Dionissios T. Hristopulos

Professor of Geostatistics

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Education

1987–1991 **PhD, Condensed Matter Physics**, *Princeton University*, Princeton, NJ.

1985–1987 **Master's, Physics**, *Princeton University*, Princeton, NJ.

1979–1985 **Diploma in Electrical Engineering**, *National Technical University*, Athens.

PhD Dissertation

title *Aspects of the Hubbard Model in Relation to High Tc Superconductivity*

supervisors Prof. Philip W. Anderson (Nobel Laureate)

description Development of computational models for Monte Carlo simulations of variational wavefunctions and calculations of ground-state energy using theoretical models that represent the normal state of the cuprate high-temperature superconductors

Master's Thesis

title *Construction of an Electromagnetic Graphite-fiber Mass Balance*

supervisors Prof. Russ Gianetta

description Construction of a graphite-fiber mass balance based on the principle of electromagnetic resonance for measurements of deposited gas layers onto the fiber in low-temperature conditions; this was an experimental research project in completion of the experimental experience requirement (only lab notes available)

Diploma Thesis

title *Optical Activity and the Electrooptic Effect in $B_{12}GeO_{20}$ Crystals*

supervisors Prof. A. A. Serafetinidis and E. Anastasakis

description Theoretical analysis and experimental measurements of the electrooptic coefficient of semiconductor BGO crystals used in optical fiber communications (in Greek)

Appointments

Research and Academic

1/7/2013-15/8/2013 **Visiting Professor**, *Division of Applied Mathematics, Brown University* , Providence, RI, USA.

Research Activities: Developing methods for space-time data analysis

9/2007–Present **Professor**, *Department of Mineral Resources Engineering, Technical University of Crete*, Chania, Greece.

Research Activities:

- Development of novel space-time covariance functions and spatiotemporal interpolation methods for environmental applications.
- Geostatistical analysis of water resources in sparsely gauged basins.
- Statistical analysis and dynamic modeling of earthquake recurrence times.
- Analysis of anisotropy in scattered spatial data (e.g., ground measurements of background radioactivity).
- Estimation of lignite reserves and quality for electric power generation.

9/2002–9/2007 **Associate Professor**, *Department of Mineral Resources Engineering, Technical University of Crete*, Chania, Greece.

Research Activities:

- Development of spatial interpolation and classification methods based on statistical physics concepts.
- Analysis of GPS signals for structural monitoring under wind loading.
- Development of effective parameters in random porous media.
- Modelling of mechanical and flow properties in porous materials, natural and artificial.

8/2000–8/2002 **Research Scientist**, *Pulp and Paper Research Institute of Canada*, Pointe Claire, Québec, Canada.

Research Activities:

- Modeling paper web dynamics and fracture of heterogeneous materials.
- Development of new physical models to explain tension variations in paper webs and statistical variations of tensile paper strength.

11/1995–7/2000 **Research Assistant Professor**, *Department of Environmental Sciences and Engineering, University of North Carolina*, Chapel Hill, USA.

Research Activities:

- Formulation of new geostatistical methods (theoretical and computational) and investigations of environmental fluid mechanics.
- Development of a renormalization group method for hydraulic conductivity coarse-graining and Monte Carlo algorithms for geostatistical simulations (FORTRAN, MATLAB codes).

5/1993–10/1995 **Research Associate**, *Department of Environmental Sciences and Engineering, University of North Carolina*, Chapel Hill, USA.

Research Activities:

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

3/1991–12/1992 **Communications Engineer**, *Tanagra Air Force Base*, Greece, Mandatory military service.
In charge of computer organization of Pilot training office at the Tanagra Combat Wing.

Other Appointments

Summer 1986 **Research Assistant**, *Physics Department, Princeton University*, Princeton, NJ, USA.
Studied the structure and phase transitions of biolipids using X-ray imaging methods in the biophysics group of Prof. Sol Gruner.

1981 - 1985 **Scientific Translation**, *Science Magazine, "Periscope of the Sciences,"*, Athens, Greece.
Translation of English, French and German popular science articles in Greek and article compilation based on several sources.

Summer 1984 **Summer Trainee**, *Deutscher Akademischer Austausch Dienst*, Jülich, Germany.
Maintenance of short-wave radio emitters at Deutsche Welle Broadcasting Station.

Research Recognition and Awards

2016 **Invited Presentation**, *Workshop on Stochastic models for climate-related risk*, Lebesgue Center of Mathematics, University of Bretagne Sud, France.
Title: "Stochastic Local Interaction Models and Space-Time Covariance Functions based on Linear Response Theory"

2013-Present **Reviewer Editorial Board**, *Frontiers in Environmental Informatics, section of Frontiers in Environmental Science*, published by Frontiers.

2010 **Recognition of Research Project Achievement**, *European Communities*.
The Marie Curie project SPATSTAT (2005-2008) that I coordinated was selected as a *Marie Curie 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**, *statGIS2007 Conference*, University of Klagenfurt, Austria.
Title: "On the Importance of Being Spartan"

2006 **Invited Presentation**, *statGIS2006 International Summer School*, University of Klagenfurt, Austria.
Title: "Spartan Random Fields Modelling"

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

2003 **Johannes A. Van den Akker International Prize for Advances in Paper Physics**, *Technical Association of the Pulp and Paper Industry (TAPPI) Paper Physics Committee*.
Title: "A Model of Machine-Direction Tension Variations in Paper Webs with Runnability Applications," *the Journal of Pulp and Paper Science, Dec. 2002*

1998-Present **Member of the Editorial Board**, *Stochastic Environmental Research and Risk Assessment*, Published by Springer, 2014 Impact factor: 2.086.

1985 **Stanley Seeger Graduate Studies Fellowship**, *Princeton University*, Princeton, USA.

Research Recognition of Former Students

2015 **Emmanouil Varouchakis**, *Natural Resources Research Award*, International Association of Mathematical Geology, (Former PhD student).
Title: "A Bayesian Space-Time Geostatistical Model for Groundwater Level Variability Estimation"

Research Interests

Geostatistics & Applied Mathematics	Novel space-time statistical methods based on Gibbs random fields and Langevin equations; Monte Carlo simulations of spatially distributed systems; Computationally efficient methods for big data in geosciences
Geophysics	Statistical and dynamic modeling of earthquake recurrence times; Fiber Bundle models of fracture and their relation to earthquake laws and statistics
Porous Media	Effective parameter calculations; Mechanical and flow properties in porous materials, natural and artificial
Statistical Physics	Statistical physics and extreme events; Models of grain growth and applications to ceramic powder sintering
Stochastic Hydrology	Applications of random fields to groundwater mapping and monitoring; Estimation of effective parameters for subsurface flows; Simulations of geological structures based on Spartan random fields
Energy	Development of novel mathematical methods for simulation of geological structures for application in oil reservoirs; Estimation of lignite reserves and quality parameters with geostatistical methods

Research Highlights

- Developed Monte Carlo simulations with a novel *variational ground state for the Hubbard model* in connection with the normal state of cuprate materials that exhibit high temperature superconductivity (PhD thesis, *Princeton University*)
- Generated a series of papers using advanced field-theory methods (renormalization group, replica variational approach) that provided higher-order evidence for the exponential dielectric permittivity-effective fluid permeability *Landau-Lifshitz-Matheron ansatz* in statistically isotropic random media (1995-2003, *University of North Carolina at Chapel Hill/Technical University of Crete*)
- Analyzed *web-tension fluctuations* in printing presses based on first principles leading to a low-frequency-pass-filter model of the paper web; this research was awarded the 2003 *Van den Akker Prize for Advances in Paper Physics* (2000-2002, *Paprican, Canada*)
- Developed a non-parametric (covariance independent) method for the *fast estimation of statistical geometric anisotropy* in two-dimensional spatial data based on relations between the spectral moments of differentiable random fields. R software available as component of the integrated interpolation system from www.intamap.org (2008-Present, *Technical University of Crete*)

- Introduced and developed *Spartan spatial random fields* leading to new covariance models and computationally fast interpolation; established links with statistical field theories, Gauss-Markov random fields, machine learning and Gaussian processes. Matlab software available from GeosLab (*2003-Present, Technical University of Crete*)
- Developed a physics-based connection between fracture mechanics and *earthquake recurrence times probability distribution* providing support for the Weibull model of recurrence times; proposed and investigated the κ-Weibull probability distribution as a suitable model with heavy tails for *extreme events in finite-size systems* (*2010-Present, Technical University of Crete*)
- Formulated and solved a *nonlinear dynamic growth model* of mass exchange between grains with mass dependent Arrhenius kinetic factor that exhibits a transition between diffusive and aggregation regimes, thus capturing the equilibrium normal and abnormal grain distributions observed in the sintering of ceramic powders (*2005-Present, Technical University of Crete*)
- Formulated non-separable, physically inspired *space-time covariance functions* by combining Spartan spatial random fields with the statistical mechanics theory of linear response, leading to stochastic partial differential equations that were explicitly solved (*2015-Present, Technical University of Crete*)
- Proposed and developed *Stochastic Local Interaction* models which are based on discrete approximations of Spartan Spatial Random Fields tailored for scattered data in d dimensions and take advantage of the local structure of interactions to achieve improved computational speed in interpolation problems. Matlab software available from GeosLab (*2014-Present, Technical University of Crete*)

Recent Funded Research Projects

6/2016 - 5/2018 **DESIRES: DESign of DESalination systems based on optimal usage of multiple Renewable Energy Sources**, *ERANETMED NEXUS-14-049*, co-financed by the European Commission's 7th Framework Programme, Budget: 335,458€. Role: Principal Investigator.

7/2012 - 6/2015 **SPARTA: Development of Space-Time Random Fields based on Local Interaction Models and Applications in the Processing of Spatiotemporal Datasets**, *Excellence Research Grant 2011*, co-financed by the European Social Fund and National Resources, Operational Programme for Education and Lifelong Learning, Greece, Budget: 250,000€. Role: Coordinator.

4/2012-3/2015 **NAMCO: Development of High Performance Alumina Matrix Nanostructured Composites**, *Thalis Research Grant: Operational Programme for Education and Lifelong Learning*, Ministry of Education, Lifelong Learning and Religious Affairs, Greece, Budget/Total Budget: 90,000€/600,000€, co-financed by the European Union. Role: Principal Investigator.

1/2012-12/2012 **Is the Spili Fault, Crete, Responsible for the Double Destruction of the Minoan Palace at Phaistos?**, *Scientific Projects 2012-Physical Sciences*, John S. Latsis Public Benefit Foundation, Budget: 12,000€. Role: Researcher in Charge.

11/2010-11/2012 **FIBREBREAK: Development of Fibre Bundle Breakdown Model for the Simulation of Point Patterns and the Simulation of Interevent Times between Fibre Breaks**, *Basic Research Fund*, Technical University of Crete, Budget: 15,000€. One proposal per Department is funded annually. Role: Principal Investigator.

3/2009-3/2011 **BRIDGSEISMTIME: Bridging the timescales in fault-slip accumulation: from the earthquake record to the geological record**, *Marie Curie International Incoming Fellowship (MC IIF) (fellow: V. Mouslopoulou)*, FP7, European Commission, Budget: 202,163€. Success rate of MC IIF projects is 23%-24%. Role: Coordinator.
Project site: www.mred.tuc.gr/projects/BridgSeismTime/

9/2006-8/2009 **INTAMAP: Interoperability and Mapping**, *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€. Success rate of FP6 IST STREP calls was 11.7%. Role: Principal Investigator & Work Package Leader.
Project site: http://www.intamap.org

9/2005-8/2008 **SPATSTAT: Development of Spartan Spatial Random Field Models for Geostatistical Applications**, *Marie Curie Transfer of Knowledge (MC TOK)*, FP6, European Commission, Budget: 304,806€. Success rate of MC TOK projects was 23%-24%. Role: Coordinator.
Project site: www.mred.tuc.gr/projects/spatstat/

9/2004-8/2007 **ACTIVATION: Super high Energy Milling in the Production of Hard Alloys, Ceramic and Composite Materials**, *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 €. (I coordinated this project after the departure of the initial coordinator —Prof.Tsetsekou— for another University). Success rate of FP6 NMP STREP calls was 16%. Role: Principal Investigator & Coordinator replacement.
Project site: www.mred.tuc.gr/projects/activation/index.htm

2005-2006 **Development of Novel Geostatistical Methods in Environmental Pollutant Mapping and Environmental Risk Assessment**, *PYTHAGORAS II: Operational Programme for Education and Initial Vocational Training*, Ministry of Education, Lifelong Learning and Religious Affairs, Greece, Budget: 50,000€, co-financed by the Third Community Support Framework and the European Social Fund. Role: Coordinator.

Languages

English	**Fluent**	*I lived in the USA and Canada for 15 years*
French	**Very good**	*Speaking and writing ability - Certificat Sorbonne Premier Degré*
German	**Good**	*Somewhat rusty - mainly reading ability - Mittelstuffe Diplom*
Spanish	**Fair**	*Survival skills*

Publications

Summary: 176 Publications including journals, conference proceedings, conference abstracts, technical reports

Google scholar (8-9-2016): 169 publications, 1360 citations, h-index =20

Books

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

Journal Papers

[2] E.A. Varouchakis, K. Spanoudaki, D.T. Hristopulos, G.P. Karatzas, and G.A. Corzo Perez. Stochastic modeling of aquifer level temporal fluctuations based on the conceptual basis of the soil-water balance equation. *Soil Science*, 2016. Article in Press. doi:10.1097/SS.0000000000000157.

[3] A. Muradova and **D. T. Hristopulos**. Numerical simulation of a coupled nonlinear model for grain coarsening and coalescence. *Simulation Modelling Practice and Theory*, 62:102–116, March 2016. doi:10.1016/j.simpat.2016.01.012.

[4] I. Tsantili and **D. T. Hristopulos**. Karhunen-Loève expansions of Spartan spatial random fields. *Probabilistic Engineering Mechanics*, 43:132–147, January 2016. doi:10.1016/j.probengmech.2015.12.002.

[5] **D. T. Hristopulos** and A. Muradova. Kinetic model of mass exchange with dynamic Arrhenius transition rates. *Physica A*, 444:95–109, February 2016. doi:10.1016/j.physa.2015.10.007.

[6] A. Pavlides, **D. T. Hristopulos**, C. Roumpos, and Z. Agioutantis. Spatial modelling of lignite energy reserves for exploitation planning and quality control. *Energy*, 93(Part 2):1906–1917, 2015. doi:10.1016/j.energy.2015.10.049.

[7] **D. T. Hristopulos** and Ivi Tsantili. Space-Time models based on random fields with local interactions. *International Journal of Modern Physics B*, 29:1541007, 2015. doi:10.1142/S0217979215410076.

[8] **D. T. Hristopulos**, M. P. Petrakis, and G. Kaniadakis. Weakest-link scaling and extreme events in finite-sized systems. *Entropy*, 17(3):1103–1122, 2015. doi:10.3390/e17031103.

[9] **D. T. Hristopulos**. Stochastic Local Interaction (SLI) model: Bridging Machine Learning and Geostatistics. *Computers and Geosciences*, 85(Part B):26–37, December 2015. doi:10.1016/j.cageo.2015.05.018.

[10] **D. T. Hristopulos**. Covariance functions motivated by spatial random field models with local interactions. *Stochastic Environmental Research and Risk Assessment*, 29(3):739—754, 2015. doi:10.1007/s00477-014-0933-0.

[11] **D. T. Hristopulos** and E. Porcu. Multivariate Spartan spatial random field models. *Probabilistic Engineering Mechanics*, 37:84–92, 2014. doi:10.1016/j.probengmech.2014.06.005.

[12] V. Mouslopoulou, D. Moraetis, L. Benedetti, V. Guillou, O. Bellier, and **D. Hristopulos**. Normal faulting in the forearc of the Hellenic subduction margin: Paleoearthquake history and kinematics of the Spili fault, Crete, Greece . *Journal of Structural Geology*, 66:298–308, 2014. doi:10.1016/j.jsg.2014.05.017.

[13] **D. T. Hristopulos**, M. Petrakis, and G. Kaniadakis. Finite-size effects on return interval distributions for weakest-link-scaling systems. *Physical Review E*, 89:052142, May 2014. doi:10.1103/PhysRevE.89.052142.

[14] M. Žukovič and **D. T. Hristopulos**. A Directional gradient-curvature method for gap filling of gridded environmental spatial data with potentially anisotropic correlations. *Atmospheric Environment*, 77:901–909, October 2013. doi:10.1016/j.atmosenv.2013.05.078.

[15] V. Mouslopoulou, **D. T. Hristopulos**, A. Nicol, J. J. Walsh, and S. Bannister. The importance of microearthquakes in crustal extension of an active rift. *Journal of Geophysical Research - Solid Earth*, 118(4):1556—1568, 2013. doi:10.1002/jgrb.50062.

[16] **D. T. Hristopulos** and V. Mouslopoulou. Strength statistics and the distribution of earthquake interevent times. *Physica A*, 392(3):485–496, 2013. doi:10.1016/j.physa.2012.09.011.

[17] E. A. Varouchakis and **D. T. Hristopulos**. Improvement of groundwater level prediction in sparsely gauged basins using physical laws and local geographic features as auxiliary variables.

Advances in Water Resources, 52:34–49, 2013. doi:10.1016/j.advwatres.2012.08.002.

[18] E. A. Varouchakis and **D. T. Hristopulos**. Comparison of stochastic and deterministic methods for mapping groundwater level spatial variability in sparsely monitored basins. *Environmental Monitoring and Assessment*, 185(1):1–19, 2013. doi:10.1007/s10661-012-2527-y.

[19] E. A. Varouchakis, **D. T. Hristopulos**, and G. Karatzas. Improving kriging of groundwater level data using non-linear normalizing transformations-a field application. *Hydrological Sciences Journal*, 57(7):1404–14019, 2012. doi:10.1080/02626667.2012.717174.

[20] M. Žukovič and **D. T. Hristopulos**. Reconstruction of missing data in remote sensing images using conditional stochastic optimization with global geometric constraints. *Stochastic Environmental Research and Risk Assessment*, 27(4):785—-806, 2013. doi:10.1007/s00477-012-0618-5.

[21] V. Mouslopoulou, A. Nicol, J. J. Walsh, J. G. Begg, D. B. Townsend, and **D. T. Hristopulos**. Fault-slip accumulation in an active rift over thousands to millions of years and the importance of paleoearthquake sampling. *Journal of Structural Geology*, 36(2):71–80, March 2012. doi:10.1029/2010JB007804.

[22] V. Mouslopoulou and **D. T. Hristopulos**. Patterns of tectonic fault interactions captured through geostatistical analysis of microearthquakes. *Journal of Geophysical Research (Solid Earth)*, 116(B15):7305, 2011. doi:10.1029/2010JB007804.

[23] I. Spiliopoulos, **D. T. Hristopulos**, M. P. Petrakis, and A. Chorti. A multigrid method for the estimation of geometric anisotropy in environmental data from sensor networks. *Computers and Geosciences*, 37(3):320–330, 2011. doi:10.1016/j.cageo.2010.06.007.

[24] G. Dubois, D. Cornford, **D. Hristopulos**, E. Pebesma, and J. Pilz. Introduction to this special issue on geoinformatics for environmental surveillance. *Computers and Geosciences*, 37(3):277–279, 2011.

[25] E. Pebesma, D. Cornford, G. Dubois, G.B. M. Heuvelink, **D. Hristopoulos**, J. Pilz, J. Stöhlker, G. Morin, and J. O. Skøien. Intamap: The design and implementation of an interoperable automated interpolation web service. *Computers and Geosciences*, 37(3):343–352, 2011. doi:10.1016/j.cageo.2010.03.019.

[26] **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*, 25(2):11–19, 2011. doi:10.1016/j.cageo.2010.06.002.

[27] **D. T. Hristopulos** and S. N. Elogne. Computationally efficient spatial interpolators based on Spartan spatial random fields. *IEEE Transactions On Signal Processing*, 57(9):3475–3487, 2009. doi:10.1109/TSP.2009.2021450.

[28] 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*, 51(2):173–185, 2009. doi:10.1198/TECH.2009.0018.

[29] 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. doi:10.1088/1742-5468/2009/02/P02023.

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[32] M. Žukovič and **D. T. Hristopulos**. Classification of missing values in spatial data using spin models. *Physical Review E*, 80(1, Part 1), 2009. Art. No. 011116. doi:10.1103/PhysRevE.80.011116.

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[36] 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*, 22(5):633–646, 2008. doi:10.1007/s00477-007-0167-5.

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[38] **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*, 11(2):85–95, 2007. doi:10.1007/s10291-006-0035-7.

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[42] **D. T. Hristopulos**. Erratum: Spartan Gibbs random field models for geostatistical applications (vol 24, pg 2125, 2003). *SIAM Journal on Scientific Computing*, 26(6):2176, 2005. doi:10.1137/050624613.

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[44] 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*, 27(8):815–830, 2004. doi:10.1016/j.advwatres.2004.04.002.

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[47] **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*, 17(3):191–216, 2003. doi:10.1007/s00477-003-0126-8.

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[51] **D. T. Hristopulos** and G. Christakos. Practical calculation of non-Gaussian multivariate moments in spatiotemporal Bayesian maximum entropy analysis. *Mathematical Geology*, 33(5):543–568, 2001.

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[56] **D. T. Hristopulos** and G. Christakos. An analysis of hydraulic conductivity upscaling. *Nonlinear Analysis-Theory Methods & Applications*, 30(8):4979–4984, 1997.

[57] G. Christakos, **D. T. Hristopulos**, and X. Y. Li. Multiphase flow in heterogeneous porous media from a stochastic differential geometry viewpoint. *Water Resources Research*, 34(1):93–102, 1998.

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[59] **D. T. Hristopulos** and G. Christakos. Diagrammatic theory of effective hydraulic conductivity. *Stochastic Hydrology and Hydraulics*, 11(5):369–395, 1997.

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[162] 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.

[163] A. Kolovos, G. Christakos, **D. T. Hristopulos**, and M. L. Serre. Visual representations of non-separable spatiotemporal covariance models. In *EOS Transactions of the American Geophysical Union 2003 Fall Meeting Supplement*, volume 84, San Francisco, December 2003.

[164] **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.

[165] **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.

[166] **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.

[167] **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.

[168] **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.

[169] 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.

[170] **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.

[171] 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.

[172] 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.

[173] **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.

[174] 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.

Other Peer Reviewed Publications

[175] **D. T. Hristopulos**. Identification of spatial anisotropy by means of the govariance tensor identity. In G. Dubois, editor, *EUR 21595 EN - Automatic Mapping Algorithms for Routine and Emergency Monitoring Data*, pages 103–124. Office for Official Publications of the European Communities, Luxembourg, 2006. ISBN 92-894-9400-X.

[176] **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*, V(1-2):7–15, 2002.

Submitted Manuscripts

In Preparation

[177] **D. T. Hristopulos**. *From Statistical Physics to Spatial Data Analysis: A Guide for Engineers and Physicists*. under contract with Springer.

Teaching Experience

Graduate courses

2002 - Present **Department of Mineral Resources Engineering**, *Technical University of Crete*.

- Data Analysis (harmonic analysis, random fields, variogram estimation, optimal interpolation) (2002 –2013)
- Introduction to Geostatistical Simulations (model inference, kernel methods, Monte Carlo methods, Ising model, conditional simulations)
- Time Series Analysis (2014–)
- Introduction to Spartan Spatial Random Fields and their Applications (2016 –)
- Coordinated graduate research seminars (2004 – 2009)

Undergraduate courses

2002 - Present **Department of Mineral Resources Engineering**, *Technical University of Crete*.

- Electrical Circuits (2002 – 2006)
- Engineering Probability and Statistics (2002 – Present)
- Applied Geostatistics (Introduction to spatial analysis) (2002 – Present)
- Physics I (Mechanics, Thermodynamics) (2015)

Teaching assistantships

1986 - 1990 **Physics Department**, *Princeton University*, NJ, USA.

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

Advising

2002 - Present **Department of Mineral Resources Engineering**, *Technical University of Crete*, Chania, Greece.

- **Seven post-doctoral advisees** (listed below):
  1. S. Elogne, PhD Applied Mathematics, University of Toulouse I & III, France
  2. M. Zukovic, PhD Engineering (Solid State Physics), Kyushu University, Japan
  3. A. Chorti, PhD Communications & Signal Processing, Imperial College, United Kingdom
  4. A. Moustakas, PhD Ecology, Friedrich-Schiller-University University, Jena, Germany
  5. A. Muradova, PhD Mathematics, Tsiblisi State University, Republic of Georgia
  6. V. Mouslopoulou, PhD Geology, Victoria University of Wellington, New Zealand
  7. I. Tsantili, PhD Naval Architecture and Marine Engineering, National Technical University of Athens, Greece
- **Four doctoral students**
  1. E.Varouchakis (PhD granted, October 2012: Dissertation title: "Geostatistical Analysis and Space-Time Models of Aquifer Levels: Application to Mires Hydrological Basin in the Prefecture of Crete")
  2. E. Ieronymydi (PhD granted, November 2009: Dissertation title (in Greek): "Development of Fusion Methods for Remote Sensing Data and Application to Vegetation Monitoring in Areas with Past Mining Activity")
  3. A. Pavlidis (PhD defense completed: Dissertation title: "Development of Novel Geostatistical Methods of Spatial Interpolation and Application to the Estimation of Reserves and Quality Properties of Lignite")
  4. E. Petrakis: (PhD research in progress: Dissertation title: "Development of Geostatistical Models based on Random Fields with Local Interactions")
- **Six M.Sc. students**
  1. A. Pavlidis, M.Sc. granted, November 2008: Thesis title: Comparison of Lignite Reserves Estimation Methods for the Amyndeo Mine and Development of Profitability Index"
  2. E. Varouchakis, M.Sc. granted, November 2008: Thesis title: "Application of Spartan Spatial Random Fields in the Geostatistical Analysis of the Spatial Distribution of Environmental Pollutants"
  3. I. Spiliopoulos, M.Sc. granted, November 2010: Thesis title: "Development of Geometric Anisotropy Estimation Methods using Data from Sensor Networks"
  4. E. Petrakis, M.Sc. granted, December 2012. Thesis title: "Elliptical Anisotropy Statistics of Spatial Data and Geostatistical Applications"
  5. V. Agou: (M.Sc. thesis granted, January 2016. Thesis title: "Geostatistical Analysis of Non-Gaussian Spatial Data. Application to Rainfall Field in Crete")
  6. I. Rogdakis: (M.Sc. thesis in progress. Thesis title: "Stochastic Prediction of Midterm Electricity Demand with Geostatistical Methods")
- Four undergraduate research advisees from Dept. of Electronics and Computer Enginerring (S. Blanas, M. Demertzi, I. Spiliopoulos, I. Karadaras)
- **Extramural Advising**
  1. November 2008: Member of the PhD examination committee of Dominique Fasbender, *Earth and Life Institute/Environmental Sciences, Université Catholique de Louvain*. Thesis title: "Data fusion in Environmental Sciences: Theory and Applications" - Advisor: Prof. Patrick Bogaert
  2. April 2012: Member of the PhD examination committee of Ioannis Dimou, *Department of Electronic Engineering, Technical University of Crete*. Thesis title: "Design and Implementation of Support Vector Machines and Information Fusion Methods for Biomedical Decision Support Systems" - Advisor: Prof. Michael Zervakis
  3. 2012 - : External committee member for the PhD dissertation of Sarah Gengler, *Earth and Life Institute/Environmental Sciences, Université Catholique de Louvain*. Provisional thesis title: "Bayesian Data Fusion for Spatial Prediction of Categorical Variables in Environmental Sciences" - Advisor: Prof. Patrick Bogaert
  4. November 2013: Member of the PhD examination committee of Sevasti Ivi Tsantili, *School of Naval Architecture and Marine Engineering, National Technical University of Athens*. Thesis title: "Two-Time Response Excitation Theory For Non Linear Stochastic Dynamical Systems" - Advisor: Prof. Gerassimos A. Athanassoulis

Conference Organization & Session Chairing

ECCOMAS 2016 **7th European Congress on Computational Methods in Applied Sciences and Engineering**, *Hersonisos, Crete*, Greece: June 2016, Session convener: MS 1305: Stochastic Models Of Failure In Random Heterogeneous Materials And Complex Networks.
https://www.eccomas2016.org/

IAMG 2015 **The 17th annual conference of the International Association for Mathematical Geosciences**, *Freiberg*, Germany: September 2015, Session convener: Integration of stochastic and numerical models.
http://www.iamg2015.de/

Spatial Statistics 2015 **Spatial Statistics: Emerging Patterns**, *Avignon*, France: June 2015, Chair of Session: New Spatial Data Sources.
http://www.spatialstatisticsconference.com/

EGU 2015 **EGU General Assembly 2015**, *Vienna*, Austria; April 2015, Co-organizer of HS3.2 Session: Geostatistics for space-time analysis of hydrological events and environmental problems.
http://www.egu2015.eu/home.html

SigmaPhi 2014 **International Conference on Statistical Physics**, *Rhodes*, Greece; July 2014, Member of the organizing committee, Organizer of Workshop on Environmental Statistical Physics .
http://areeweb.polito.it/sigmaphi/

Interpore 2012 **The Fourth International Conference on Porous Media and Annual Meeting of the International Society for Porous Media**, *Purdue University* , Indiana, USA; May 2012, Member of the international scientific committee and organizer of session "Nonlinear and Complex Processes in Porous Media".
http://www.physics.purdue.edu/interpore2012/

SigmaPhi 2011 **International Conference on Statistical Physics**, *Larnaca*, Cyprus; July 2011, Member of the organizing and scientific committees.
http://www.sigmaphi2011.org/

EMS2010 **28th European Meeting of Statisticians**, *University of Piraeus*, Greece; August, 2010, Session Chair (Environmental and Spatial Statistics).

StatGIS2009 **Geoinformatics for Environmental Surveillance International Conference**, *Milos Island*, Greece; June 2009, Member of the organizing and scientific committees.
http://www.sigmaphi2011.org/

SigmaPhi 2008 **International Conference on Statistical Physics**, *Orthodox Academy of Crete, Chania*, Greece; August 2008, Member of the organizing and scientific committees.
http://www.sigmaphi2011.org/

StatGIS 2007 **Geoinformatics for Environmental Surveillance International Conference**, *University of Klagenfurt*, Austria; September 2007, Member of the scientific committee - Co-chair of "Theory and Methodology" Session.
http://www.sigmaphi2011.org/

ICCMSE 2004 **International Conference on Computational Methods in Sciences and Engineering**, *Athens*, Greece; November 2004, Session Chair (Stochastic Methods and Applications).

Selected Committee and Service Work

2016 - Present **July 2016 - : Representative of TUC on the National Cooperation Committee of the Academic Institutes of Greece (appointed by the Rector)**, *Technical University of Crete (TUC)*, Chania, Greece.

2012 - Present **December 2012 - Present: Member of the elected 14-member University Council (Board of Trustees)**, *Technical University of Crete*, Chania, Greece.

2011 - Present **Institution Operational Contact for AXA Research Fund**, Technical University of Crete, Chania, Greece.

2011 - 2013 **Chair (October 2012 - 2013) and Member (June 2011-September 2012) of the Undergraduate Curriculum Committee**, *Department of Mineral Resources Engineering*, Technical University of Crete, Chania, Greece.

2004-2009 **Director of Graduate Studies: Program "*Geotechnology and Environment*"**, *Department of Mineral Resources Engineering*, Technical University of Crete, Chania, Greece.

2009 **Committee for the Development Planning of Technical University of Crete**, *Department of Mineral Resources Engineering*, Technical University of Crete, Chania, Greece.

2003-2006 **Supervising Committee of the Computer Labs**, Technical University of Crete, Chania, Greece.

Membership in Professional Societies

- American Physical Society, Member since 1986
- Society of Industrial and Applied Mathematics, Member since 2013
- Institute of Electrical and Electronic Engineers, Member since 2008
- International Association of Mathematical Geology, Life Member since 2014
- European Geophysical Union, 2010, 2013, 2014
- Technical Chamber of Greece, Member since 1985
- In the past I have been a Member of the European Association of Geoscientists, Interpore, the American Geophysical Union, and the Technical Association of the Pulp and Paper Industry

Journal Paper Refereeing

- *Advances in Water Resources*, published by Elsevier
- *Computers & Geosciences*, published by Elsevier
- *Environmental Modeling and Software*, published by Elsevier
- *Environmental Science and Technology*, published by the American Chemical Society
- *Journal of the American Ceramic Society*
- *Journal of the European Ceramic Society*, published by Elsevier
- *Journal of Geophysics and Engineering*, published by the Institute of Physics
- *Journal of Hydrology*, published by Elsevier

- *Journal of Pulp and Paper Science*, published by the Technical Association of Pulp and Paper Industry
- *Journal of Physics A: Mathematical and Theoretical*, published by the Institute of Physics
- *Mathematical Geosciences*, published by Springer
- *Physica A*, published by Elsevier
- *Probabilistic Engineering Mechanics*, published by Elsevier
- *Quarterly Journal of the Royal Meteorological Society*
- *Simulation Modelling Practice and Theory*, published by Elsevier
- *Spatial Statistics*, published by Elsevier
- *Transactions on Remote Sensing and Geosciences*, published by the Institute of Electrical and Electronic Engineers
- *Transactions on Information Theory*, published by the Institute of Electrical and Electronic Engineers
- *Transactions on Wireless Communications*, published by the Institute of Electrical and Electronic Engineers
- *Water Resources Research*, published by the American Geophysical Union

External Reviewing of Research Grant Proposals

- Qatar National Research Fund, Qatar, 2015
- National Centre for Research and Development, Ministry of Science and Higher Education, Poland, 2013
- Romanian National Council for Scientific Research, Romania, 2012
- National Center of Science and Technology Evaluation, Ministry of Education and Science, Republic of Kazakhstan, 2011, 2012, 2013
- European Commission (STCU), 2005
- Israel Science Foundation, 2004, 2007
- US Civilian Research and Development Foundation, 1998

Seminars

1. "Local-Interaction Energy Functionals and Applications in Space-Time Data Analysis", Department of Mathematics and Statistics, University of Cyprus, Nicosia, November 2015.
2. "Stochastic Local Interaction Models for Spatiotemporal Data", Department of Informatics and Telecommunications, National and Kapodistrian University of Athens, Athens, May 2014.
3. "Random Fields based on Local Interaction Models for Spatiotemporal Data," Department of Civil and Environmental Engineering, Princeton University, Princeton, NJ, USA, December 2013.
4. "Stochastic Local Interaction Models for Spatiotemporal Data," Academia Sinica, Taipei, Taiwan, October 2013.
5. "Connections between Fracture Mechanics and Earthquake Interevent Times", National Central University, Jhongli, Taiwan, October 2013.
6. "Stochastic Local Interaction Models for Spatiotemporal Data," Pacific Northwest National Laboratory Computational Sciences & Mathematics Division, Washington State, USA, July 2013.
7. "Statistical Physics, Fracture Mechanics, Geostatistics and Earthquakes," Statistics Department, University of Valparaiso, Chile, May 2013.

8. "Gaussian Field Theory as a Tool for Spatial Data Processing", Physics Department, University of Crete, Herakleion, March 2013.
9. "Statistical Models of Spatial Processes Based on Local-Interaction Energy Functionals", Uncertainty Quantification Workshop, Institute for Computational and Experimental Research in Mathematics, Brown University, Providence, RI, USA, October 2012.
10. "Spatial Random Fields based on Local Interactions and Applications to Spatial Interpolation", Department of Applied Mathematics, Brown University, USA, May 2012.
11. "Statistical Mechanics of Brittle Fracture: From Paper Webs to Earthquakes," Physics Department, University of Crete, Herakleion, April 2012.
12. "Spartan Gibbs Random Fields." CRENoS - DEIR Seminar, Economics Faculty, University of Sassari, Italy, September 2011.
13. "An Introduction to the Analysis of Spatial Data using Spartan Spatial Random Fields." School of Rural and Surveying Engineering, Aristotle University of Thessaloniki, Greece, May 2011.
14. "An Introduction to the Analysis of Spatial Data using Spartan Spatial Random Fields." Department of Statistics, North Carolina State University, Raleigh, North Carolina, USA, July 2010.
15. "Estimation of Geometric Anisotropy from Scattered Spatial Data with Emphasis on Automatic Mapping." Center of Applied Environmental Fluid Mechanics, Johns Hopkins University, Baltimore, Maryland, USA, July 2010.
16. "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.
17. "Stochastic Methods of Spatial Analysis for Scattered Data with Environmental Applications." Department of Electronic and Computer Engineering, Technical University of Crete, April 2008.
18. "Spartan Spatial Random Fields: Reinventing Geostatistics for Environmental Systems Applications." Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, Maryland, USA, January 2008.
19. "Development of Spartan Spatial Random Fields for Geostatistical Applications." Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, Maryland, USA, January 2005.
20. "Spartan Geostatistical Models." Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, North Carolina, USA, August 2003.
21. "Modern Trends in Geostatistics and Applications in the Geophysical Sciences." Department of Mineral Resources Engineering, Technical University of Crete, Chania, Greece, August 2001.
22. "Geostatistical Models of Anisotropic Dependence." Department of Mineral Resources Engineering, Technical University of Crete: Chania, Greece, June 2001.
23. "Dancing Strings and Tension Variations." Pulp and Paper Research Institute of Canada: Pointe-Claire, Quebec, Canada, May 2001.
24. "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.
25. "Random Fields in the Analysis of Groundwater Flow and Contaminant Transport." Department of Physics, University of Crete, Herakleion, Greece, June 1999.
26. "Coarse-graining Analysis of Fluctuations in Porous Media." Pulp and Paper Research Institute of Canada, Pointe Claire, Quebec, Canada, May 1999.
27. "Renormalization Analysis of Flow and Transport in Heterogeneous Media." Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas, USA, January 1999.

28. "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.
29. "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.
30. "Stochastic Models: Estimation, Simulation and Scale Change." Integrated Decisions and Systems, Inc., Eagan, Minnesota, USA, June 1998.
31. "Applications of Random Field Models in Subsurface Hydrology." Department of Civil and Environmental Engineering, University of Cincinnati, Cincinnati, Ohio, USA, October 1998.
32. "Variational Calculation of Effective Parameters in Stochastic Porous Media Using Replicas." Applied Mathematics Seminar, Department of Mathematics, University of North Carolina, Chapel Hill, North Carolina, USA 1997.
33. "Stochastic Models of Porous Media and the Scale-Up Problem." Physical Chemistry Institute, National Center for Scientific Research Democritus, Athens, Greece, July 1997.
34. "Heterogeneous Media and Level Statistics Analysis using Phase/Indicator Functions." Higher Dimension Research, Inc., Saint Paul, Minnesota, USA, June 1997.
35. "Modeling Random Heterogeneous Media at Various Physical Scales." Higher Dimension Research, Inc., Saint Paul, Minnesota, USA, June 1997.
36. "Advances in Groundwater Modeling." UNC Superfund Center Annual Workshop, University of North Carolina, Chapel Hill, North Carolina, USA 1996.
37. "Flow in Stochastic Porous Media: A Multiple-Scale Sea." Water Resources Engineering Seminar series, Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, North Carolina, USA 1995.
38. "Stochastic Analysis of Flow and Transport Phenomena." UNC Superfund Center Annual Workshop, University of North Carolina, Chapel Hill, North Carolina, USA 1995.
39. "Non-local Generalization of Darcy's Law and Diagrammatic Theory." Department of Petroleum Engineering, Stanford University, Palo Alto, California, USA, March 1994.

Volunteer Work

2014 **Science & Technology Day** , *Geostatistics laboratory participated with presentation in one-day event for elementary school children* , Technical University of Crete, Chania, Greece, October 18, 2014.

2013 **Science & Technology Day**, *Geostatistics laboratory participated with presentation in one-day event for elementary school children*, Technical University of Crete, Chania, Greece, December 7, 2013.

1996-1998 **Academic Advisor**, Hellenic Students Association, University of North Carolina, Chapel Hill, USA.