Dionissios T. Hristopulos

Curriculum Vitae

Contact

Department of Mineral Resources Engineering
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Education

Ph.D., Theoretical Physics, June 1991
Princeton University, Princeton, NJ
Dissertation: *Aspects of the Hubbard Model in Relation to High Tc Superconductivity*
Advisers: Prof. Phil W. Anderson and Prof. B. S. Shastry

M.A., Physics, June 1987
Princeton University, Princeton, NJ
Experimental Project: *Construction of an Electromagnetic Graphite-fiber Mass Balance*
Adviser: Prof. Russ Giannetta

Diploma, Electrical Engineering, June 1985
National Technical University of Athens, Athens, Greece
Thesis: *Optical Activity and the Electrooptic Effect in* $\mathrm{B_{12}GeO_{20}}$ *Crystals*
Adviser: Prof. A. A. Serafetinidis
GPA: 8.5/10.0

Professional Experience

9/2007 - Present **Professor, Technical University of Crete, Greece**

- Statistical analysis of earthquake return times and fiber bundle fracture models.
- Development of covariance functions and interpolation methods based on Spartan Spatial Random Fields.
- Analysis of anisotropy in scattered spatial data.

9/2002 - 8/2007 **Associate Professor, Technical University of Crete, Greece**

- Development of spatial interpolation and classification methods based on statistical physics concepts.
- Development of effective parameters in random porous media.
- Modelling of mechanical and flow properties in porous materials, natural and artificial.

8/2000 - 9/2002 **Research Scientist, Pulp and Paper Research Institute, Pointe Claire, Canada**

- Research focused on modeling paper web dynamics and fracture of heterogeneous materials.
- Advised paper mill engineers on impact of variability on quality control and improvement of paper strength properties.
- Presented research seminars to colleagues and informative talks to pulp and paper industry representatives.

- Developed MATLAB® programs for statistical analysis of paper and pulp properties.
- Developed new physical models to explain tension variations in paper webs and statistical variations of tensile paper strength.

1995-2000 **Research Assistant Professor, Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, USA**

- Research focus on new geostatistical methods (theoretical and computational) and investigations in environmental fluid mechanics.
- Developed a renormalization group method for hydraulic conductivity coarse-graining and Monte Carlo algorithms for geostatistical simulations (FORTRAN, MATLAB® codes).

1993-1995 **Research Associate, Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, USA**

- Investigated geostatistical applications in environmental mapping and coarse-graining methods for heterogeneous media.
- Developed computational methods for solving flow differential equations in heterogeneous (e.g., subsurface) media.

Other Experience

Summer 1986 **Assistant in Research, Physics Department, Princeton University, New Jersey, USA**

- Studied the structure and phase transitions of biolipids using X-ray imaging methods in the group of Prof. Sol Gruner.

1981 - 1985 **Scientific Translation, Periscope of the Sciences, Athens, Greece**

- Translation of English, French and German popular science articles in Greeks and composition of articles from several sources.

Summer 1984 **Summer Trainee, Deutscher Akademischer Austausch Dienst, Jülich, Germany**

- Maintenance of short-wave radio emitters at Deutsche Welle Broadcasting Station.

Honors

2010 *Recognition of Research Project Achievement, EC*
The Marie Curie project SPATSTAT (2005-2008), coordinated by D. T. Hristopulos was selected by the European Commission as a success story and highlighted in the special edition "Marie Curie Actions: Inspiring Researchers", European Commission, Luxembourg: Publications Office of the European Union, 2010 ISBN 978-92-79-14328-1.

2007 *Invited Presentation, University of Klagenfurt, Austria*
Conference: statGIS2007
Presentation title: On the Importance of Being Spartan

2006 *Invited Presentation, University of Klagenfurt, Austria*
Event: Summer School statGIS2006
Presentation title: Spartan Random Fields Modelling

2005 *Invited Presentation, Vienna, Austria*
Conference: European Geophysical Union 2003 General Assembly
Presentation title: Applications of the Renormalization Group in Upscaling Hydrological Parameters

2003 *Johannes A. Van den Akker International Prize for Advances in Paper Physics*

Awarded by international panel of judges appointed by the Technical Association of the Pulp and Paper Industry (TAPPI) Paper Physics Committee for the paper: "A Model of Machine-Direction Tesion Variations in Paper Webs with Runnability Applications", *the Journal of Pulp and Paper Science, Dec. 2002,* in recognition of the greatest contribution to the field of paper physics in 2003.

1998-Present *Associate Editor*
Journal: Stochastic Environmental Research and Risk Assessment
Publisher: Springer Verlag

1985 *Stanley Seeger Fellowship, Princeton University, Princeton, USA*

Research Interests

New geostatistical methods based on Spartan Spatial Random Fields

Monte Carlo simulations of spatially distributed systems

Spatial interpolation and classification methods based on Ising spin Hamiltonians

Statistical analysis of earthquake return times

Fiber Bundle models of fracture and their relation to earthquake statistics

Applications of geostatistics to lignite reserves and quality estimation

Space-time analysis of ground water table depth

Statistical mechanical approach to grain growth modeling

Research highlights

Monte Carlo simulations with a novel variational ground state for the Hubbard model in connection with high temperature superconductivity (PhD thesis, *Princeton University*)

Series of papers that provided higher-order support for the exponential dielectric permittivity - effective fluid permeability ansatz of Landau-Lifshitz-Matheron, using advanced field-theory methods (1995-2003, Chapel Hill - *Technical University of Crete*)

Analysis of web-tension variations in printing presses leading from first principles to a low-frequency-pass-filter model of the paper web; publication awarded the 2003 Van den Akker Prize for Advances in Paper Physics (2000 - 2002, *Paprican, Canada*)

Development of a non-parametric method for the estimation of statistical geometric anisotropy in spatial data. Code available below (Matlab) and as component of an integrated R interpolation system from www.intamap.org (2008 - Present, *Technical University of Crete*)

Introduction of the new family of Spartan spatial random fields for geostatistical analysis, leading to new covariance models and computationally fast interpolation approaches; developing links with statistical field theories, Markov random fields, machine learning and Gaussian processes (*2003 - Present, Technical University of Crete*)

Recent Funded Research Projects

BRIDGSEISMTIME: Bridging the timescales in fault-slip accumulation: from the earthquake record to the geological record. www.mred.tuc.gr/projects/BridgSeismTime/

Marie Curie International Incoming Fellowship (MC IIF) (fellow: V. Mouslopoulou): FP7, European Commission.
Budget: 202.163€.
Duration: 2009-2011.
Success rate of MC IIF projects is 23%-24%.

INTAMAP: Interoperability and Mapping. www.intamap.org

Specific Targeted Research Project (STREP), (IST Call 5: IST-2005-2.5.12, ICT for Environmental Risk Management): FP6, European Commission.
TUC Budget/Total Budget: 174.960€/1.856.000€.
Duration: 2006-2009.
Success rate of FP6 IST STREP calls was 11.7%.

SPATSTAT: Development of Spartan Spatial Random Field Models for Geostatistical Applications. www.mred.tuc.gr/projects/spatstat/

Marie Curie Transfer of Knowledge (MC TOK): FP6, European Commission.
Budget: 304.806€.
Duration: 2005-2008.
Success rate of FP6 MC TOK projects is 23%-24%.

ACTIVATION: Super high Energy Milling in the Production of Hard Alloys, Ceramic and Composite Materials. www.mred.tuc.gr/projects/activation/index.htm

Specific Targeted Research Project (STREP), (NMP2, Nanotechnology and nanosciences, knowledge-based multifunctional materials and new production processes and devices): FP6, European Commission.
TUC Budget/Total Budget: 334.800€/ 1.999.999 €(Coordination TUC).
Duration: 2004-2007.
Success rate of FP6 NMP STREP calls was 16%.

PYTHAGORAS II: Development of novel geostatistical methods in environmental pollutant mapping and environmental risk assessment.

Greek Ministry of Education, Operational Programme for Education and Initial Vocational Training: VIR-Pithagoras II, co-financed by the Third Community Support Framework and the European Social Fund.
Budget: 50000 €.
Duration: 2005-2006.

Publications

Books (1)

D. T. Hristopulos and G. Christakos, *Spatiotemporal Environmental Health Modelling*. Boston: Kluwer Academic (Springer), 1st ed., 1998.

Journal Papers (42)

G. Dubois, D. Cornford, **D. Hristopulos**, E. Pebesma, and J. Pilz, "Introduction to this special issue on geoinformatics for environmental surveillance," *Computers and Geosciences*, 2010. Article in Press. Online at: http://dx.doi.org/10.1016/j.cageo.2010.06.002.

D. T. Hristopulos and M. Žukovič, "Relationships between correlation lengths and integral scales for covariance models with more than two parameters," *Stochastic Environmental Research and Risk Assessment*, 2010. Article in Press. Online at: http://dx.doi.org/10.1016/j.cageo.2010.06.002.

D. T. Hristopulos and S. N. Elogne, "Computationally efficient spatial interpolators based on Spartan spatial random fields," *IEEE Transactions On Signal Processing*, vol. 57, no. 9, pp. 3475–3487, 2009.

M. Žukovič and **D. T. Hristopulos**, "The method of normalized correlations: A fast parameter estimation method for random processes and isotropic random fields that focuses on short-range dependence," *Technometrics*, vol. 51, no. 2, pp. 173–185, 2009.

M. Žukovič and **D. T. Hristopulos**, "Multilevel discretized random field models with "spin" correlations for the simulation of environmental spatial data," *Journal of Statistical Mechanics - Theory and Experiment*, FEB 2009. Art. No. P02023.

A. Moustakas and **D. T. Hristopulos**, "Estimating tree abundance from remotely sensed imagery in semi-arid and arid environments: bringing small trees to the light," *Stochastic Environmental Research and Risk Assessment*, vol. 23, no. 1, pp. 111–118, 2009.

A. Chorti and **D. T. Hristopulos**, "Nonparametric identification of anisotropic (elliptic) correlations in spatially distributed data sets," *IEEE Transactions on Signal Processing*, vol. 56, no. 10, Part 1, pp. 4738–4751, 2008.

A. Žukovič and **D. T. Hristopulos**, "Spartan random processes in time series modeling," *Physica A-Statistical Mechanics and its Applications*, vol. 387, no. 15, pp. 3995–4001, 2008.

D. T. Hristopulos and M. Demertzi, "A semi-analytical equation for the Young's modulus of isotropic ceramic materials," *Journal Of The European Ceramic Society*, vol. 28, no. 6, pp. 1111–1120, 2008.

M. Žukovič and **D. T. Hristopulos**, "Environmental time series interpolation based on Spartan random processes," *Atmospheric Environment*, vol. 42, no. 33, pp. 7669–7678, 2008.

S. N. Elogne, **D. T. Hristopulos**, and E. Varouchakis, "An application of Spartan spatial random fields in environmental mapping: focus on automatic mapping capabilities," *Stochastic Environmental Research and Risk Assessment*, vol. 22, no. 5, pp. 633–646, 2008.

D. T. Hristopulos and S. N. Elogne, "Analytic properties and covariance functions for a new class of generalized Gibbs random fields," *IEEE Transactions on Information Theory*, vol. 53, no. 12, pp. 4667–4679, 2007.

D. T. Hristopulos, S. P. Mertikas, I. Arhontakis, and J. M. W. Brownjohn, "Using GPS for monitoring tall-building response to wind loading: filtering of abrupt changes and low-frequency noise, variography and spectral analysis of displacements," *GPS Solutions*, vol. 11, no. 2, pp. 85–95, 2007.

D. T. Hristopulos, "Spatial random field models inspired from statistical physics with applications in the geosciences," *Physica A-Statistical Mechanics and its Applications*, vol. 365, no. 1, pp. 211–216, 2006.

D. T. Hristopulos, L. Leonidakis, and A. Tsetsekou, "A discrete nonlinear mass transfer equation with applications in solid-state sintering of ceramic materials," *European Physical Journal B*, vol. 50, no. 1-2, pp. 83–87, 2006.

D. T. Hristopulos, "Approximate methods for explicit calculations of non-Gaussian moments," *Stochastic Environmental Research and Risk Assessment*, vol. 20, no. 4, pp. 278–290, 2006.

D. T. Hristopulos, "Spartan Gibbs random field models for geostatistical applications (vol 24, pg 2125, 2003)," *SIAM Journal on Scientific Computing*, vol. 26, no. 6, p. 2176, 2005.

A. Kolovos, G. Christakos, **D. T. Hristopulos**, and M. L. Serre, "Methods for generating non-separable spatiotemporal covariance models with potential environmental applications," *Advances in Water Resources*, vol. 27, no. 8, pp. 815–830, 2004.

D. T. Hristopulos and T. Uesaka, "Structural disorder effects on the tensile strength distribution of heterogeneous brittle materials with emphasis on fiber networks," *Physical Review B*, vol. 70, no. 6, 2004.

D. T. Hristopulos, "Renormalization group methods in subsurface hydrology: overview and applications in hydraulic conductivity upscaling," *Advances in Water Resources*, vol. 26, no. 12, pp. 1279–1308, 2003.

D. T. Hristopulos, "Permissibility of fractal exponents and models of band-limited two-point functions for fGn and fBm random fields," *Stochastic Environmental Research and Risk Assessment*, vol. 17, no. 3, pp. 191–216, 2003.

D. T. Hristopulos, "Spartan Gibbs random field models for geostatistical applications," *SIAM Journal on Scientific Computing*, vol. 24, no. 6, pp. 2125–2162, 2003.

D. T. Hristopulos and T. Uesaka, "A model of machine-direction tension variations in paper webs with runnability applications," *Journal of Pulp and Paper Science*, vol. 28, no. 12, pp. 389–394, 2002.

D. T. Hristopulos, "New anisotropic covariance models and estimation of anisotropic parameters based on the covariance tensor identity," *Stochastic Environmental Research and Risk Assessment*, vol. 16, no. 1, pp. 43–62, 2002.

D. T. Hristopulos, "Uncertainty, Scale Dependence and Variability in Stochastic Models for Environmental Risk Assessment," *Technical Chronicles, Scientific Journal of the Technical Chamber of Greece*, vol. V, no. 1-2, pp. 7–15, 2002.

D. T. Hristopulos and G. Christakos, "Practical calculation of non-Gaussian multivariate moments in spatiotemporal Bayesian maximum entropy analysis," *Mathematical Geology*, vol. 33, no. 5, pp. 543–568, 2001.

G. Christakos, **D. T. Hristopulos**, and P. Bogaert, "On the physical geometry concept at the basis of space/time geostatistical hydrology," *Advances in Water Resources*, vol. 23, no. 8, pp. 799–810, 2000.

G. Christakos, **D. T. Hristopulos**, and A. Kolovos, "Stochastic flowpath analysis of multiphase flow in random porous media," *SIAM Journal on Applied Mathematics*, vol. 60, no. 5, pp. 1520–1542, 2000.

D. T. Hristopulos and G. Christakos, "Renormalization group analysis of permeability upscaling," *Stochastic Environmental Research and Risk Assessment*, vol. 13, no. 1-2, pp. 131–160, 1999.

D. T. Hristopulos, G. Christakos, and M. Serre, "Numerical implementation of a space-transformation approach for solving the three-dimensional flow equation," *SIAM Journal on Scientific Computing*, vol. 20, no. 2, pp. 619–647, 1998.

D. T. Hristopulos and G. Christakos, "An analysis of hydraulic conductivity upscaling," *Nonlinear Analysis-Theory Methods & Applications*, vol. 30, no. 8, pp. 4979–4984, 1997.

G. Christakos, **D. T. Hristopulos**, and X. Y. Li, "Multiphase flow in heterogeneous porous media from a stochastic differential geometry viewpoint," *Water Resources Research*, vol. 34, no. 1, pp. 93–102, 1998.

G. Christakos and **D. T. Hristopulos**, "Stochastic indicator analysis of contaminated sites," *Journal of Applied Probability*, vol. 34, no. 4, pp. 988–1008, 1997.

D. T. Hristopulos and G. Christakos, "Diagrammatic theory of effective hydraulic conductivity," *Stochastic Hydrology and Hydraulics*, vol. 11, no. 5, pp. 369–395, 1997.

D. T. Hristopulos and G. Christakos, "Variational calculation of the effective fluid permeability of heterogeneous media," *Physical Review E*, vol. 55, no. 6, Part B, pp. 7288–7298, 1997.

G. Christakos and **D. T. Hristopulos**, "Stochastic radon operators in porous media hydrodynamics," *Quarterly of Applied Mathematics*, vol. 55, no. 1, pp. 89–112, 1997.

G. Christakos and **D. T. Hristopulos**, "Characterization of atmospheric pollution by means of stochastic indicator parameters," *Atmospheric Environment*, vol. 30, no. 22, pp. 3811–3823, 1996.

G. Christakos and **D. T. Hristopulos**, "Stochastic indicators for waste site characterization," *Water Resources Research*, vol. 32, no. 8, pp. 2563–2578, 1996.

G. Christakos, **D. T. Hristopulos**, and C. T. Miller, "Stochastic diagrammatic analysis of groundwater-flow in heterogeneous porous-media," *Water Resources Research*, vol. 31, no. 7, pp. 1687–1703, 1995.

G. Christakos and **D. T. Hristopulos**, "Stochastic space transforms in subsurface hydrology .2. generalized spectral decompositions and Plancherel representations," *Stochastic Hydrology and Hydraulics*, vol. 8, no. 2, pp. 117–138, 1994.

P. W. Anderson, B. S. Shastry, and **D. Hristopulos**, "Class of variational singlet wave-functions for the Hubbard-model away from half filling," *Physical Review B*, vol. 40, no. 13, pp. 8939–8944, 1989.

Peer-Reviewed Papers in Conference Proceedings (26)

D. T. Hristopulos, "Spartan random fields and applications in spatial interpolation and conditional simulation," in *Proceedings of the 12th European Conference on the Mathematics of Oil Recovery, Oxford, UK*, EAGE, SEP 2010. Paper B004. Online at: http://www.earthdoc.org/detail.php?pubid=41284.

M. Žukovič and **D. T. Hristopulos**, "An algorithm for spatial data classification and automatic mapping based on "spin" correlations," in *Proceedings 22nd European Conference on Modeling and Simulation, Nicosia, Cyprus* (L. S. Louca, Y. Chrysanthou, Z. Oplatkova, and K. Al-Begain, eds.).

A. Pavlides, **D. T. Hristopulos**, Z. Agioutantis, K. Kavouridis, and C. Roumpos, "Comparison of lignite reserves estimates in the multilayer deposit of the amyndeo mine," in *Proceedings of the 2nd International Workshop on Geoenvironment and Geotechnics (GEOENV 2008), 8-9 September 2008* (Z. Agioutantis and K. Komnitsas, eds.), pp. 231–236, Athens: Heliotopos Conferences, 2008.

A. Pavlides, **D. T. Hristopulos**, Z. Agioutantis, K. Kavouridis, and C. Roumpos, "Geostatistical analysis of lignite calorific values from a multiseam deposit," in *Proceedings, 3rd International Conference on Sustainable Development Indicators in the Minerals Industry (SDIMI 2007), 17-20 June 2007, Milos* (Z. Agioutantis, ed.), pp. 137–144, Athens: Heliotopos Conferences, 2008.

A. Moustakas, A. Chorti, and **D. T. Hristopulos**, "Geostatistical analysis of tree size distributions in the southern kalahari, obtained from remotely sensed data," in *Proceedings of the SPIE Conference on Remote Sensing for Agriculture, Ecosystems, and Hydrology IX* (C. M. U. Neale, M. Owe, and G. D'Urso, eds.), vol. 6742, SPIE, 2007.

E. Ieronimidi, S. P. Mertikas, and **D. Hristopoulos**, "Fusion of Quickbird satellite images for vegetation monitoring in previously mined reclaimed areas," in *Proceedings of the SPIE Conference on Remote Sensing for Environmental Monitoring, GIS Applications, and Geology VI, Stockholm, Sweden* (M. Ehlers and U. Michel, eds.), vol. 6366, International Society for Optical Engineering, SPIE, 2006.

S. N. Elogne and **D. T. Hristopulos**, "Geostatistical applications of Spartan spatial random fields," in *geoENV VI Geostatistics for Environmental Applications* (A. Soares, M. J. Pereira, and R. Dimitrakopoulos, eds.), vol. 15 of *Quantitative Geology and Geostatistics*, pp. 477–488, Berlin, Gemany: Springer, 2008.

A. Muradova and **D. T. Hristopulos**, "Mathematical modelling of formation and dissociation of gas hydrate in the sea floor sediment," in *Proceedings of the International Conference of Computational Methods in Sciences and Engineering 2006* (T. E. Simos and G. Maroulis, eds.), vol. 7A, pp. 402–405, The Netherlands: VSP International Science Publishers, 2006.

M. Varouchakis and **D. T. Hristopulos**, "Mapping of soil contaminants using spatial Spartan random fields: A comparative study," in *Proceedings of the International Workshop in Geoenvironment and Geotechnics, Milos, Greece: September 2005* (Z. Agioutantis and K. Komnitsas, eds.), pp. 235–240, Athens: Heliotopos Conferences, 2005.

D. T. Hristopulos, "The geostatistical power average and coarse-graining of the hydraulic conductivity in heterogeneous porous media," in *Proceedings of the 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology* (Z. Agioutantis and K. Komnitsas, eds.), pp. 601–607, Athens: Heliotopos Conferences, 2004.

D. T. Hristopulos, "Anisotropic Spartan random field models for geostatistical analysis," in *Proceedings of the 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology* (Z. Agioutantis and K. Komnitsas, eds.), pp. 127–132, Athens: Heliotopos Conferences, 2004.

M. Galetakis and **D. T. Hristopulos**, "Prediction of long-term quality fluctuations in the South Field lignite mine of West Macedonia," in *Proceedings of the 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology* (Z. Agioutantis and K. Komnitsas, eds.), pp. 133–138, Athens: Heliotopos Conferences, 2004.

A. Kolovos, G. Christakos, **D. T. Hristopulos**, and M. L. Serre, "Spatiotemporal covariance functions from physical models," in *Proceedings of the 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology* (Z. Agioutantis and K. Komnitsas, eds.), pp. 157–162, Athens: Heliotopos Conferences, 2004.

E. Varouchakis, **D. T. Hristopulos**, and I. Vardavas, "Stochastic modeling of the groundwater level in the Messara valley of Crete," in *Proceedings of the 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology* (Z. Agioutantis and K. Komnitsas, eds.), pp. 139–144, Athens: Heliotopos Conferences, 2004.

E. Ieronymidi, S. P. Mertikas, M. Zervakis, G. Petrakis, A. Kefalas, and **D. T. Hristopulos**, "Multi-image fusion and combined classification in land reclamation after mining exploitation at the island of Milos, Aegean Sea, Greece," in *Proceedings of the 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology* (Z. Agioutantis and K. Komnitsas, eds.), pp. 495–500, Athens: Heliotopos Conferences, 2004.

M. Varouchakis and **D. T. Hristopulos**, "An application of spatial Spartan random fields in geostatistical mapping of environmental pollutants," in *Proceedings of the International Conference of Computational Methods in Sciences and Engineering 2004* (T. E. Simos and G. Maroulis, eds.), vol. I, pp. 741–744, The Netherlands: VSP International Science Publishers, 2004.

D. T. Hristopulos, "Effects of uncorrelated noise on the identification of spatial Spartan random field parameters," in *Proceedings of the International Conference of Computational Methods in Sciences and Engineering 2004* (T. E. Simos and G. Maroulis, eds.), vol. I, pp. 737–740, The Netherlands: VSP International Science Publishers, 2004.

D. T. Hristopulos, "Preface of the Symposium: Stochastic Methods and Applications," in *Proceedings of the International Conference of Computational Methods in Sciences and Engineering 2004* (T. E. Simos and G. Maroulis, eds.), vol. I, pp. 734–736, The Netherlands: VSP International Science Publishers, 2004.

D. T. Hristopulos, "Effects of physical heterogeneity on two-dimensional anisotropic materials under tension," in *Proceedings of the 7th National Congress on Mechanics, Chania, Greece: June 2004* (A. Kounadis, C. Providakis, and G. Exadaktylos, eds.), vol. II, pp. 164–169, Athens: Hellenic Society for Theoretical and Applied Mechanics, 2004.

S. Mertikas, E. Ieronymidi, and **D. Hristopulos**, "A proposal for the development of an integrated monitoring system for hazards control in the mining industry using remote sensing and related technologies," in *Proceedings of International Conference on Sustainable Development Indicators in the Mineral Industries, Milos Conference Center - George Eliopoulos: September 2003* (Z. Agioutantis, ed.), pp. 341–346, Athens: Heliotopos Conferences, 2003.

D. T. Hristopulos, "Simulations of Spartan random fields," in *Proceedings of the International Conference of Computational Methods in Sciences and Engineering, Kastoria, Greece: September 2003* (T. E. Simos, ed.), pp. 242–247, London, England: World Scientific, 2003.

D. T. Hristopulos, "Computationally efficient Spartan geostatistical models," in *Interfacing Geostatistics and GIS (Proceedings of the StatGIS 2003 International Conference, Poertschach, Austria: September 2003)* (J. Pilz, ed.), pp. 17–28, Heidelberg: Springer, 2008.

D. T. Hristopulos and T. Uesaka, "Factors that control the tensile strength distribution in paper," in *Proceedings of the International Paper Physics Conference, Victoria, BC, Canada: September 2003*, (Montreal, Canada), pp. 5–17, Pulp and Paper Technical Association of Canada, 2003.

D. T. Hristopulos and T. Uesaka, "Model of machine-direction web dynamics and impact on web break rates," in *Proceedings of the 2002 Progress in Paper Physics Seminar, Syracuse, NY, USA: September 2002* (D. S. Keller and B. V. Ramarao, eds.).

T. Uesaka, M. Ferahi, **D. Hristopulos**, N. Deng, and C. Moss, "Factors controlling pressroom runnability of paper," in *Science of Papermaking: Transactions of the 12th Fundamental Research Symposium, Oxford, UK: September 2001* (C. F. Baker, ed.), vol. II, pp. 1423–1440, Lancashire, England: Pulp and Paper Fundamental Research Society, 2001.

G. Christakos, **D. T. Hristopulos**, and M. L. Serre, "BME studies of differential equations representing physical laws: Part i.," in *Proceedings of the Fifth Annual Conference of the International Association for Mathematical Geology* (S. J. Lippard, A. Naess, and R. Sinding-Larsen, eds.), vol. I, pp. 63–68, Trondheim, Norway: Tapir, 1999.

Peer Reviewed Technical Reports

D. T. Hristopulos, "Identification of spatial anisotropy by means of the govariance tensor identity," in *EUR 21595 EN - Automatic Mapping Algorithms for Routine and Emergency Monitoring Data* (G. Dubois, ed.), pp. 103–124, Luxembourg: Office for Official Publications of the European Communities, 2006. ISBN 92-894-9400-X.

D. T. Hristopulos and T. Uesaka, "Factors that control tensile strength distribution of paper," Pulp and Paper Report 1643, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, 2003. 49 pages.

D. T. Hristopulos and T. Uesaka, "Web dynamics modelling, part I: Analysis of md tension variations for constant and fluctuating web speeds," Pulp and Paper Report 1560, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, 2001. 42 pages.

D. T. Hristopulos and T. Uesaka, "Web dynamics modelling, part I: Analysis of md tension variations for constant and fluctuating web speeds," Pulp and Paper Report 1560, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, 2001. 42 pages.

D. T. Hristopulos, "Variogram analysis of pulp and paper strength properties," P3 update, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, May - June 2001. 5 pages.

D. T. Hristopulos, "Web dynamics model," P3 update, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, March-April 2001. 2 pages.

D. T. Hristopulos, "Stochastic geometry and paper modeling," PBQ update, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, November 2000. 3 pages.

D. T. Hristopulos, "Error analysis of mechanical draw measurements," PBQ update, Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, November 2000. 4 pages.

D. T. Hristopulos and G. Christakos, "Renormalization and Upscaling Analysis: From a Grain of Sand to Complex Heterogeneities," *Center for the Advanced Study of the Environment News - University of North Carolina at Chapel Hill*, vol. 1, no. 1, pp. 1–8, 2001.

D. T. Hristopulos and G. Christakos, "Stochastic Models and the Scale-Up Problem in Heterogeneous Porous Media," *Center for Multiphase Research News - University of North Carolina at Chapel Hill*, vol. 3, no. 1, pp. 1–8, 1997.

D. T. Hristopulos, G. Christakos, and C. T. Miller, "Stochastic Modeling of Heterogeneity in Groundwater Flow and Transport Systems," *Center for Multiphase Research News - University of North Carolina at Chapel Hill*, vol. 1, no. 2, pp. 1–4, 1994.

L. D. Oliver, G. Christakos, and **D. T. Hristopulos**, "Implementation of a Space Transformation Approach for Solving the Three-dimensional Flow Equation," *Center for Multiphase Research News - University of North Carolina at Chapel Hill*, vol. 1, no. 2, pp. 9–13, 1994.

Conference Abstracts (27)

D. T. Hristopulos. Spartan random fields and applications in the analysis of gappy spatial data. In *28th European Meeting of Statisticians*, University of Piraeus, Greece, August 2010. Online at: http://stat.unipi.gr/ems2010/.

V. Mouslopoulou and **D. T. Hristopulos**. Patterns of fault interactions triggered by micro earthquake activity. In *Geophysical Research Abstracts*, volume 12, Vienna, Austria, 2010. European Geosciences Union. Abstract no. EGU2010-3035.

D. T. Hristopulos. Statistical downscaling based on Spartan spatial random fields. In *Geophysical Research Abstracts*, volume 12, Vienna, Austria, 2010. European Geosciences Union. Abstract no. EGU2010-4176.

E. Varouchakis, **D. T. Hristopulos**, and G. Karatzas. A study of the groundwater level spatial variability in the Messara valley of Crete. In *Geophysical Research Abstracts*, volume 11, Vienna, Austria, 2009. European Geosciences Union. Abstract no. EGU2009-9351-1.

D. T. Hristopulos. Extending minimum curvature estimators using Spartan spatial random fields. In *SigmaPhi2008 International Conference in Statistical Physics*, Kolymbari, Chania, August 2008. Online at: http://areeweb.polito.it/eventi/sigmaphi2008/.

S. Elogne and **D. T. Hristopulos**. Fast spatial interpolation using Spartan random fields with environmental health applications. In *Geophysical Research Abstracts*, volume 10, Vienna, Austria, 2008. European Geosciences Union. Abstract no. EGU2008-A-02504.

D. T. Hristopulos, A. Chorti, G. Spiliopoulos, and E. Petrakis. Systematic detection of anisotropy in spatial data obtained from environmental monitoring networks. In *Geophysical Research Abstracts*, volume 10, Vienna, Austria, 2008. European Geosciences Union. Abstract no. EGU2008-A-03671.

M. Žukovič and **D. T. Hristopulos**. A non-parametric approach for the conditional simulation of large environmental data sets based on statistical physics models and an application to the Walker lake data. In *Geophysical Research Abstracts*, volume 10, Vienna, Austria, 2008. European Geosciences Union. Abstract no. EGU2008-A-03865.

E. Varouchakis and **D. T. Hristopulos**. Geostatistical study of groundwater level spatial variability in the Messara valley of Crete. In *Geophysical Research Abstracts*, volume 11, Vienna, Austria, 2009. European Geosciences Union. Abstract no. EGU2008-A-00281.

A. Chorti and **D. T. Hristopulos**. Automatic detection of spatial anisotropy in environmental data sets. In *statGIS Conference 2007*, University of Klagenfurt, Austria, September 2007. Online at: http://www.math.uni-klu.ac.at/stat/Tagungen/statgis2007/content.html.

D. T. Hristopulos. Spartan random fields modelling. In *StatGIS Summer School 2006: Recent Developments in Spatial Statistics*, University of Klagenfurt, Austria, September 2006. Online at: http://wwwg.uni-klu.ac.at/statgis06/content.html.

E. Varouchakis, S. Elogne, and **D. T. Hristopulos**. Geostatistical applications of Spartan spatial random fields in environmental mapping. In *Geophysical Research Abstracts*, volume 8, Vienna, Austria, 2006. European Geosciences Union. Abstract no. 00674.

S. Elogne and **D. T. Hristopulos**. Kernel methods for estimating the anisotropic parameters by using the covariance tensor identity. In *Geophysical Research Abstracts*, volume 8, Vienna, Austria, 2006. European Geosciences Union. Abstract no. 02170.

D. T. Hristopulos. Applications of the renormalization group method in upscaling hydrological parameters. In *Geophysical Research Abstracts*, volume 7, Vienna, Austria, 2005. European Geosciences Union General Assembly. Abstract no. 01809.

D. T. Hristopulos. Spartan spatial random field models inspired from statistical physics with applications in the geosciences. In *Abstracts of the Next III Conference*, Kolymbari, Chania, August 2004. Online at: http://www2.polito.it/eventi/next-sigmaphi/html/listpre.html.

L. Leonidakis and **D. T. Hristopulos**. A nonlinear master equation with applications in grain growth processes. In *Abstracts of the Next III Conference*, Kolymbari, Chania, August 2004. Online at: http://www2.polito.it/eventi/next-sigmaphi/html/listpre.html.

D. T. Hristopulos. A model of longitudinal tension variations in paper webs and implications for web breaks. In *Bulletin of the American Physical Society*, volume 47, page 943, Indianapolis, Indiana, March 2002. American Physical Society.

D. T. Hristopulos. Calculation of effective fluid permeability in porous media with quenched random disorder using the coherent potential approximation. In *Bulletin of the American Physical Society*, volume 46, page 779, Seattle, Washington, March 2001. American Physical Society.

D. T. Hristopulos and G. Christakos. Monte carlo calculations of single-phase effective permeability in 2-d anisotropic porous media. In *Bulletin of the American Physical Society*, volume 44, page 23, Chapel Hill, North Carolina, November 1999. Southeastern American Physical Society.

D. T. Hristopulos and G. Christakos. A renormalization group calculation of the effective fluid permeability of heterogeneous porous media. In *Bulletin of the American Physical Society*, volume 44, page 1811, Los Angeles, California, March 1999. American Physical Society.

D. T. Hristopulos and G. Christakos. Variational calculation of effective parameters in random porous media. In *Bulletin of the American Physical Society*, volume 43, page 339, Los Angeles, California, March 1998. American Physical Society.

M. L. Serre, G. Christakos, and **D. T. Hristopulos**. Using the space transform method in geosciences. In *Fourth SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Albuquerque, New Mexico, June 1997.

D. T. Hristopulos and G. Christakos. Nonlocal kernels and upscaling of effective parameters. In *EOS Transactions of the American Geophysical Union 1996 Fall Meeting Supplement*, volume 77, page F277, San Francisco, December 1996.

G. Christakos and **D. T. Hristopulos**. Stochastic path analysis of multiphase flow systems. In *EOS Transactions of the American Geophysical Union 1996 Fall Meeting Supplement*, volume 77, page F243, San Francisco, December 1996.

G. Christakos and **D. T. Hristopulos**. Stochastic characterization of contaminated sites. In *EOS Transactions of the American Geophysical Union 1995 Spring Meeting Supplement*, volume 76, page S138, Baltimore, May 1995.

D. T. Hristopulos and G. Christakos. Modeling of nonlocality and nonhomogeneity in the hydraulic conductivity. In *EOS Transactions of the American Geophysical Union 1995 Spring Meeting Supplement*, volume 76, page S138, Baltimore, May 1995.

G. Christakos, **D. T. Hristopulos**, L. D. Oliver, and C. T. Miller. Stochastic analysis of flow in saturated porous media systems. In *EOS Transactions of the American Geophysical Union 1993 Fall Meeting Supplement*, volume 74, page S250, San Francisco, December 1993.

Teaching Experience

Graduate courses, Technical University of Crete

- Data Analysis (harmonic analysis, random fields, variogram estimation, optimal interpolation)
- Introduction to Geostatistical Simulations (model inference, kernel methods, Monte Carlo methods, Ising model, conditional simulations)
- Coordinated graduate student research seminars (2004 – 2009)

Undergraduate courses, Technical University of Crete

- Electrical circuits (2002 – 2006)
- Introduction to Geostatistics (2002 – Present)
- Applied Geostatistics (2002 – Present)

Teaching assistant, Princeton University

- Laboratory teaching assistant for sophomore mechanics and electromagnetism classes for engineers (2 years)
- Introductory physics for non-science majors (2 years)

Service

Conference Organization

- *SigmaPhi 2011 International Conference on Statistical Physics.*
  Member of the organizing and scientific committees.
  Ayia Napa, Cyprus; July 2011.
- *EMS2010, 28th European Meeting of Statisticians.*
  Session Chair (Environmental and Spatial Statistics).
  University of Piraeus, Greece; August, 2010.
- *StatGIS2009 Geoinformatics for Environmental Surveillance International Conference.*
  Member of the organizing and scientific committees.
  Milos Island, Greece; June 2009.
- *SigmaPhi 2008 International Conference on Statistical Physics.*
  Member of the organizing and scientific committees.
  Orthodox Academy of Crete, Chania; August, 2008.
- *StatGIS2006 Geoinformatics for Environmental Surveillance International Conference.*
  Member of the scientific committee.
  University of Klagenfurt, Austria; September 2007.
- *ICCMSE 2004, International Conference on Computational Methods in Sciences and Engineering.*
  Session Chair (Stochastic Methods and Applications).
  Athens, Greece; November, 2004.

Selective Committee Work

- *Director of Graduate Studies, Department of Mineral Resources Engineering*
  Technical University of Crete, Chania, Greece, 2004-2009.
- *Committee for the Development Planning of TUC*
  Technical University of Crete, Chania, Greece, 2009.
- *Supervising Committee of the Computer Labs*
  Technical University of Crete, Chania, Greece, 2003-2006.

External Reviewer for Journals

- *Computers and Geosciences*
- *Quarterly Journal of the Royal Meteorological Society*
- *Journal of Physics A: Mathematical and Theoretical*
- *IEEE Transactions on Information Theory*
- *Journal of Geophysics and Engineering*
- *Probabilistic Engineering Mechanics*
- *Mathematical Geology*
- *Advances in Water Resources*
- *Water Resources Research*
- *Journal of the American Ceramic Society*
- *Journal of the European Ceramic Society*
- *Journal of Pulp and Paper Science*

External Reviewer for Proposals

- *US Civilian Research and Development Foundation, 1998*
- *European Commission (STCU), 2005*
- *Israel Science Foundation, 2004, 2007*

Memberships

Current

2010 – Present Member, European Association of Geoscientists and Engineers

2009 – Present Member, Institute of Electrical and Electronics Engineers (IEEE)

1990 – Present Member, American Physical Society

1985 – Present Member, Technical Chamber of Greece

Other

- Technical Association of Pulp and Paper Industry
- American Geophysical Union

Lectures presented at Universities, Research Institutes and Companies

"An Introduction to the Analysis of Spatial Data using Spartan Spatial Random Fields." *Department of Statistics, North Carolina State University*, North Carolina, USA, July 2010.

"Estimation of geometric anisotropy from scattered spatial data with emphasis on automatic mapping." *Center of Applied Environmental Fluid Mechanics, Johns Hopkins University*, Maryland, USA, July 2010.

"Spartan Random Fields and Applications in the Analysis of Spatial Data with Irregular Sampling." *Department of Applied Mathematics, École Centrale de Paris*, France, November 2009.

"Stochastic Methods of Spatial Analysis for Scattered Data with Environmental Applications." *Department of Electronic and Computer Engineering, Technical University of Crete*, April 2008.

"Spartan Spatial Random Fields: Reinventing Geostatistics for Environmental Systems Applications." *Department of Geography and Environmental Engineering, Johns Hopkins University*, Baltimore, USA. January 2008.

"Development of Spartan Spatial Random Fields for Geostatistical Applications." *Department of Geography and Environmental Engineering, Johns Hopkins University*, Baltimore, USA. January 2005.

"Spartan Geostatistical Models." *Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill*, USA. August (2003).

"Modern Trends in Geostatistics and Applications in the Geophysical Sciences." *Department of Mineral Resources Engineering, Technical University of Crete*, Chania, Greece. August (2001).

"Geostatistical Models of Anisotropic Dependence." *Department of Mineral Resources Engineering, Technical University of Crete,* Chania, Greece. June (2001).

"Dancing Strings and Tension Variations." *Pulp and Paper Research Institute of Canada,* Pointe-Claire, Quebec, Canada. May (2001).

"Upscaling of Spatial Heterogeneity in Porous Media Using Random Field Models." *Center of Nonlinear and Complex Systems, Duke University* Durham, North Carolina, USA. March (2000).

"Random Fields in the Analysis of Groundwater Flow and Contaminant Transport." *Department of Physics, University of Crete* Herakleion, Greece. June (1999).

"Coarse-graining Analysis of Fluctuations in Porous Media." *Pulp and Paper Research Institute of Canada,* Pointe Claire, Quebec, Canada. May (1999).

"Renormalization Analysis of Flow and Transport in Heterogeneous Media." *Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute,* San Antonio, Texas, USA. January (1999).

"New Upscaling Methods for Heterogeneous Media: Beyond Low-Order Perturbation Expansions." *Department of Geological Sciences, University of South Carolina,* Columbia, South Carolina, USA. October (1998).

"Calculation of Effective Parameters in Random Models of Porous Media by means of Statistical Field Theories." *Physical Chemistry Institute, National Center for Scientific Research Democritus,* Athens, Greece. June (1998).

"Stochastic Models: Estimation, Simulation and Scale Change." *Integrated Decisions and Systems, Inc.,* Eagan, Minnesota, USA. June (1998).

"Applications of Random Field Models in Subsurface Hydrology." *Department of Civil and Environmental Engineering, University of Cincinnati,* Cincinnati, Ohio, USA. October (1998).

"Variational Calculation of Effective Parameters in Stochastic Porous Media Using Replicas." *Applied Mathematics Seminar, Department of Mathematics, University of North Carolina at Chapel Hill*, North Carolina, USA (1997)/

"Stochastic Models of Porous Media and the Scale-Up Problem." *Physical Chemistry Institute, National Center for Scientific Research Democritus,* Athens, Greece. July (1997).

"Heterogeneous Media and Level Statistics Analysis using Phase/Indicator Functions." *Higher Dimension Research, Inc.,* Saint Paul, Minnesota, USA. June (1997).

"Modeling Random Heterogeneous Media at Various Physical Scales." *Higher Dimension Research, Inc.,* Saint Paul, Minnesota, USA. June (1997).

"Advances in Groundwater Modeling." *UNC Superfund Center Annual Workshop, University of North Carolina,* Chapel Hill, North Carolina, USA (1996)

"Flow in Stochastic Porous Media: A Multiple-Scale Sea." *Water Resources Engineering Seminar series, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill*, North Carolina, USA (1995).

"Stochastic Analysis of Flow and Transport Phenomena." *UNC Superfund Center Annual Workshop, University of North Carolina at Chapel Hill,* North Carolina, USA (1995).

"Non-local Generalization of Darcy's Law and Diagrammatic Theory." *Department of Petroleum Engineering, Stanford University,* Palo Alto, California, USA. March (1994).

Miscellaneous

H index: 9

Citations by others: 219 (ISI)

January 14, 2011