

CURRICULUM VITAE

DAVID ROBERT NELSON

Department of Physics
Harvard University
Cambridge, MA 02138
Phone: 617-495-4331 (office)

Born: May 9, 1951
Birthplace: Stuttgart, Germany

Citizenship: U.S.

Fax: 617-496-2545

Married, three children

EDUCATION

1. A.B., Cornell University, May 1972
Summa cum laude in physics with Distinction in all subjects
National Merit Scholar, Phi Kappa Phi, Phi Beta Kappa
Cornell Six Year Ph.D. Program
2. M.S., Cornell University, May 1974
Major subject: Theoretical Physics
3. Ph.D., Cornell University, January 1975
Major subject: Theoretical Physics
Thesis subject: Applications of the Renormalization Group
to Critical Phenomena
Supervisor: Michael E. Fisher

EMPLOYMENT

1. Junior Fellow, Harvard Society of Fellows 1975-78
2. Associate Professor of Physics, Harvard University 1978-80
3. Professor of Physics, Harvard University 1980-92
4. Mallinckrodt Professor of Physics, Harvard University 1992-05
5. Professor of Applied Physics, Harvard University 1997-
6. Chair of Physics Department, Harvard University 1997-00
7. Arthur K. Solomon Professor of Biophysics and Professor
of Physics and Applied Physics 2005-
8. Consulting with IBM T. J. Watson Research Laboratory,
Exxon Research, Bell Laboratories and the Mitre Corporation

HONORS

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| A.P. Sloan Fellowship | 1979-83 |
| MacArthur Prize Fellowship | 1984-89 |
| National Academy of Sciences Award for
Initiatives in Research | 1986 |
| Guggenheim Fellowship | 1993-94 |
| Harvard Ledlie Prize | 1995 |
| Bardeen Prize (for research in superconductivity) | 2003 |
| Buckley Prize (for research on soft condensed matter) | 2004 |
| Welsh lectures, University of Toronto | 2001 |
| Mary Upson Visiting Professor, Cornell University, | 2004 |
| Mayent-Rothschild Visiting Professor Paris, Insitute Curie | 2005 |
| Sommerfeld Lecturer, Ludwig-Maxilliam University, Munich | 2006 |
| Lorentz Visiting Professor Leiden | 2006 |
| Mark Kac Memorial Lecturer, Los Alamos National Laboratory | 2007 |
| Primakoff Lecturer, University of Pennsylvania | 2007 |
| Visiting Professor, Neils Bohr Insitute, Copenhagen | 2009 |

SOCIETIES

Fellow, American Physical Society
American Association for the Advancement of Science
Elected to American Academy of Arts and Sciences, 1988
Senior Fellow, Harvard Society of Fellows, 1986-2003
Elected to National Academy of Sciences, 1994

RESEARCH INTERESTS

- Collective effects in the physics, chemistry and materials science of condensed matter
- Interplay between fluctuations, geometry and statistical mechanics. In collaboration with his Harvard colleague, Bertrand I. Halperin, he is responsible for a theory of dislocation-mediated melting in two dimensions. The prediction of Halperin and Nelson of a fourth “hexatic” phase of matter, interposed between the usual solid and liquid phases, has now been confirmed in experiments on thin films and bulk liquid crystals.
- Research includes a theory of the structure and statistical mechanics of metallic glasses and investigations of “tethered surfaces,” which are two-dimensional generalizations of linear polymer chains. These fishnet-like structures exhibit a remarkable low temperature flat phase upon cooling.
- Flux line entanglement in high temperature superconductors. At high magnetic fields, thermal fluctuations cause regular arrays of flux lines to melt into a tangled spaghetti state. The physics of this melted flux liquid has important implications for many of the proposed applications of these new materials.
- Current interests include vortex physics, the statistical mechanics of polymers, topological defects on frozen topographies and biophysics problems such as the motion of biological motors along polynucleotide sequences and the unzipping of DNA and population genetics.
- Current biological interests include measuring selective advantages from sector angles with *Saccharomyces cerevisiae*, genetic drift and chirality at the frontier of range expansions of bacteria, viral spreading on inhomogeneous bacterial substrate, theory and experiments on mutualistic behavior of microorganisms at frontiers and dislocation-mediated remodeling of cell walls.