

# Francis W. Starr | Curriculum Vitæ

Physics Department – Wesleyan University – Middletown, CT 06459 USA

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## Education

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<b>Boston University</b> <i>Ph.D., Physics, Advisor: H. Eugene Stanley</i>	<b>1999</b> <i>Boston, MA</i>
<b>Boston University</b> <i>M.A., Physics</i>	<b>1999</b> <i>Boston, MA</i>
<b>Carnegie Mellon University</b> <i>B.S. with University Honors, Physics</i>	<b>1994</b> <i>Pittsburgh, PA</i>

## Appointments

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<b>Wesleyan University</b> <i>Professor, Physics Department</i>	<b>2013–present</b> <i>Middletown, CT</i>
<b>Wesleyan University</b> <i>Associate Professor, Physics Department</i>	<b>2009–2013</b> <i>Middletown, CT</i>
<b>Wesleyan University</b> <i>Assistant Professor, Physics Department</i>	<b>2003–2009</b> <i>Middletown, CT</i>
<b>National Institute of Standards and Technology (NIST)</b> <i>Deputy Director, Center for Theoretical and Computational Materials</i>	<b>2001–2003</b> <i>Gaithersburg, MD</i>
<b>National Institute of Standards and Technology (NIST)</b> <i>Physicist, Polymers Division</i>	<b>2001–2003</b> <i>Gaithersburg, MD</i>
<b>National Institute of Standards and Technology (NIST)</b> <i>N.R.C. Postdoctoral Associateship, Advisor: Sharon C. Glotzer</i>	<b>1999–2001</b> <i>Gaithersburg, MD</i>
<b>Oak Ridge National Lab</b> <i>Research Assistant, Physics Division</i>	<b>1994</b> <i>Oak Ridge, TN</i>

## Visiting Appointments

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<b>Università di Roma “La Sapienza”</b> <i>Visiting Professor, Dipartimento di Fisica</i>	<b>January 2014</b> <i>Roma, Italy</i>
<b>Università di Roma “La Sapienza”</b> <i>Visiting Professor, Dipartimento di Fisica</i>	<b>September 2010</b> <i>Roma, Italy</i>
<b>Universitat de Barcelona</b> <i>Visiting Professor, Departament de Física Fonamental</i> Master on Computational and Applied Physics program	<b>May 2009</b> <i>Barcelona, Spain</i>
<b>International Centre for Theoretical Physics</b> <i>Lecturer, College on Computational Physics</i>	<b>May-June 1997</b> <i>Trieste, Italy</i>

## Publications

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Current *h*-index: 35 (ISI Web of Science); 39 (Google Scholar)

Wesleyan student authors are starred (\*).

### Peer-Reviewed Research Articles.....

90. J. Chiu, **F. W. Starr**, and N. Giovambattista  
*Pressure-Induced Transformations in Computer Simulations of Glassy Water*  
*Journal of Chemical Physics* **129**, 184504 (2013).
89. **F. W. Starr**, J. F. Douglas, and S. Sastry  
 The Relationship of Dynamical Heterogeneity to the Adam-Gibbs and Random First-Order Transition Theories of Glass Formation  
*Journal of Chemical Physics* **138**, 12A541 (2013); Special Issue on the Glass Transition.
88. B. A. Pazmiño-Betancourt\*, J. F. Douglas, and **F. W. Starr**  
 Fragility and cooperative motion in a glass-forming polymer-nanoparticle composite  
*Soft Matter* **9**, 241-254 (2013).
87. P. Hanakata\*, J. F. Douglas, and **F. W. Starr**  
 Local Variation of Fragility and Glass Transition Temperature of Ultra-thin Supported Polymer Films  
*Journal of Chemical Physics*, **137**, 244901 (2012).
86. C. Chi, F. Vargas-Lara\*, A. Tkachenko, **F. W. Starr**, and O. Gang  
 Internal Structure of Nanoparticle Dimers Linked by DNA  
*ACS Nano* **6**, 6793-6802 (2012).
85. N. Giovambattista, T. Loerting, B. R. Lukanov\*, and **F. W. Starr**  
 Interplay of the Glass Transition and the Liquid-Liquid Phase Transition in Water  
*Nature Scientific Reports* **2**, 390 (2012).
84. V. I. Clapa\*, T. Kottos, **F. W. Starr**  
 Localization Transition of Instantaneous Normal Modes and Liquid Diffusion  
*Journal of Chemical Physics* **136**, 144504 (2012).
83. P. H. Poole, S. R. Becker\*, F. Sciortino, **F. W. Starr**  
 Dynamical Behavior Near a Liquid-Liquid Phase Transition in Simulations of Supercooled Water  
*Journal of Physical Chemistry B*, **115**, 14176-14183 (2011).
82. **F. W. Starr** and J. F. Douglas  
 Modifying Fragility and Collective Motion in Polymer Melts with Nanoparticles  
*Physical Review Letters* **106**, 115702 (2011).
81. F. Vargas Lara\* and **F. W. Starr**  
 Stability of DNA-linked nanoparticle crystals I: Effect of linker sequence and length  
*Soft Matter* **7**, 2085-2093 (2011).
80. O. Padovan-Merhar\*, F. Vargas Lara\*, **F. W. Starr**  
 Stability of DNA-Linked Nanoparticle Crystals II:  
 Effect of Surface Mobility, Number of Strands, and Core Size  
*Journal of Chemical Physics*, **134**, 244701 (2011).
79. W. Dai\*, S. K. Kumar, and **F. W. Starr**  
 Universal two-step crystallization of DNA-functionalized nanoparticles  
*Soft Matter*, **6**, 6130-6135 (2010).
78. C. W. Hsu\*, F. Sciortino, and **F. W. Starr**  
 Theoretical Description of a DNA-Linked Nanoparticle Self-Assembly  
*Physical Review Letters* **105**, 055502 (2010).
77. J. Jancar, J.F. Douglas, **F. W. Starr**, S.K. Kumar, P. Cassagnau, A.J. Lesser, S.S. Sternstein, M.J. Buehler  
 Current issues in research on structure-property relationships in polymer nanocomposites

- Feature Article in *Polymer*, **51**, 3321-3343 (2010).  
Article featured on the cover of the July 8, 2010 issue.
76. S. T. Knauert\*, J. F. Douglas, and **F. W. Starr**  
[Morphology and Transport Properties of Two-Dimensional Sheet Polymers](#)  
*Macromolecules* **43**, 3438-3445 (2010).  
Article featured on the cover of the April 13, 2010 issue.
75. J. L. Rivera and **F. W. Starr**  
[Rapid Transport of Water via a Carbon Nanotube Syringe](#)  
*Journal of Physical Chemistry C*, **114**, 3737-3742 (2010).
74. W. Dai\*, C. W. Hsu\*, F. Sciortino, and **F. W. Starr**  
[Valency Dependence of Polymorphism and Polyamorphism in DNA-Functionalized Nanoparticles](#)  
*Langmuir* **26**, 3601-3608 (2010).
73. L. Xu, F. Mallamace, Z. Yan, **F. W. Starr**, S. V. Buldyrev, and H. E. Stanley  
[Appearance of a Fractional Stokes-Einstein Relation in Water and a Structural Interpretation of Its Onset](#)  
*Nature Physics*, **5**, 565-569 (2009).
72. C. W. Hsu\* and **F. W. Starr**  
[Interpenetration as a Mechanism for Liquid-Liquid Phase Transitions](#)  
*Physical Review E* **79**, 041502 (2009).
71. C. W. Hsu\*, J. Largo, F. Sciortino, **F. W. Starr**  
[Hierarchies of networked phases induced by multiple liquid-liquid critical points](#)  
*Proceedings of the National Academy of Sciences of the USA* **105**, 13711-13715 (2008).
70. A. J. Rahedi\*, J. F. Douglas, and **F. W. Starr**  
[Model for Reversible Nanoparticle Assembly in a Polymer Matrix](#)  
*Journal of Chemical Physics*, **128**, 024902 (2008); also selected to appear in the *Virtual Journal of Nanoscale Science & Technology* and the *Virtual Journal of Biological Physics Research*.
69. J. L. Rivera, J. L. Rico, and **F. W. Starr**  
[Interaction of Water with Cap-Ended Defective and Non-Defective Small Carbon Nanotubes](#)  
*Journal of Physical Chemistry C*, **111**, 18899-18905 (2007).
68. M. G. Mazza, N. Giovambattista, H. E. Stanley, and **F. W. Starr**  
[Connection of translational and rotational dynamical heterogeneities with the breakdown of the Stokes-Einstein and Stokes-Einstein-Debye relations in water](#)  
*Physical Review E* **76**, 031203 (2007); also selected to appear in the *Virtual Journal of Biological Physics Research*, **14** (2007).
67. S. T. Knauert\*, J. F. Douglas, and **F. W. Starr**  
[The Effect of Nanoparticle Shape on Polymer-Nanocomposite Rheology and Tensile Strength](#)  
*Journal of Polymer Science Part B: Polymer Physics* **45**, 1882-1897 (2007).  
Chosen by editors as a Highlight Article.
66. P. Kumar, S. V. Buldyrev, S. R. Becker\*, P. H. Poole, **F. W. Starr**, and H.E. Stanley  
[Breakdown of the Stokes-Einstein Relation in Supercooled Water](#)  
*Proceedings of the National Academy of Sciences of the USA* **104**, 9575-9579 (2007).
65. J. Largo, **F. W. Starr**, and F. Sciortino  
[Self-assembling DNA dendrimers: A numerical study](#)  
*Langmuir* **23**, 5896-5905 (2007).
64. P. Kumar, **F. W. Starr**, S. V. Buldyrev, and H. E. Stanley  
[Effect of water-wall interaction potential on the properties of nanoconfined water](#)  
*Physical Review E* **75**, 011202 (2007); also selected to appear in the *Virtual Journal of Nanoscale Science & Technology* (2007).

63. J. L. Rivera, **F. W. Starr**, P. Paricaud, and P. T. Cummings  
[Polarizable contributions to the surface tension of liquid water](#)  
*Journal of Chemical Physics* **125**, 094712 (2006).
62. S. R. Becker\*, P. H. Poole, and **F. W. Starr**  
[Fractional Stokes-Einstein and Debye-Stokes-Einstein relations in a network forming liquid](#)  
*Physical Review Letters* **97**, 055901 (2006).
61. **F. W. Starr** and F. Sciortino  
[Model for Assembly and Gelation of Four-Armed DNA Dendrimers](#)  
Letter, *Journal of Physics: Condensed Matter* **18**, L347-L353 (2006).  
Chosen by editors for the IoP Select collection of journal articles.
60. M. Mazza, N. Giovambattista, **F. W. Starr**, and H. E. Stanley  
[Relation between Rotational and Translational Dynamic Heterogeneities in Water](#)  
*Physical Review Letters* **96**, 057803 (2006).
59. P. Kumar, S.V. Buldyrev, **F. W. Starr**, N. Giovambattista, and H.E. Stanley  
[Thermodynamics, Structure, and Dynamics of Water Confined between Hydrophobic Plates](#)  
*Physical Review E* **72**, 051503 (2005).
58. J. C. Conrad, **F. W. Starr**, D. A. Weitz  
[Weak Correlations between Local Density and Dynamics near the Glass Transition](#)  
*Journal of Physical Chemistry B* **109** 21235-21240 (2005).
57. N. Giovambattista, S. V. Buldyrev, H. E. Stanley, and **F. W. Starr**  
[Clusters of mobile molecules in supercooled water](#)  
*Physical Review E* **72**, 011202 (2005).
56. Y. Gebremichael, M. Vogel, M. Bergroth, **F. W. Starr**, and S. C. Glotzer  
[Spatially Heterogeneous Dynamics and the Adam-Gibbs Relation in the Dzugutov Liquid](#)  
*Journal of Physical Chemistry B* **109**, 15068-15079 (2005).
55. N. Giovambattista, M. G. Mazza, S. V. Buldyrev, **F. W. Starr**, and H. E. Stanley  
[Dynamic heterogeneities in supercooled water](#)  
*Journal of Physical Chemistry B*, **108**, 6655-6662 (2004).
54. **F. W. Starr**, J. F. Douglas, and S. C. Glotzer  
[Origin of Particle Clustering in a Simulated Polymer Nanocomposite and its Impact on Rheology](#)  
*Journal of Chemical Physics* **119**, 1777-1788 (2003); also selected to appear in the *Virtual Journal of Nanoscale Science & Technology* **8** (2003).
53. N. Giovambattista, S. V. Buldyrev, **F. W. Starr**, and H. E. Stanley  
[Connection between Adam-Gibbs Theory and Spatially Heterogeneous Dynamics](#)  
*Physical Review Letters* **90**, 085506 (2003).
52. **F. W. Starr**, C. A. Angell, and H. E. Stanley  
[Prediction of entropy and dynamic properties of water below the homogeneous nucleation temperature](#)  
*Physica A* **323**, 51-66 (2003).
51. M. Aichele, Y. Gebremichael, **F. W. Starr**, J. Baschnagel, and S. C. Glotzer  
[Stringlike correlated motion in the dynamics of supercooled polymer melts](#)  
*Journal of Chemical Physics* **119**, 5290-5304 (2003).
50. N. Lačević, T. B. Schrøder, **F. W. Starr**, and S. C. Glotzer  
[Spatially heterogeneous dynamics investigated via a time-dependent four-point density correlation function](#)  
*Journal of Chemical Physics* **119**, 7372-7387 (2003).
49. **F. W. Starr**, C. A. Angell, E. La Nave, S. Sastry, A. Scala, F. Sciortino, and H. E. Stanley  
[Dynamics of deeply supercooled water](#)  
*Biophysical Chemistry* **105**, 573-583 (2003).

48. **F. W. Starr**, S. Sastry, J. F. Douglas, and S. C. Glotzer  
[What do we learn from the local geometry of glass-forming liquids?](#)  
*Physical Review Letters* **89**, 125501 (2002).
47. N. Giovambattista, **F. W. Starr**, F. Sciortino, S. V. Buldyrev and H. E. Stanley  
[Transitions between Inherent Structures in Water](#)  
*Physical Review E* **65**, 041502 (2002).
46. P. A. Netz, **F. Starr**, M. C. Barbosa, and H. E. Stanley  
[Translational and rotational diffusion in stretched water](#)  
*Journal of Molecular Liquids* **101**, 159-168 (2002).
45. **F. W. Starr**, T. B. Schrøder, and S. C. Glotzer  
[Molecular dynamics simulation of a polymer melt with a nanoscopic particle](#)  
*Macromolecules* **35**, 4481-4492 (2002).
44. N. Lačević, **F. W. Starr**, T. B. Schrøder, V. N. Novikov, and S. C. Glotzer  
[Growing correlation length on cooling below the onset of caging in a simulated glass-forming liquid](#)  
Rapid Communication, *Physical Review E* **66**, 030101 (2002).
43. **F. W. Starr**, S. Sastry, E. La Nave, A. Scala, H. E. Stanley, and F. Sciortino  
[Thermodynamic and structural aspects of the potential energy surface of simulated water](#)  
*Physical Review E*, **63**, 041201 (2001).
42. P. A. Netz, **F. W. Starr**, H. E. Stanley, and M. C. Barbosa  
[Static and dynamic properties of stretched water](#)  
*Journal of Chemical Physics* **115**, 344-348 (2001).
41. **F. W. Starr**, T. B. Schrøder, and S. C. Glotzer  
[Effects of a nanoscopic filler on the structure and dynamics of a simulated polymer melt and the relationship to ultra-thin films](#)  
*Physical Review E*, **64**, 021802 (2001).
40. Y. Gebremichael, T. B. Schrøder, **F. W. Starr**, and S. C. Glotzer  
[Spatially correlated dynamics in a simulated glass-forming polymer melt: Analysis of clustering phenomena](#)  
*Physical Review E* **65**, 051503 (2001).
39. E. La Nave, A. Scala, **F. W. Starr**, F. Sciortino, and H. E. Stanley  
[Dynamics of Supercooled Water in Configuration Space](#)  
*Physical Review E* **64**, 036102 (2001).
38. A. Scala, **F. W. Starr**, E. La Nave, F. Sciortino, and H. E. Stanley  
[Configurational Entropy and Diffusivity of Supercooled Water](#)  
*Nature* **406**, 166-169 (2000).
37. E. La Nave, A. Scala, **F. W. Starr**, F. Sciortino, and H. E. Stanley  
[Instantaneous Normal Mode Analysis of Supercooled Water](#)  
*Physical Review Letters* **84**, 4605-4608 (2000).
36. **F. W. Starr**, J. K. Nielsen, and H. E. Stanley  
[Hydrogen Bond Dynamics in the extended simple point charge model of water](#)  
*Physical Review E* **62**, 579-587 (2000).
35. A. Scala, **F. W. Starr**, E. La Nave, H. E. Stanley, and F. Sciortino  
[Free Energy Surface of Supercooled Water](#)  
*Physical Review E* **62**, 8016-8020 (2000).
34. **F. W. Starr**, J. K. Nielsen, and H. E. Stanley  
[Fast and Slow Dynamics of Hydrogen Bonds in Liquid Water](#)  
*Physical Review Letters* **82**, 2294-2297 (1999).
33. **F. W. Starr**, S. Harrington, F. Sciortino, and H. E. Stanley  
[Slow Dynamics of Water under Pressure](#)  
*Physical Review Letters* **82**, 3629-3632 (1999).

32. **F. W. Starr**, M.-C. Bellissent-Funel, and H. E. Stanley  
[Structure of supercooled and glassy water](#)  
*Physical Review E* **60**, 1084-1087 (1999).
31. **F. W. Starr**, F. Sciortino, and H. E. Stanley  
[Dynamics of simulated water under pressure](#)  
*Physical Review E*, **60**, 6757-6768 (1999).
30. M. Canpolat, **F. W. Starr**, M. R. S.-Lahijany, A. Scala, O. Mishima, S. Havlin, and H. E. Stanley  
[Local Structural Heterogeneities in Liquid Water under Pressure](#)  
*Chemical Physics Letters* **294**, 9-12 (1998).
29. **F. W. Starr**, S. T. Harrington, B. M. Boghosian, and H. E. Stanley  
[Interface Roughening in a Hydrodynamic Lattice-Gas Model with Surfactant](#)  
*Physical Review Letters* **77**, 3363-3366 (1996).
- [Peer-Reviewed Conference Proceedings](#).....
28. H. E. Stanley, S. V. Buldyrev, G. Franzese, N. Giovambattista, and **F. W. Starr**  
[Static and Dynamic Heterogeneities in Liquid Water](#)  
*Phil. Trans. Royal Soc. A: Mathematical, Physical, and Engineering Sciences* **363**, 509–523 (2005).
27. H. E. Stanley, S. V. Buldyrev, N. Giovambattista, E. La Nave, S. Mossa, A. Scala, F. Sciortino, **F. W. Starr**,  
 and M. Yamada  
[Application of Statistical Physics to Understand the Static and Dynamic Anomalies in Liquid Water](#)  
*Journal of Statistical Physics* **110**, 1039-1054 (2003).
26. S. C. Glotzer, Y. Gebremichael, N. Lačević, T. B. Schrøder, and **F. W. Starr**  
[Glass-Forming Liquids and Polymers: With a Little Help From Computational Statistical Physics](#)  
*Computer Physics Communications* **146**, 24-29 (2002).
25. H. E. Stanley, S. V. Buldyrev, M. Canpolat, O. Mishima, M. R. Sadr-Lahijany, A. Scala, and **F. W. Starr**  
[The Puzzling Behavior of Water at Very Low Temperature](#)  
*Physical Chemistry and Chemical Physics (PCCP)* **2**, 1551-1558 (2000).
- [Book Chapters](#).....
24. **F. W. Starr**, P. Z. Hanakata\*, B. A. Pazmiño Betancourt\*, S. Sastry, and J. F. Douglas  
[Fragility and Cooperative Motion in Polymer Glass Formation](#)  
*Fragility of glass forming liquids*, xxx  
 Edited by A. L. Greer, K. F. Kelton, S. Sastry (Hindustan, New Delhi, India, 2013).
23. **F. W. Starr** and S. C. Glotzer  
[Science and Engineering of Nanoparticle-Polymer Composites: Insights from Computer Simulation](#)  
*Soft Materials: Structure and Dynamics*, 107-124  
 Edited by J. R. Dutcher and A. G. Marangoni (Marcel Dekker, N.Y., 2004).
22. N. Giovambattista, S. V. Buldyrev, **F. W. Starr**, and H. E. Stanley  
[Dynamic Heterogeneities in Liquid Water](#)  
*Slow Dynamics in Complex Systems: 3rd International Symposium*  
 Edited by M. Tokuyama and I. Oppenheim (AIP Conference Proceedings, Melville NY, 2004), pp. 483–490.
21. H. E. Stanley, M. C. Barbosa, S. Mossa, P. A. Netz, F. Sciortino, **F. W. Starr**, and M. Yamada  
[Water at Positive and Negative Pressures](#)  
*Proc. NATO Advanced Research Workshop "Liquids Under Negative Pressure", February 23-25, 2002*,  
 A. Imre, Ed. (Kluwer, Dordrecht, 2002).
20. M. Canpolat, O. Mishima, M. R. Sadr-Lahijany, A. Scala, H. E. Stanley, and **F. W. Starr**  
[The Hypothesized Low-Temperature, High-Pressure Second Critical Point in Liquid Water](#)  
*Steam, Water, and Hydrothermal Systems: Physics and Chemistry Meeting the Needs of Industry*

Edited by P. R. Tremaine, P. G. Hill, D. E. Irish, and P. V. Balakrishnan (NRC Research Press, Ottawa, 2000), pp. 494-500.

19. S. V. Buldyrev, M. Canpolat, S. Havlin, O. Mishima, M. R. Sadr-Lahijany, A. Scala, **F. W. Starr**, and H. E. Stanley  
*Physics of Supercooled Water: Possibility of Two Liquid Phases*  
*Slow Dynamics in Complex Systems: Proceedings of the 8th Tohwa University International Symposium*  
 Edited by Michio Tokuyama and Irwin Oppenheim (AIP Conference Series, 1999), 243–256.

#### Educational Articles.....

18. **F. W. Starr**  
 Cyberinfrastructure and the Sciences at Liberal Arts Colleges  
 Academic Commons: Special Cyberinfrastructure Issue, December 2007.

#### Other Conference Proceedings.....

17. P. A. Netz, **F. W. Starr**, M. C. Barbosa, and H. E. Stanley  
*Computer Simulation of Dynamical Anomalies in Stretched Water*  
*Brazilian Journal of Physics* **34**, 24-31 (2004).
16. H. E. Stanley, S. V. Buldyrev, N. Giovambattista, E. La Nave, A. Scala, F. Sciortino, and **F. W. Starr**  
*Statistical physics and liquid water: 'What matters'*  
*Physica A* **306**, 230–242 (2002).
15. R. L. Jones, C. L. Soles, **F. W. Starr**, E. K. Lin, J. L. Lenhart, W.-L. Wu, D. L. Goldfarb, and M. Angelopoulos  
*Chain conformations in ultrathin polymer resists*  
*Proceedings of SPIE* **4690**, 342-350 (2002).
14. P. A. Netz, **F. W. Starr**, M. C. Barbosa, and H. E. Stanley  
*Relation between structural and dynamical anomalies in supercooled water*  
*Physica A* **314**, 470-476 (2002).
13. H. E. Stanley, M. C. Barbosa, S. Mossa, P. A. Netz, F. Sciortino, **F. W. Starr**, and M. Yamada  
*Statistical physics and liquid water at negative pressures*  
*Physica A* **315**, 281-289 (2002).
12. S. C. Glotzer, Y. Gebremichael, N. Lačević, T. B. Schröder, and **F. W. Starr**  
*Spatially heterogeneous dynamics in liquids near their glass transition*  
*ACS Symposium Series* **820**, 214-227 (2002)
11. F. Sciortino, E. La Nave, A. Scala, H. E. Stanley, and **F. W. Starr**  
*Water and its energy landscape*  
*European Physics Journal E* **9**, 233-237 (2002).
10. S. C. Glotzer and **F. W. Starr**  
*Multiscale Modeling of Filled and Nanofilled Polymers*  
*Proc. of Foundations of Molecular Modeling and Simulation (FOMMS 2000)*, AICHE Symposium Series **97**  
 (2001).
9. **F. W. Starr** and S. C. Glotzer  
*Simulation of filled polymer melts on multiple length scales*  
*Proc. of Materials Research Society* **661** (2001).
8. H. E. Stanley, S. V. Buldyrev, O. Mishima, M. R. Sadr-Lahijany, A. Scala, and **F. W. Starr**  
 Unsolved Mysteries of Water in its Liquid and Glassy Phases  
*J. Phys. Cond. Mat.* **12** A403-A412 (2000).
7. **F. W. Starr**, S. Sastry, F. Sciortino, and H. E. Stanley  
*Supercooled Water: Dynamics, Structure and Thermodynamics*  
*Solid State Physics (India)* **42**, 77 (1999).

6. H. E. Stanley, S. V. Buldyrev, M. Canpolat, S. Havlin, O. Mishima, M. R. Sadr-Lahijany, A. Scala, and **F. W. Starr**  
The puzzle of liquid water: a very complex fluid  
*Physica D* **133**, 453-462 (1999).
5. H. E. Stanley, S. T. Harrington, O. Mishima, P. H. Poole, S. Sastry, F. Sciortino, and **F. W. Starr**  
*The Puzzling Statistical Physics of Liquid Water*  
*Anales de Física, Monografías RSEF*, **4**, 21–30 (1998).
4. H. E. Stanley, S. V. Buldyrev, M. Canpolat, M. Meyer, O. Mishima, M. R. Sadr-Lahijany, A. Scala, and **F. W. Starr**  
The Puzzling Behavior of Liquid Water  
*Physica A* **257**, 213-222 (1998).
3. H. E. Stanley, L. Cruz-Cruz, S. T. Harrington, P. H. Poole, S. Sastry, F. Sciortino, **F. W. Starr**, and R. Zhang  
*Cooperative Molecular Motions in Water: The Liquid-Liquid Critical Point Hypothesis*  
*Physica A*, **236**, 19-37 (1997).
2. H. E. Stanley, S. T. Harrington, P. H. Poole, S. Sastry, F. Sciortino, and **F. W. Starr**  
*Cooperative Molecular Motions in Water*  
*Prog. Theor. Phys. Suppl.* **126**, 201-206 (1997).
1. E. Neis, **F. W. Starr**, T. Handler  
*Using Neural Networks as an Event Trigger in Elementary Particle Physics Experiments.*  
1994 IEEE International Conference on Neural Networks **1-7**, 3056-3060 (1994).

## Honors, Awards, and Activities

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1. Member-at-Large, APS Topical Group on Statistical and Nonlinear Physics, 2012-2015.
2. Guest Editor for *PNAS (Proceedings of the National Academy of Sciences)*, 2013
3. Research articles (45 and 38) cited more than 200 times; research articles (50, 48, 41, 34, 31) cited more than 100 times each; 24 articles with more than 50 citations each
4. Article 82 featured by press reports from MRS News, ThomasNet, Medill Reports, AZ nano, and redOrbit.
5. Advisee Chia Wei Hsu awarded the 2010 APS Apker award for the best undergraduate research in the USA at a Ph.D. granting institution.
6. Article 77 featured as the cover of *Polymer* volume 51, issue 15 (8 July 2010).
7. Article 76 featured as the cover of *Macromolecules* volume 43, issue 7 (13 April 2010).
8. Simulation image featured in "Water Molecules, Unite!", *Physical Review Focus* **19**, story 19 (18 June 2007).
9. Member of the editorial board of the *Journal of Computational and Theoretical Nanoscience* 2003-2006
10. Best poster, Gordon Conference on Water and Aqueous Solutions, August 2006; co-authors M. Mazza, N. Giovambattista, and H.E. Stanley.
11. Research article (61) chosen by editors for the IoP Select collection of journal articles, June 2006.
12. Simulation images featured as the cover of *Soft Materials: Structure and Dynamics*, edited by J.R. Dutcher and A.G. Marangoni (Marcel Dekker, N.Y., 2004).
13. Computer simulation images featured in *Physics Today* **46**, 40-46 (2003).
14. Computer simulation images featured in *Nature* **409**, 301 (2001).
15. Recipient of a NIST/NRC Postdoctoral Associateship, August 1999 - August 2001.
16. Recipient of a NSF Graduate Research Trainee Fellowship, 1996 - 1999.
17. Computer simulation images featured on the cover of the *MRS Bulletin*, volume 24, Issue 5 (May 1999).
18. Recipient of the Pugh Undergraduate Scholarship for Physics at Carnegie Mellon University: 1991 and 1992.

## Research Supervision

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### Graduate and Post-Doctoral.....

1. Beatrice Pazmiño Betancourt, Ph.D. 2013. "Glass Formation and Cooperative Motion in Polymer Melts and Composites"; Presently at Wesleyan University and the National Institute of Standards and Technology.

2. Fernando Vargas Lara, Ph.D. 2012 “Structure and Stability of DNA-Driven Nanoparticle Assemblies”; Presently at the National Institute of Standards and Technology.
3. Iulian Clapa, Ph.D. 2011. “Relating the Dynamics of Supercooled Liquids to the Localization Properties of the Instantaneous Normal Modes”.
4. Zhi Da Tan, MA 2009. “The Role of Limited Valency and Bonding Orientation on Phase Behavior”
5. Scott Knauert, MA 2008. “The Effect of Stiffness on Square-Sheet Morphology and Viscoelastic Properties.”
6. Jose Rivera-Rojas, Postdoctoral Associate, 9/05-8/07. Current: Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, Mexico.
7. Andrew Rahedi, MA 2006. “Phase behavior and clustering of nanoparticles with approximate polymer interactions.”
8. Boris Lukanov, MA 2005. Current: Graduate student, Mechanical Engineering, Yale University.

#### Undergraduate Theses.....

1. Paul Z. Hanakata, BA 2014 with High Honors.
2. Joshua Neitzel, BA 2014 with High Honors.
3. Wei Dai, BA 2012 with High Honors. “Effect of Valency of DNA-Linked Nanoparticle Materials”
4. Chia Wei Hsu, BA 2010 with High Honors. “Self Assembly of DNA-Linked Nanoparticles”; awarded the 2010 APS Apker award for the best undergraduate research in the USA.
5. Olivia Padovan-Merhar, BA 2010 with High Honors. “Stability of DNA-Linked Nanoparticle Crystals”
6. Zhi Da Tan, BA 2008, with Honors. “Study of Multi-Armed DNA Dendrimers with Lattice Models.”
7. Scott Knauert, BA 2007 with High Honors. “The Effect of Nanoparticle Geometry on Polymer Nanocomposite Tensile Strength and Rheology.”
8. Stephen Becker, BA 2005 with High Honors. “Translational and Rotational Dynamics in Supercooled Water.”

#### Conference and Workshop Organization

1. Co-Organizer for *Conference on Water Science: New Results, Directions and Opportunities*, May 2014 in Beijing, China.
2. Session Co-Organizer for *2010 APS March Meeting*, March 2010 in Portland, OR, USA. Session: Biological-Synthetic Hybrid Materials, co-sponsored by DPLOY and DBP.
3. Session Co-Organizer for 15<sup>th</sup> Symposium on Thermophysical Properties, June 2003 in Boulder, CO, USA. Session: Properties of Polymers and Mesoscopic Systems.
4. Co-Organizer for *Workshop on Polymer-Nanoparticle Composite Materials*, May 2002 in Gaithersburg, MD, USA.
5. Co-Organizer for *Workshop on Predicting the Thermophysical Properties of Fluids by Molecular Simulation*, June 2001 in Gaithersburg, USA.

#### Presentations

##### Invited Presentations.....

50. *Workshop on Soft Matter: Self Assembly and Dynamics*, January 2014 in Hyderabad, India.
49. *Symposium on Fragility*, January 2014 in Bengaluru, India.
48. 14<sup>th</sup> *Annual Wesleyan Biophysics Retreat*, September 2008 in Middletown, CT. Title: Universal Origin for Raft-like Structures in Membranes
47. 7<sup>th</sup> International Discussion Meeting on Relaxations in Complex Systems, July 2013 in Barcelona, Spain. Title: Cooperative Dynamics and the Fragile-to-Strong Crossover in Simulated Water.
46. Programmable Self-Assembly of Matter, June 2013 in New York, USA.
45. Queens College of City University of New York, Physics Department Colloquium, April 2012.
44. *American Physical Society*, March 2012 in Boston, USA.
43. Drexel University, Physics Department Colloquium, October 2011
42. 48<sup>th</sup> New England Complex Fluids Meeting, September 2011 at Brandeis University, in Waltham, MA

41. Telluride Workshop on Polymer Physics, June 2011 in Telluride, CO. Title: DNA-linked Nanoparticle Assemblies.
40. Brookhaven National Laboratory, Center for Functional Nanomaterials, October 2010 in Upton, NY. Title: DNA-linked Nanoparticle Assemblies.
39. Università di Roma La Sapienza, Dipartimento di Fisica, Seminario di Struttura della Materia, September 2010 in Rome, Italy. Title: DNA-linked Nanoparticle Assemblies.
38. University of Massachusetts, Polymer Science and Engineering Department Colloquium, December 2009. Title: DNA Directed Nanoparticle Assemblies: What are the Rules?
37. University of Akron, College of Polymer Science and Engineering, July 2009. Title: DNA Directed Nanoparticle Assemblies: What are the Rules?
36. *Late Night with Nanocomposites II*, May 2009 in Brno, Czech Republic. Title: Origin and Effects of Nanoparticle Clustering in Polymer Nanocomposites.
35. Universitat de Barcelona, Departament de Fisica Fonamental Seminar, May 2009 in Barcelona, Spain. Title: DNA Directed Nanoparticle Assemblies.
34. *American Physical Society*, March 2009 in Pittsburgh, USA. Title: DNA Directed Nanoparticle Assemblies.
33. *BECAT-IBM Workshop on High Performance Computational Science and Engineering*, December 2008 in Storrs, CT. Title: Computational Methods applied to the Soft Materials.
32. *9<sup>th</sup> Annual Wesleyan Biophysics Retreat*, September 2008 in Middletown, CT. Title: DNA Functionalized Nanoparticles: Creating a Customized Chemistry Toolkit.
31. *NERCOMP: Cyberinfrastructure and The Liberal Arts: Institutions and the Future of Discipline-Based Research*, March 2008 in Amherst, MA. Title: Deploying Cyberinfrastructure for the Sciences at Liberal Arts Institutions.
30. Università di Roma La Sapienza, Dipartimento di Fisica, Gruppo Liquidi Seminar, January 2008 in Rome, Italy. Title: Polymer Nanocomposites: Nanoparticle Clustering, Phase Behavior, and Mechanical Properties.
29. *Materials Research Society*, November 2007 in Boston, MA. Title: Self-Assembled DNA Networks and Gels.
28. *Ninth Annual Greater Boston Area Statistical Mechanics Meeting*, October, 2007 in Boston, MA. Title: Using DNA as a template to design novel materials.
27. Wesleyan University, Chemistry Department Colloquium, October 2007 in Middletown, CT. Title: Two waters, no ice: polyamorphism in water and other fluids.
26. Boston University, Center for Computational Science Seminar, February 2007 in Boston, MA. Title: Molecular Dynamics Simulations: What can they do for you?
25. Clark University, Department of Physics Colloquium, November 2006 in Worcester, MA. Title: Some Assembly Required: Computer-Aided Design of Materials from the Bottom Up
24. *International Conference on Properties of Fluids and Phase Equilibria for Chemical Process Design*, Plenary Lecture, October 2006 in Morelia, Mexico. Title: Computer Simulations of Material Assembly and Design.
23. Università di Palermo, Department of Chemistry Colloquium; October 2006 in Palermo, Italy. Title: Some Assembly Required: Computational Approaches to Designing Materials from the Bottom Up.
22. *Patchy Colloids, Proteins and Network Forming Liquids: Analogies and new insights from computer simulations*, June 2006 at CECAM in Lyon, France. Title: Self-assembled structures of single-stranded DNA.
21. University of Massachusetts, Dartmouth, Department of Physics Colloquium; April 2006, Amherst, USA. Title: Some Assembly Required: designing new materials from the bottom up.
20. *American Physical Society*, March 2006 in Baltimore, USA. Title: Assembly and Gelation of Custom-Sequenced, Multifunctional DNA Dendrimers.
19. University of Massachusetts, Amherst, Department of Physics Seminar; September 2005, Amherst, USA. Title: Connecting Bulk Dynamics to Local Heterogeneity in Supercooled Water.
18. *229th ACS National Meeting*; March 2005, San Diego, USA. Title: Dynamics and phase behavior in supercooled and glassy water.

17. Yeshiva University, Department of Physics Colloquium; December 2004, New York, USA. Title: Digital Liquids: Computer Simulations of Soft Materials.
16. *International Union of Crystallography at High Pressure*, August 2004, Saskatoon, Canada. Title: Two Waters, No Ice: An Overview of Polyamorphism in H<sub>2</sub>O.
15. *Unifying Concepts in Glass Physics*, June 2004, Bangalore, India. Title: Water as a Model Glass Former.
14. *78th ACS Colloid and Surface Science Symposium*, June 2004, New Haven, USA. Title: Thermoreversible Gelation and Polymer Nanocomposites.
13. University of California, Berkeley; Department of Bioengineering, November 2003, Berkeley, USA. Title: Dynamics of Supercooled Water.
12. *Scientific Opportunities for Cold Neutron Spectroscopy*, July 2003, Washington, USA. Title: Connections between Neutron Scattering and Molecular Simulation.
11. *Polymer Theory versus Polymer Experiment*, July 2003, Telluride, USA. Title: Interfacial Properties, Clustering Mechanism, and Rheology of Polymer Nanocomposites.
10. *15<sup>th</sup> Symposium on Thermophysical Properties*, June 2003, Boulder, USA. Title: What Controls the Structure and Properties of Polymer Nanocomposites?
9. Naval Research Laboratory, February 2003 in Washington, DC, USA. Title: Origin of Particle Clustering in a Simulated Polymer Nanocomposite.
8. *Workshop on Polymer-Nanoparticle Composite Materials*, May 2002 in Gaithersburg, USA. Title: Probing nanocomposite structure and properties using computer simulations.
7. Air Force Research Lab, Dayton, USA, March 2002.
6. *Unifying Concepts in Glass Physics*, February 2002 in Roma, Italy. Title: What can we learn from the local geometry of melts and liquids?
5. *The International Association for the Properties of Water and Steam Annual Meeting*, September 2001 in Gaithersburg, USA. (Canceled due to September 11, 2001 events.)
4. *New kinds of phase transitions: Transformations in disordered substances* (NATO-ARW) May 2001 on the Volga River, Russia.
3. U. Maryland Institute for Physical Science and Technology (IPST), December 2000. Title: Dynamics of Supercooled Liquids: Water as a Model Liquid.
2. Center for Neutron Research, NIST, Gaithersburg, MD. March 2000. Title: Thermodynamics and Dynamics of Supercooled Water.
1. *The Instantaneous Normal Mode Approach to Dynamics in Liquids*, July 1999 at CECAM in Lyon, France. Title: Dynamics and Configurational Entropy of Liquid Water.

#### Contributed Presentations.....

33. *American Physical Society*, March 2013 in Baltimore, USA.
  - (a) The Relationship of Dynamical Heterogeneity to the Adam-Gibbs and Random First-Order Transition Theories of Glass Formation
  - (b) The impact of fragility on the properties of the glass formation of polymer nanoparticle composites; Presented by Beatriz Pazmiño.
  - (c) Local Variation of Fragility and Glass Transition Temperature of Ultra-thin Supported Polymer Films; Presented by Paul Hanakata.
  - (d) Modeling Lattice Structures of DNA-Coated Nanoparticles with Tetrahedral Linkers; Presented by Joshua Neitzel.
32. *American Physical Society*, March 2012 in Boston, USA.
  - (a) The Internal Structure of Nanoparticle Dimers Linked by DNA; Presented by Fernando Vargas Lara.
  - (b) DNA Regulated Clusters: Structure and Self-limiting Assembly; Presented by Cheng Chi.
  - (c) Cooperative Motion in Lipid Bilayer Membranes; Presented by Benedikt Hartmann.

- (d) Modifying Fragility and Length Scales of Polymer Glass Formation with Nanoparticles; Presented by Beatriz Pazmiño.
31. *American Physical Society*, March 2011 in Dallas, USA. Title: Influence of Nanoparticles on Fragility and Collective Particle Motion in Polymer Glass-Formation; Presented by Jack Douglas.
30. *American Physical Society*, March 2010 in Portland, USA. Session Chair: Focus Session: Biological-Synthetic Hybrid Materials. Talks: 7 contributed talks.
- (a) Crystallization Dynamics of DNA-functionalized Nanoparticles; Presented by Francis Starr
- (b) Theoretical Description of the Self-Assembly Dynamics of DNA-functionalized Nanoparticles; Presented by Chia Wei Hsu.
- (c) Phase Behavior of DNA-Functionalized Nanoparticles: Dependence on Number and Orientation of Attached DNA strands; Presented by Wei Dai.
- (d) Relative Stability of DNA-Linked Nanoparticle Crystals; Presented by Fernando Vargas.
- (e) Stability of DNA-linked Nanoparticle Crystals: Effect of Number of Strands; Presented by Olivia Padovan-Merhar
- (f) Relating the Dynamics of Supercooled Liquids to the Sensitivity of Modes to Small Perturbations; Presented by Vasile Iulian Clapa.
- (g) Fragility of Polymer Nanocomposites with Ideal Nanoparticle Dispersion; Presented by Beatriz Pazmiño.
29. *American Physical Society*, March 2009 in Pittsburgh, USA. Title: Influence of Nanoparticles on the Amplitude of Molecular Motions and the Fragility a Model Glass-Forming Polymer Melt; Presented by Jack Douglas.
28. *7th Liquid Matter Conference*, June 2008, Lund, Sweden. Title: Multiple Liquid-Liquid Critical Points for DNA-functionalized Nanoparticles
27. *Soft, Complex, and Biological Matter Conference*, July 2007 near Palermo, Italy. Title: DNA-based Nanomaterials: Controlling Phase Behavior, Structure, and Dynamics using Molecular Recognition.
26. *IV Workshop on Non Equilibrium Phenomena in Supercooled Fluids, Glasses and Amorphous Materials*, September 2006 in Pisa, Italy. Talk: Breakdown of the (Debye)-Stokes-Einstein Relation and Heterogeneous Dynamics.
25. *3rd New York / New England Granular Materials Workshop*, June 2005 at Wesleyan University in Middletown, CT. Talk: Can the Physics of Glasses contribute to the understanding of Granular Materials?
24. *American Institute of Chemical Engineers*, November 2003 in San Francisco, USA. Talks: (1) How Do We Relate Local Structure to Dynamics in Glass Forming Liquids? and (2) Origins of Particle Clustering and Effect On Properties.
23. *American Physical Society*, March 2003 in Austin, USA. Session Chair: Dynamics and the Glass Transition Talk: Computer Simulation of Fundamental Polymer Nanocomposite Properties.
22. *Nanomaterials and the Chemical Industry R&D Roadmap Workshop*, October 2002, Baltimore, USA.
21. *Gordon Conference on Polymer Physics*, August 2002 in Newport, Rhode Island. Title: Molecular Dynamics Simulations of a Filled Polymer Melt.
20. *American Institute of Chemical Engineers*, November 2001 in Reno, USA. Talks: (1) Simulation of a nanofilled polymer melt and (2) Predicting thermophysical properties of fluids by molecular simulation – plenary session, presented by A.M. Chaka.
19. *4<sup>th</sup> International Discussion Meeting on Relaxations in Complex Systems*, June 2001 in Hersonissos, Crete. Title: Local structure and dynamics of a cooled polymer melt.
18. *American Physical Society*, March 2001 in Seattle, USA. Session Chair: Nanoparticle Filled Systems. Talks: (1) Molecular Dynamics Simulations of a Nanoparticle in a Polymer Melt and (2) Local Structure, Mobility, and Vitrification of a Polymer Melt.
17. *Materials Research Society*, November 2000 in Boston, USA. Title: Molecular Dynamics Simulations of a Filled Polymer Melt.

16. *American Chemical Society*, August 2000 in Washington, DC, USA. Title: Dynamics of a Simulated Filled Polymer Melt.
15. *Gordon Conference on Water and Aqueous Solutions*, August 2000 in New Hampshire. Title: Phase Diagram, Energy Landscape, and Dynamics of Simulated Water.
14. *Gordon Conference on Polymer Physics*, August 2000 in New London, Connecticut. Title: Molecular Dynamics Simulations of a Filled Polymer Melt.
13. *American Physical Society*, March 2000 in Minneapolis, USA. Session Chair: Classical Fluids and Thermodynamics. Talks: (1) Structure and Dynamics in Simulated Filled Polymers and (2) Dynamics and Energy Landscape of Liquid Water.
12. *International Bunsen Discussion Meeting on Metastable Water*, September 1999 in Nordkirchen, Germany. Title: Dynamics and Energy Landscape of Liquid Water.
11. *Unifying Concepts in Glass Physics*, September 1999 in Trieste, Italy. Title: Dynamics and Energy Landscape of Liquid Water.
10. *Phase space and energy landscapes in disordered systems*, June 1999 at CECAM in Lyon, France.
9. *Workshop on Non-equilibrium Phenomena in Supercooled Fluids, Glasses, and Amorphous Materials*, September 1998 in Pisa, Italy. Title: Dynamics and Inherent Structures of Liquid Water.
8. *Gordon Conference on Water and Aqueous Solutions*, August 1998 in New Hampshire. Titles: (1) Dynamics of Water and the Energy Landscape (2) Continuity of Liquid and Glassy Water: Structural Evidence (3) presented by M. Yamada - Effect of Solutes on the Liquid-Liquid Transition of Simulated Water.
7. *StatPhys 20*, July 1998 in Paris. Title: Continuity of Liquid and Glassy Water.
6. *Hydration Processes in Biology* (NATO-ASI), May 1998 in Les Houches, France. Title: Continuity of Liquid and Glassy Water: Structural and Dynamic Evidence.
5. *78<sup>th</sup> Statistical Mechanics Conference*, December 1997 at Rutgers University. Title: Effect of Pressure on the Local Structure of Liquid Water.
4. Provided a simulation for *Super-Computing 97*, November 1997 in San Jose, California. Title: Stretched Liquid Water: Finite Size Effects.
3. *Gordon Conference on the Chemistry and Physics of Liquids*, August 1997 in New Hampshire. Title: Effect of Pressure on Liquid Water.
2. *Sixth International Conference on Discrete Models for Fluid Mechanics*, August 1996 at Boston University. Title: Interface Roughening in a Hydrodynamic Lattice-Gas Model with Surfactant.
1. *Gordon Conference on Water and Aqueous Solutions*, August 1996 in New Hampshire.