
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8. H. E. Stanley, E. Balcells, E. Ruiz-Geli, M. Dominguez, P. Puigdomenech, S. Rovira, O. Pibernat, J. Ros, M. J. Pico, P. Noguera, R. Salecl, H. Lieberman, J. Pigem, L. Fananas, D. Jou, L. Reales, S. Jorda, J. Scott, C. Gelabert, O. Vilarroya, M. Maso, M. Maso, J. Roca, and J. Perello, *Fora d'equilibri: encontre internacional noves fronteres de la ciencia, l'art i el pensament* (Generalitat de Catalunya Departament de Cultura i Mitjans de Comunicacio, 2008).
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