

ALLEN G. HUNT

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EDUCATION

- M.A. in Geomorphology: "Surface Transport Processes on a Small Hill in an Arid Environment in Greenwater Valley, CA." *Advisor: Peter Haff*, Duke University, Durham, North Carolina, December, **1996**
- Ph.D. in Theoretical Condensed Matter Physics; Disordered Systems: "Theoretical Studies of the Coulomb Gap." *Advisor: Michael Pollak*, University of California, Riverside, June, 1983
- M.S. in Physics, University of California, Riverside, March, 1980
- B.S. in Physics, University of California, Riverside, June, 1977

DISTINCTIONS

- 2004** **627 (Cumulative) Citations in ISI Web of Science**
- 2003** **Scientific Committee**, Hydrofractals03, <http://www.ihw.ethz.ch/hydrologie/hydrofractals03/index.html>
- 2003** **Invited Review**: "Flow & Transport in Porous Media, Perspective from Percolation Theory," *Rev. Geophys.*
- 2003** **Invited Talk**, Rutgers Statistical Mechanics Conference, <http://www.math.rutgers.edu/events/statmech.html>
- 2001 **Guest Editor**, *Philosophical Magazine B*, special issue honoring physicist **Michael Pollak**
- 2001 **Invited Talk**, Effects of Climate Change on ENSO, Understanding Complex Systems, UI Urbana-Champaign
- 2000 **Invited talk**, Possible Feedback Chain for Enhancing Effects of Solar Variability on Climate, AGU, December, 2000
- 1999 **Invited talk**, El Niño and Global Warming, La Jolla International School of Physics, Science of Climate
- 1999 **Invited talk**, Glass Transition in Super-cooled Liquids, IX ICPS, Tucson, AZ, October, 1999
- 1999 **Invited talk**, Theoretical Aspects of the Mixed-Alkali Effect, American Ceramic Society, Natl. Meeting
- 1998 **"Teacher of Distinction,"** Riverside Community College (LDS Students Association)
- 1998 Paleoseismology Research Article in *Nature*, subject of lead news article in *Geotimes*, August issue
- 1993 Solicited 44-page Review Article, "Non-Debye Relaxation and the Glass Transition," *Journal of Non-Crystalline Solids*
- 1986-87 Member **Fulbright Central Selection Committee** in Bonn, FRG, for science, engineering, and mathematics
- 1985-87 **2.5 years Fulbright Research Stipend**, Condensed Matter Theory, Philipps-Universität, Marburg, FRG
- 1980-81 Graduate Council Fellowship, UC Riverside
- 1979-80 Earl C. Anthony Fellowship, UC Riverside

POSITIONS HELD

- Associate Professor, Wright State University, Dayton, OH Jan. 2004 -
- Research Associate, CIRES, University of Colorado, Boulder, Dec. 2001-March, 2004
- Program Director, Hydrologic Sciences, National Science Foundation, March 2002-June 2003.
- Visiting Scientist, University of California, Berkeley, Earth & Planetary Sciences, summer 2001.
- Visiting Scientist, Pacific Northwest National Laboratories, Atmospheric Sciences, 1999-2002.
- Instructor, Geology Department, Irvine Valley College, CA, 1998-1999.
- Lecturer, Mathematics Department, University of California, Riverside, 1998-1999.
- Full-time Instructor, Natural Sciences, Riverside Community College, CA, 1997-1998.
- Post-doctoral Research Associate, Surface Hydrology, University of California, Riverside, 1997.
- Research Assistant, Department of Geology, Duke University, Durham, NC, 1995-1996.
- Postdoctoral Research Associate, Soil and Environmental Sciences, University of California, Riverside, 1992-1994.
- Lecturer, Department of Physics, University of California, Irvine, 1988-1992.
- Visiting Professor, Physics Department, Philipps-Universität, Marburg, Federal Republic of Germany, 1985-1987.
- Lecturer, Department of Physics, California State University, Fullerton, 1984-1985.
- Lecturer, Department of Physics, University of Redlands, Redlands, CA, 1982-1984.

- Lecturer, Department of Physics, California State University, San Bernardino, 1980-1981.

INFORMATION TECHNOLOGY

Wrote Fortran code to access GLOBE (global 1km DEM), generate statistics of elevation classes for GCM grids, and generate input into GCM's for evaluation of thermodynamics of orographic effects on precipitation. Presently considered for use in ECMWF forecasting mode. Developed Fortran (and Grads) code for verification of "downscaled" GCM, and evaluating mesoscale variability of ENSO teleconnections using PRISM gridded precipitation model.

RESEARCH EXPERIENCE

Representative Projects (references to my work numbered consecutively from publication list)

General Transport in Random Systems

- developed first treatment^{18,29} of ac conductivity, $\sigma(\omega)$, fully consistent with percolation theory
- applied it to relaxation processes in ionic^{14,17,37} [verified by L. Murawski and R. Barczynski (*J. Non-Cryst. Solids* **185** 84-93 1995)], and electronic^{13,16,29} glasses and dipolar liquids³³ in one²⁵, two¹⁵ and three dimensions
- developed thermodynamics of cluster relaxation processes allowing treatment of intra-cluster screening³⁸
- showed²¹ that critical path analysis (percolation) is basis of frequency-dependent scaling in $\sigma(\omega)$ in electronic and ionic glasses and "universal scaling" in dipolar liquids [P. K. Dixon, L. Wu, S. R. Nagel B. D. Williams and J. P. Carini, *Phys. Rev. Lett.* **65** 1108 (1990)]

Transport in Disordered Semiconductors

- first treated¹⁸ $\sigma(\omega)$ at frequencies below $\sigma(\omega_c)$, which accounts for observed [Long et al., *Phil. Mag.* **B58** 153 (1988)] non-analytic frequency dependences in a-Si (and a-Si:H:Au) [Long and Hansmann, *Hopping and Related Phenomena* H. Fritzsche and M. Pollak, ed. (World Scientific, Singapore, 1991)]
- derived^{13,30} observed temperature dependence of ratio of $\sigma(\omega)/\sigma(0)$ in variable-range hopping (references to Long et al. and to Long and Hansmann), allowing comparison with experiment of temperature-dependence of dc conductivity pre-exponential in amorphous semiconductors

Transport in Ionic Conducting Amorphous Systems

- extended^{14,17,33,37} [M. Pollak and G. E. Pike, *Phys. Rev. Lett.* **28** 1449 (1972)] model to all frequencies; calculated¹⁴ $\sigma(0)$ agreed with experiment [I. Svare, F. Borsa, D. R. Torgeson and S. W. Martin, *Phys. Rev.* **B48**, 9336 (1993)]
- predicted¹⁴ low frequency $\sigma(\omega)$ subsequently found [L. Murawski R. Barczynski, *Journal of Non-Crystalline Solids*, **185** 84-93 (1995); K. K. Bardhan and R. K. Chakraborty, *Phys. Rev. Lett.* **72** 1068 (1994)]
- theory of the mixed-alkali effect^{32,40} on ionic conduction now accepted as "pioneering" [S. Baranovskii, to be published in *J. Chem Phys.*]

Theory of Mechanical Relaxation and the Glass Transition

- showed that a cross-over from diffusive to percolative transport²³ near mode-coupling temperature explains the puzzling transport and relaxation results of super-cooled liquids [verified by A. Voronel et al., *J. Phys.: CM* **9** L247-L249]; percolation theory for inhomogeneous liquids at low T yields:
 - pressure³⁵ dependence of glass transition temperature in agreement with experiment [E. A. Williams and C. A. Angell, *J. Phys. Chem.* **81** 232 (1977)] for a continuous range of compositions in CKN
 - glass transition temperature in confined geometries in agreement with experiments [e.g. C. L. Jackson and G. B. McKenna, *J. Non-Cryst. Solids* **130** 221 (1991)]
 - physical basis for the "Kauzmann" paradox³⁴
 - explanation for the correlation between the glass and melting temperatures²⁰

Theory of Transport/Flow in Soils

- developed theory for unsaturated hydraulic conductivity of fractal media using critical path analysis, which
 - relates the moisture content at which solute diffusion vanishes to the breakup of capillary flow paths and both the drz-end and the wet-end deviations of experimental water retention curves from fractal scaling (*Vadose Zone Journal* - separate articles),

- delivers quantitative agreement with experiment for water retention, hydraulic conductivity, solute and gas diffusion, air permeability, and electrical conductivity using parameters fixed from measurements of physical properties, such as surface area to volume ratio, fractal dimensionality, porosity, and in terms of the measured value of the saturated hydraulic conductivity (*Advances in Water Resources; Vadose Zone Journal; SSSAJ*)
- combined critical path analysis with percolation scaling (*Chaos Solitons, and Fractals*). This work is important for fundamental analysis of transport on fractal structures and for understanding Archie's law for the electrical conductivity of saturated porous media.
- developed analytical results for hysteresis of wetting and drying in agreement with experiment as well as for the lack of equilibration during further drying of dry porous media.
- developed⁴¹ general expressions for distribution of hydraulic conductivity (*Advances in Water Resources; Transport in Porous Media*) that explain:
 - field data for the distribution of hydraulic conductivity [D. Nielsen, *Hilgardia* **42** 215-259 (1973)]
 - relationship between coefficients in Philip's cumulative infiltration [Sharma et al., *J. Hydrol.* **45** 892-898]
 - scale dependence of ensemble-mean K [Paleologos et al., *Wat. Res. Res.* **32** 1333-1341 (1996)]
- derived from percolation statistics usual formulations of semi-variograms for the hydraulic conductivity (*Trans. Por. Med.*) as well as observed experimental proportionality of variogram range to support volume size.
- derived (with T. Skaggs) expression for hydraulic conductivity pdf in terms of measured electrical conductivity (*Advances in Water Resources*).
- derived results for geologic scale upscaling that explain the apparent scale-effect in the hydraulic conductivity for nested heterogeneity as due to improper weighting of small-scale heterogeneity (*Advances in Water Resources*), or for anisotropic media as due to a dimensional cross-over (*Hydrogeology Journal*, accepted).

Geomorphology

- reconstructed Pleistocene surface of a small hill in the Mojave desert, described its evolution through the Holocene (*Geomorphology*, in press)
- developed method of determining age of a surface from a *distribution* of desert varnish characteristics
- used shallow seismic refraction to determine configuration and properties of bedrock and soil (*Geomorphology*, in press)
- showed transport limited erosion produces bedrock surfaces conformed to topography (generalizing Ahnert's observation that weathering-limited erosion makes surface topography conform to bedrock topography)

Climate

- argued that mechanism for the Pacific Decadal Oscillation is a cross-over from short-term positive feedback in El Niño frequency to long-term negative feedback (*Eos*, 2001)
- Participated in development of thermodynamic downscaling of orographic effects on precipitation in GCM (*Climate Dynamics*)
- Participated in investigation of mesoscale teleconnections of ENSO in Pacific Northwest (*J. Climate*)
- showed that current increase in frequency of El Niño events relates to increase of global temperature rather than its present value (*Bulletin American Meteorological Society*, 1999, *Eos* 2000, *Complexity*, 2001, *Meteorology and Atmospheric Physics*, 2002)
- showed that Colorado Plateau flooding and droughts strongly correlate with ENSO index, and Anasazi population movements may be interpreted in terms of ENSO variability (to be submitted to *The Holocene*)
- showed that paleoclimates of Arizona were strongly affected by Pliocene enlargement of the Gulf of California and that this climate change influenced Colorado Plateau geomorphology (*The Colorado River: Origin and Evolution*, in press)
- showed that effects of an early Holocene monsoon were necessary to produced observed Holocene erosion on eastern Mojave Desert hill (*Geomorphology*, in press)

Sediment Transport

- introduced a probabilistic method for treating fluvial sediment transport consistent with Shields' diagram, with self-consistent integral equation for the distribution of particle sizes on a river bed (*JGR-Solid Earth*, 1999).
- Calculated downstream transport velocity of clasts in high flow regime as product of number of entrainments per unit time and the transport distance per entrainment. First factor is consistent with Shields' diagram, explaining

rapid diminution of transport velocity at large particle sizes; the second factor, proportional to 1 divided by particle size, d , is a “bursting frequency,” and explains the $1/d$ contribution to the transport velocity at smaller sizes. This result has been confirmed both in experimental and in field studies (*Advances in Water Resources*, in press).

TEACHING EXPERIENCE: PHYSICS AND PHYSICAL SCIENCES

University of California

Preparation for Physics (PHY1); Basic Physics (PHY3B, 3C); Basic Physics Laboratory (Physics of Medical Imaging, PHY3LA); Basic Physics Laboratory (3LB); Fundamental Physics (PHY5A, 5B, 5C, 5E); Fundamental Physics Laboratory (PHY5LA, 5LB)

California State Universities

Fundamentals of Physics [Mechanics (PHY225A), Electricity/Magnetism (PHY225B)]; Elementary Physics Lab (PHY211AL); Fundamental Physics Lab (PHY225AL, 225BL, 225CL); Basic Concepts of Physics Lab (PHY121L); Physical Science I (PHY106L); Patterns in Nature (PHY100); Thermal and Statistical Physics (PHY416); Electromagnetic Theory (PHY330, 350); Modern Physics (340); Introduction to Mathematical Physics (PHY410); Atomic Spectra (PHY476); Modern Optics (PHY411)

Private Universities (La Sierra Academy, University of Redlands)

General Physics (PHY232, 233); Fundamentals of Physics (PHY20, 21); Physics of Waves (PHY235); Advanced Electricity and Magnetism (PHY132, 133)

California Community Colleges

Introduction to Physical Science (PHYSICI1); Fundamentals of Physics (PHY110); Fundamental Physics Lab (PHY11)

TEACHING EXPERIENCE: GEOLOGY AND EARTH SCIENCES

California Community Colleges

Introduction to Earth Sciences (ES20); Astronomy (AST1A)

TEACHING EXPERIENCE: MATHEMATICS

University of California

Introduction to Calculus (MTH9A, 9B), Differential Equations (Math 46), Multivariate Calculus (10B)

LANGUAGES

English: native;

German: fluent; certificates from Goethe Institute and German Academic Exchange Service; - translated 202 pages of *German Industrial Guidelines for Air Pollution Control* into English, 1989-1991, for the Association of German Engineers (VDI).

MEMBERSHIPS

American Geophysical Union (1995-)

American Physical Society (1980-)

REFEREED FOR FOLLOWING JOURNALS

J. Non-Cryst. Solids (15); *Phil. Mag.* (18); *J. Stat. Phys.* (1); *Physica B* (1); *Physica Status Solidi* (2); *J. Applied Physics* (2); *Water Resour. Res.* (4); *Soil Sci. Soc. Amer. J.*, (2); *Transport in Porous Media* (1); *Adv. in Water Res.* (2); *Vadose Zone Journal* (3); *Soil Science* (1); *J. Geophys. Res.* (2); *Rev. of Geophys.* (1); *Hydrogeology Journal* (1); *Optimization and Engineering* (1), AGU Monograph (1).

EXTENDED INVITED CONSULTATIONS

1995 August, Vanderbilt University and the Journal of Non-Crystalline Solids, Host: Robert A. Weeks, editor of the Journal of Non-Crystalline Solids. Consultation Subject: Transport in Disordered Systems. Three-day sponsored visit.

1994 November, University of Bologna, Host: Professor Loris Ferrari (collaborator of Nobel Prize Winner, Sir Neville Mott, with publications on the glass transition). Research subject: The Glass Transition in Viscous Liquids. Two-week sponsored visit with two paid seminars.

1993 August, King's College London, Hosts: Professor Robert Hill and Dr. Leonard Dissado. Research Subject: Non-exponential Relaxation and Transport in Disordered Systems. One-week sponsored visit with one seminar.

1993 July, Polish Academy of Sciences and Hugo Steinhaus Center for Stochastic Studies, Hosts: Professor Aleksander and Karina Weron. Research Subject: Non-exponential relaxation. Two-week sponsored visit with two seminars.

EXTERNAL FUNDING

USDA Cooperative Agreement, 2004, 15K, Calculation of frequency-dependent conductivity of hydrated clay minerals.

Phelps-Dodge, (Private) 2004, 13K, Calculation of the air permeability of porous media.

CONFERENCE FUNDING

2004 European Geosciences Union (Spring Meeting, Nice)
2004 From Particle Size to Sediment Dynamic (Hanse Institute for Advanced Study, Delmenhorst, Germany)
2003 NSF Workshop on Underutilized Methods in Subsurface Hydrology
2003 Hydrofractals 03, ETH, Monte Verita, Switzerland
2001 International Conference on Hopping and Related Phenomena, Shef'ayim, Israel
2001 Symposium on Complex Systems, University of Illinois, Urbana-Champaign
1998 American Ceramics Society Meeting, October, West Virginia
1997 Scholarship to Incorporated Research Institutions for Seismology Workshop, Breckenridge, Colorado
1996 Gordon Conference on Fractals, New Hampshire
1993 International Conference on Hopping and Related Phenomena, Glasgow, Scotland, and
International Discussion Meeting on Relaxation in Complex Systems, Alicante, Spain
1992 Gordon Conference on Dielectrics, New Hampshire
1983 NSF Travel Allowance to International Conference on Amorphous and Liquid Semiconductors, Tokyo, Japan

CUMULATIVE PUBLICATIONS

1.1 Refereed Technical Articles: Physics

- 1.1. Hunt, A. and Pollak, M. 1985, A Theory for the Width of the Coulomb Gap, *Journal of Physics*: **C18**, 5325-5334.
- 1.2. Hunt, A. and Pollak, M. 1986, Cohesive Energies in Certain Sequences of Cubic and Square Lattices *Philosophical Magazine* **53(5)**, 353-366.
- 1.3. Hunt, A. 1987, Critical Behavior in Electron Glass, *Philosophical Magazine* **55(4)**, 523-530.
- 1.4. Hunt, A. 1987, A New Percolation Theory for Many-Electron Excitations at Low Temperatures, *Journal of Physics*: **C20**, 1469-1482.
- 1.5. Hunt, A. 1989, The Relationship Between the Conductivity and the Glass Temperature for Hopping Systems, *Physical Review* **B39(BR)** 11154
- 1.6. Hunt, A. 1990, Approximate Thermodynamical Treatment of the Coulomb Gap, *Philosophical Magazine Letters* **62(5)**, 371-376.
- 1.7. Hunt, A. 1990, An Elementary Treatment of Sequential Correlations in Non-Local Relaxation, *Philosophical Magazine Letters* **62(6)**, 399-405.
- 1.8. Hunt, A. 1990, Frequency-Dependent Conductivity in Glasses, *Journal of Physics: Condensed Matter* **2(46)**, 9055-9063.
- 1.9. Hunt, A. 1990, Incorporation of Finite Temperature Structure and Statistics into Conductivity Calculations in the Coulomb Gap, *Physics Letters A* **151(3-4)**, 187-190.
- 1.10. Hunt, A. 1991, The Frequency-Dependent Conductivity of the Electron Glass, *Physics Letters A* **156(9)**, 502-508.
- 1.11. Hunt, A. 1991, One-Dimensional Hopping Conductivity Calculations, *Philosophical Magazine* **64(3)**, 327-334; Erratum, *Philosophical Magazine* **66(6)**, 843-843 (1992).
- 1.12. Hunt, A. 1991, The Calorimetric Glass Transition: A Simple Model, *Philosophical Magazine* **64(5)**, 563-577.
- 1.13. Hunt, A. 1991, The AC Conductivity of Variable-Range Hopping Systems, Such As Amorphous Semiconductors, *Philosophical Magazine* **64(5)**, 579-589.
- 1.14. Hunt, A. 1991, Transport in Ionic Conducting Glasses, *Journal of Physics: Condensed Matter* **3(40)**, 7831-7842.
- 1.15. Hunt, A. 1991, A Percolation Treatment of the AC Hopping Conductivity at Low Frequencies and Dimensionalities, *Journal of Non-Crystalline Solids* **134(3)**, 287-292.
- 1.16. Hunt, A. 1991, The AC Conductivity of the Fermi Glass: A Model for Glassy Conduction, *Solid State Communications* **80(3)**, 151-155.
- 1.17. Hunt, A. 1992, Transport in Ionic Conducting Glasses 2: Scaling Relations and Approximate Power-Law Behavior, *Journal of Physics: Condensed Matter* **4(24)**, 5371-5381.
- 1.18. Hunt, A. 1992, The Low Frequency Conductivity of the Fermi Glass, *Journal of Physics: Condensed Matter*, **4(33)**, 6957-6970.

- 1.19. Hunt, A. 1992, A Method for Distinguishing Power-Law and Approximate Power-Law Behavior in Glassy Relaxation: Ionic Conducting Glasses, *Applied Physics A* **54(6)**, 508-510.
- 1.20. Hunt, A. 1992, A Simple Connection Between the Melting Temperature and the Glass Temperature in a Kinetic Theory of the Glass Transition, *Journal of Physics: Condensed Matter, Letter to the Editor* **4(32)**, L429-L431.
- 1.21. Hunt, A. 1992, Some Universalities in the Relaxation of Glasses, *Journal of Non-Crystalline Solids* **144(1)**, 21-31.
- 1.22. Hunt, A. 1992, A Purely Kinetic Justification for Application of Ehrenfest Theorems to the Glass Transition, *Solid State Communications* **84(3)**, 263-266.
- 1.23. Hunt, A. 1992, Dielectric and Mechanical Relaxation in Liquids and Glasses: Transition From Effective Medium to Percolation Theories, *Solid State Communications* **84(7)**, 701-704.
- 1.24. Hunt, A. 1992, A Probabilistic Mechanism Hidden Behind the Universal Power Law For Dielectric Relaxation-General Relaxation Equation: Comment, *Journal of Physics: Condensed Matter* **4(50)**, 10503-10512.
- 1.25. Hunt, A. 1993, A General Treatment of One-Dimensional Hopping Conduction, *Solid State Communications* **86(12)**, 765-768.
- 1.26. Hunt, A. 1993, Dielectric Relaxation in Dipole Glasses, and Thermal Relaxation and the Glass Transition in Systems with a Maximum Relaxation Time, *Journal of Non-Crystalline Solids* **160(1-2)**, 42-51.
- 1.27. Hunt, A. 1993, An Explanation for the Correlation Between the Glass Temperature and the Temperature of the Extrapolated Divergence of the Viscosity in Vogel-Fulcher Phenomenology, *Solid State Communications* **88(5)**, 377-379.
- 1.28. Hunt, A. 1994, New Developments in the Theory of the Electrical Conductivity of Spatially Random Electronic Hopping Systems, *Journal of Physics: Condensed Matter* **6(6)**, 1239.
- 1.29. Hunt, A. 1994, An Explanation for the Correlation Between the Decoupling Index and the K-W-W Stretching Parameter, *Journal of Non-Crystalline Solids* **168(3)**, 258.
- 1.30. Hunt, A. 1994, Finite-Size Effects on the Glass Transition Temperature, *Solid State Communications* **90(8)**, 527.
- 1.31. Hunt, A. 1994, Statistical and Percolation Effects on Ionic Conduction in Amorphous Systems, *Journal of Non-Crystalline Solids* **175(1)**, 59-70.
- 1.32. Hunt, A. 1994, On the "Universal" Scaling of the Dielectric Relaxation in Dipole Glasses, *Journal of Physics: Condensed Matter* **6(39)**, 8087-8102.
- 1.33. Hunt, A. 1994, An Explanation for the Kauzmann "Paradox" and its Relation to Relaxation Times, *Journal of Non-Crystalline Solids* **175(2)**, 129-136.
- 1.34. Hunt, A. 1994, The Pressure Dependence of the Glass Transition Temperature in Some Ionic Liquids, *Journal of Non-Crystalline Solids* **176(2)**, 288.
- 1.35. Hunt, A. 1995, Approximate Power-Law Conductivity in the Multiple-Hopping Regime *Journal of Non-Crystalline Solids* **183(1-2)**, 109.
- 1.36. Hunt, A. 1995, Correlation Functions for Ionic Motion from NMR Relaxation and Electrical Conductivity in the Glassy Fast-Ion Conductor $(\text{Li}_2\text{S})_{0.56}(\text{SiS}_2)_{0.44}$: Comment, *Physical Review* **B51(17)**, 12000.

- 1.37. Hunt, A. 1995. Deducing Low-Frequency Scaling of Transport Properties in an Inhomogeneous Medium From Thermodynamics and Geometry *Philosophical Magazine* **B72(4)**, 401-415.
- 1.38. Hunt, A. 1996, Some Comments on the Dynamics of Super-Cooled Liquids Near the Glass Transition, *Journal of Non-Crystalline Solids* **195(3)**, 293-303.
- 1.39. Hunt, A., 1997, The Mixed-Alkali Effect Discussed within the Context of Percolative Transport, *Journal of Non-Crystalline Solids* **195(3)**, 293-303.
- 1.40. Hunt, A. G., 1998, A New Calculation of 1/f Noise in Disordered Systems with Hopping Transport, *Journal of Physics: Condensed Matter Letter to the Editor*, **10(18)**, L303-L310.
- 1.41. Hunt, A. G., 2004, Continuum Percolation Theory for Transport Properties in Porous Media, accepted Dec., 2004 to *Philosophical Magazine B*.

1.2 Refereed Technical Articles: Geology

- 1.42. Hunt, A. G. and Malin, P. E., 1998, Possible Triggering of Heinrich Events by Ice-Load Induced Earthquakes, *Nature* **393(6681)**, 156-158.
- 1.43. Hunt, A. G., and Wu, Q. J., 2004 Climatic Influences on Holocene variations in soil erosion rates on a small hill in the Mojave Desert, *Geomorphology*, **58**: 263-289.
- 1.44. Hunt, A. G., and Elders W. 2004, Climate Change, and the Evolution of the Grand Canyon and Colorado River Delta, The Colorado River: Origin and Evolution, Grand Canyon Association Monograph no. 12, ed. R. A. Young and E. E. Spamer, 191-194.
- 1.45. Hunt, A. G., 2004, Comment on “Modeling low-frequency magnetic-field precursors to the Loma Prieta Earthquake with a precursory increase in fault-zone conductivity,” by M. Merzer and S. L. Klemperer, accepted, Jan., 2005, to *Pure and Applied Geophysics*.

1.3 Refereed Technical Articles: Hydrology

- 1.46. Kabala, Z.J., and Hunt, A. 1993, A Master Equation for Reactive Solute Transport, *Stochastic Hydrology and Hydraulics* **7(4)**, 255-268.
- 1.47. Hunt, A. 1995 Fractal and Superdiffusive Transport and Hydrodynamic Dispersion in Heterogeneous Porous Media: Comment (Review) *Transport in Porous Media* **21(2)**, 175-188.
- 1.48. Hunt, A. G., 1998, Upscaling in Subsurface Transport Using Cluster Statistics of Percolation, *Transport in Porous Media* **30(2)**, 177-198.
- 1.49. Hunt, A. G., 1999, A Probabilistic Treatment of Fluvial Entrainment of Cohesionless Particles, *Journal of Geophysical Research*. **104** 15409-15413.
- 1.50. Hunt, A. G., 2000, Percolation Cluster Statistics and Conductivity Semi-variograms, *Transport in Porous Media*, **39** 131-141.
- 1.51. Hunt, A. G., and Gee, G. W., 2002, Application of Critical Path Analysis to Fractal Porous Media: Comparison with Examples from the Hanford Site, *Advances in Water Resources*, **25**, 129-146.
- 1.52. Hunt, A. G., 2004, An Explicit Derivation of an Exponential Dependence of the Hydraulic Conductivity on Saturation, *Advances in Water Resources*, **27**, 197-201.

- 1.53. Hunt, A. G., and Gee, G. W., 2002, Water Retention of Fractal Soil Models Using Continuum Percolation Theory: Tests of Hanford Site Soils, *Vadose Zone Journal*, **1**, 252-260.
- 1.54. Hunt, A. G., 2003, Some Comments on the Scale Dependence of the Hydraulic Conductivity in the Presence Of Nested Heterogeneity, *Advances in Water Resources*, **26**, 71-77.
- 1.55. Hunt, A. G., and Manga, M., 2003, Effects of Bubbles on the Hydraulic Conductivity of Porous Materials – Theoretical Results, *Transport in Porous Media*, **52**, 51-65, 2003.
- 1.56. Hunt, A. G., 2003, Percolative Transport and Fractal Porous Media, *Chaos, Solitons, and Fractals*, **19**, 309-325.
- 1.57. Hunt, A. G., and Ewing, R. P., 2003, On The Vanishing of Solute Diffusion in Porous Media at a Threshold Moisture Content, *Soil Science Society of America Journal*, **67**, 1701-1702, 2003.
- 1.58. Hunt, A. G., and Papanicolaou, T., 2003, Theory for the Downstream Transport of Large Clasts in Turbulent Flow, *Advances in Water Resources*, **26**, 1205-1211, 2003.
- 1.59. Hunt, A. G., and Gee, G. W., 2003, Wet-End Deviations from Scaling of the Water Retention Characteristics of Fractal Porous Media, *Vadose Zone Journal*, **2**, 759-765.
- 1.60. Hunt, A. G., 2004, Continuum Percolation Theory for Water Retention and Hydraulic Conductivity of Fractal Soils: 1. Estimation of the Critical Volume Fraction for Percolation, *Advances in Water Resources*, **27**, 175-183.
- 1.61. Hunt, A. G., 2004, Continuum Percolation Theory for Water Retention and Hydraulic Conductivity of Fractal Soils: 2. Extension to Non-Equilibrium, *Advances in Water Resources*, **27**, 245-257.
- 1.62. Steenhuis, T., Hunt, A. G., Parlange, J.-Y., and Ewing, R. P., 2004, Assessment of the Application of Percolation Theory to Water-Repellent Soils, accepted to *Australian Journal of Soil Research*, Oct., 2003.
- 1.63. Hunt, A. G., 2004, Comparing van Genuchten and percolation theoretical formulations of the hydraulic properties of unsaturated media, *Vadose Zone Journal*, **3**: 1483-1488.
- 1.64. Hunt, A. G., 2004, Percolation Theory and the Future of Hydrogeology (invited), accepted Sept., 2004 to *Hydrogeology Journal*.
- 1.65. Hunt, A. G., 2004, Continuum Percolation Theory and Archie's Law, 2004, *Geophysical Research Letters*, **31** (19): art. no. L19503.
- 1.66. Hunt, A. G., 2004, Comment on "Fractal approach to hydraulic properties in unsaturated porous media," by Y.F. Xu and Ping Dong, *Chaos, Solitons, and Fractals*, **19** 327-337 (2004), accepted, Sept., 2004 to *Chaos, Solitons, and Fractals*.
- 1.67. Hunt, A. G., 2005, Scale-dependent dimensionality cross-over; implications for scale-dependent hydraulic conductivity in anisotropic porous media, accepted Jan., 2005 to *Hydrogeology Journal*.
- 1.68. Hunt, A. G., 2005, Continuum Percolation Theory for Saturation Dependence of Air Permeability, *Vadose Zone Journal*, **4**: 134-138.
- 1.69. Hunt, A. G., and Skinner, T. H., 2005, Hydraulic Conductivity Limited Equilibration: Effect on Water-Retention Characteristics, *Vadose Zone Journal*, **4**: 145-150.
- 1.70. Hunt, A. G., 2005, Spatio-Temporal Scaling of Braided Streams, accepted, Feb. 2005 to *Journal of Hydrology*.

1.4 Refereed Technical Articles: Climate

- 1.71. Hunt, A. G., 1999, Understanding a Possible Correlation between El Niño Occurrence Frequency and Global Warming, *Bulletin of the American Meteorological Society* **80(2)** 297-300
- 1.72. Hunt, A. G., 2000, A Stochastic Atmospheric Trigger for El Niño: Implications for East Pacific Rise Seismicity, *Eos*, **81** 272.
- 1.73. Hunt, AG and Tsonis, A.A., 2000, The Pacific Decadal Oscillation and long-term climate prediction, *Eos*, **81** 581.
- 1.74. Ghan, S. J., Bian, X., Hunt, A. G., and Coleman, A., 2002, The Thermodynamic Influence of Subgrid Orography in a Global Climate Model, *Climate Dynamics*, 20: 31-44.
- 1.75. A. A. Tsonis and Hunt, A. G., 2003, The Role of ENSO in Global Climate Fluctuations, o *Meteorology and Atmospheric Physics*, **84**, 229-242.
- 1.76. Leung, L. R. Qian, Y., Bian, X., and Hunt, A. G., 2002, Hydroclimate of the Western United States Based on Observations and Regional Climate Simulation of 1981-2000. Part II: Interannual Variability, *Journal of Climate*, **16**, 1912-1928.

2. Review Articles (Refereed)

- 2.1. Hunt, A. 1993, Non-Debye Relaxation and the Glass Transition, *Journal of Non-Crystalline Solids* **160(3)**, R183-227.
- 2.2. Hunt, A. G., 2001, Applications of Percolation Theory to Porous Media with Distributed Local Conductances, *Advances in Water Resources* **24(3,4)**, 279-307.
- 2.3. Hunt, A. G., 2001, El Niño: Dynamics, its Role in Climate Change, and its Effects on Climate Variability, *Complexity*, **6**, 16-32.
- 2.4. Hunt, A. G., 2001, AC Hopping Conduction: Perspective from Percolation Theory, *Philosophical Magazine, B*, **81** 875-913.
- 2.5. Hunt, A. G., 2004, Hydraulic Conductivity, Pressure-Saturation Curves, and Solute Diffusion in Unsaturated Porous Media, accepted, Nov., 2004, to *Complexity*.
- 2.6. Hunt, A. G., 2004, Flow and Transport in Porous Media: Perspective from Percolation Theory, invited by Reviews of Geophysics, May, 2003.

3. Refereed Technical Articles: Submitted

- 3.1. Hunt, A. G., and S. Logsdon, 2005, Percolation treatment of charge transfer in hydrated smectites, submitted Jan. 2005, to *Soil Science Society of America Journal*.
- 3.2. Hunt, A. G., and R. P. Ewing, 2005, The saturation dependence of the electrical conductivity in real porous media, submitted Feb., 2005 to *Vadose Zone Journal*.
- 3.3. Tsonis, A. A., J. B. Elsner, A. G. Hunt, 2004, Global Temperature Fluctuations Regulate ENSO Frequency, submitted, Dec. 2004 to *Geophysical Research Letters*.

4. Refereed Technical Articles: In Preparation

- 4.1. Hunt, A. G., 2004, Effects of Soil Structure on the Hydraulic Conductivity and Air Permeability, to be submitted to *Soil Science Society of America, Journal*.
- 4.2. Hunt, A. G., and Ewing, R. P., 2004, Implications of Continuum Percolation Theory for Fractal Porous Media on Dispersion, to be submitted to *Advances in Water Resources*.
- 4.3. Hunt, A. G., 2004, Using Cluster Statistics of Percolation Theory to Calculate Distributions of Hydraulic Conductivity in Anisotropic Porous Media, to be submitted to *Advances in Water Resources*.
- 4.4. Hunt, A. G., and Ewing, R. P., 2004, Comparing Effective-Medium and Critical Path Analysis/Percolation Theory Calculations of Unsaturated Hydraulic Conductivity for Fractal Porous Media, to be submitted to *Advances in Water Resources*.
- 4.5. Hunt, A. G., 2004, Unsaturated Hydraulic Conductivity of Anisotropic Systems, to be submitted to *Vadose Zone Journal*.
- 4.6. Hunt, A. G., A Model for Hillslope Evolution through Effects of Rodent Burrowing, to be submitted to *Geomorphology*.
- 4.7. Hunt, A. G., Surface Stability from Distributions of Desert Varnish: Method to Estimate Effects of Soil Creep, to be submitted to *Earth Surface Processes and Landforms*.
- 4.8. Hunt, A. G., El Niño, Colorado Plateau Climate, and Anasazi Demographics, *The Holocene*, to be submitted.

5. Invited Contributions (Not Reviewed Unless Noted)

- 5.1. Pollak, M. and Hunt, A., 1985, Very Slow Relaxation in Systems Lacking Translational Symmetry, with Emphasis on Disordered Insulators, *Philosophical Magazine* **B52**, 391 (in honor of Sir Neville Mott).
- 5.2. Hunt, A., 1994, Percolative Aspects of Viscous Flow Near the Glass Transition (reviewed), *International Journal of Theoretical Physics*, **B8(7)**, 855.

6. Technical Book Chapters (Not Reviewed)

- 6.1. Pollak, M. and Hunt, A., 1991, Ultra-Slow Hopping Processes, in *Hopping Conduction in Solids*, edited by M. Pollak and B. I. Shklovskii, North Holland, Amsterdam.

7. Conference Proceedings and Festschrifts

- 7.1. Hunt, A. and Pollak, M. 1983, An Analytical Calculation of the Density of States in the Coulomb Gap (reviewed), *Journal of Non-Crystalline Solids*, **59-60**, 93.
- 7.2. Pollak, M. and Hunt, A., 1985, Ultra-Slow Processes in Disordered Insulators (reviewed), *Journal of Non-Crystalline Solids*, **97-98**, 131.
- 7.3. Hunt, A. and Pollak, M., 1990, The Frequency-Dependent Conductivity of Spatially Random Systems, in *Hopping and Related Phenomena*, (not reviewed) edited by M. Pollak and H. Fritzsche, World Scientific, Singapore.

- 7.4. Hunt, A., 1994, Percolation, Self-Similarity, Power-Law Conductivity, Scaling Relationships and 1D Hopping Conductivity, (reviewed) *Hopping and Related Phenomena 5*, edited by C. J. Adkins, A. R. Long, and J. A. McInnes, World Scientific, Singapore.
- 7.5. Hunt, A. G., 1999, Dependence of the Hydraulic Conductivity on Space and Time Scales, 1997 USDA Salinity Laboratory Workshop on Measuring Hydraulic Conductivity in the Vadose Zone, (not reviewed) R. Van Genuchten, F. Leij, and L. Wu, eds.
- 7.6. Hunt, A. G., 1999, Paleobotanical Evidence for the Important Role of the Gulf of California in the Southwestern Monsoon, 24th Annual NOAA Workshop on Climate Diagnostics and Prediction, (not reviewed) 96-98.
- 7.7. Hunt, A. G., 1999, A Physical Interpretation of the Correlation Between El Niño and Global Warming, 24th Annual NOAA Workshop on Climate Diagnostics and Prediction, (not reviewed) 33-36.
- 7.8. Hunt, A. G., 2000, Mixed-Alkali Effect: Some New Results, (reviewed): *Journal of Non-Crystalline Solids* **255**, 47-55.
- 7.9. Hunt, A. G., 2000, Fragility of Liquids Using Percolation-Based Transport Theories: Correlation of Limiting Slope of the Viscosity with Non-exponentiality of Relaxation, *Journal of Non-Crystalline Solids*, **274**, (reviewed) 93-101.
- 7.10. Hunt, A. G., 2000, Possible Role for the PDO as an Enhancer of the Solar Signal, 25th Annual NOAA Workshop on Climate Diagnostics and Prediction, (not reviewed) 31-34.
- 7.11. Hunt, A. G., 2001, Michael Pollak and Transport in Disordered Systems, *Phil. Mag. B* **81** 813-817.
- 7.12. Hunt, A. G., 2002, Slow Conductivity Relaxation in the Fermi Glass (reviewed), IX Int. Conf. on Hopping and Related Phenomena, *Phys. Status. Sol. B* **230** 55-59.

8. Reviewed Abstracts

- 8.1. Hunt, A., 1984, Coulomb Gap in Disordered Insulators, *Solid State Electronics* **28**, 206-207.