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CURRICULUM VITAE

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Education:

Ph.D.	Hydrology	Stanford University	1970
M.S.C.E.	Hydrology	Drexel University	1967
B.S.C.E.		Drexel University	1965

Employment:

2008-present	Distinguished University Professor, Craig E. Philip Professor of Civil and Environmental Engineering, Professor of Earth and Environmental Sciences, Vanderbilt University
2012-present	Chairman, Department of Civil and Environmental Engineering, Vanderbilt University
1991-2008	Ernest H. Ern Professor of Environmental Sciences University of Virginia
2006-2007	Visiting Professor, University of California at Berkeley
2002-2006	Associate Dean for the Sciences, University of Virginia
2002-2003	Interim Chairman, Department of Statistics, University of Virginia
1997-1998	Visiting Scientist, Institute for Alpine and Arctic Research, University of Colorado
1990-1991	Visiting Scientist, U.S. Geological Survey and, concurrently, Visiting Professor, Stanford University
1984-1990	Professor of Environmental Sciences, University of Virginia
1984-1985	Honorary Visiting Professor of Environmental Sciences, University of Lancaster, Lancaster, U.K.
1975-1984	Associate Professor (Department Chairman 1979 - 1984) University of Virginia
1977-1978	Visiting Fellow, Centre for Resource and Environmental Studies, The Australian National University
1970-1975	Assistant Professor University of Virginia

Current Research Interests

Understanding how hydrological processes affect the transport of dissolved and suspended constituents through catchments and aquifers is one of the main aims of studies of Earth surface processes. Water is "the universal solvent." Water chemically weathers rocks and soils, carrying dissolved salts from the

continents to the seas. It interacts with decaying vegetation and carries organic carbon seaward. Water readily carries chemicals that humans use to the sea, including fertilizers and other agrochemicals. The global water cycle is thus linked to other element cycles, for example, to carbon and nitrogen cycles, and is inextricably linked with a host of ecosystem functions. Moving water carries suspended solids as well as dissolved salts, so the water cycle is also closely tied to cycles of erosion and sedimentation. Current projects include work on transport of dissolved organic carbon in watersheds, on nitrogen fertilizer use and fate as influenced by individual behavior, on life-cycle analyses for an inland water transport company, and on the water-energy nexus.

Society Memberships

American Geophysical Union
Geological Society of America
American Women in Science

Editorships

Associate Editor, *Water Resources Research*, 1982 - 1984
North American Editor, *J. Hydrological Processes*, 1985-1992
Editor, *Water Resources Research*, January 1993 - January 1997
Editor for Hydrology, Encyclopedia of Inland Waters, Elsevier, 2006-2009

Awards and Honors

Virginia Chapter of Sigma Xi, President's and Visitors' Prize, 1986.
Robert E. Horton Award, Hydrology Section, American Geophysical Union, 1993.
Elected Fellow, American Geophysical Union, 1994.
Appointed to five-year Visiting Professorship at University of Reading, UK, 1995
1995 Biennial Medal for Natural Systems, Modelling and Simulation Soc. of Australia
1995 John Wesley Powell Award for Citizen's Achievement (US Geological Survey)
Elected Fellow, Association for Women in Science, 1996
Elected to membership in the National Academy of Engineering, February 1996
1999 Excellence in Geophysical Education Award, American Geophysical Union
Bownocker Lecturer, Ohio State University, May 1999
ISI Highly Cited Researcher, 2000 (http://authors.isihighlycited.com/)
National Associate of the National Academies in recognition of extraordinary service, 2001
Langbein Lecturer, American Geophysical Union, 2002
Elected Fellow, Geological Society of America, 2005
Virginia Outstanding Scientist, 2007
William Kaula Award, American Geophysical Union, 2010

Selected Service on National Committees

Chair, National Research Council, Committee on Opportunities and Challenges in Hydrologic Sciences, 2010-2012
Chair, Geopolicy Committee, American Geosciences Institute, 2011-present
Member, National Research Council, Water Science and Technology Board, 2010-present.
Member, National research Council, Committee on Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase I, 2010-2012.
Member of Steering Committee on Ecosystems Services, National Academies Keck Futures Initiative, 2011.

Member, Advisory Committee for the Geosciences Directorate, NSF, 2011-present
Chair, Committee of Visitors for the Surface Earth Processes Section, NSF, June 2011
Member, Advisory Board for the School of Earth Sciences, Stanford, 2004-present
Member, Nuclear Waste Technical Review Board (Presidential Appointment) 2004-2012
Member, National Research Council, Report Review Committee, 2004-2009
Member, National Research Council, Science Panel, America's Climate Choices, 2009-2010.
Chair, National Research Council, Board on Earth Sciences and Resources, 2002-2009.
Chair, National Research Council, Committee to Review the NSF "WATERS" Plan, 2007-09
President, Hydrology Section, American Geophysical Union, 2006-2008
Chair, Science Advisory Committee, Berkeley Water Center, 2006-2008
Member, Adaptation for Climate-Sensitive Ecosystems and Resources Advisory Committee (USEPA), 2007-2008.
Member, National Research Council, Committee on Hydrologic Sciences, Aug 2000 – 2008
Member, Hydrology Section Executive Committee, American Geophysical Union, 1994-2009.
Chair, Publications Committee, American Geophys. Union, 2000-04 (member, 1998-2004).
Chair, Advisory Committee on Nuclear Waste, Nuclear Regulatory Commission, 2001-2003 (Vice-chairman, 1997-2000; member 1996-2004)
Member, Board of Trustees, Virginia Museum of Natural History, 2000-2005
Chair, National Research Council, Committee on the Review of EarthScope Science Objectives and Implementation Planning, 2001.
Member, Sandia National Laboratories Geoscience and Environment Center Advisory Board, 1998-2004
Member, Idaho National Engineering and Environmental Laboratory, Geosciences Advisory Board, 1998-2004
Chair, Water-Cycle Initiative Study Group (Interagency committee appointed to create a science plan for a major federal research initiative on the water cycle), 1999-2001.
Chair, National Research Council Commission on Geosciences, Environment, and Resources 1996-2000, (member, 1994-2000)
Chair, Board of Journal Editors, American Geophysical Union, 1998-2000.
Chair, National Research Council Committee on Water Resources Research (WSTB), 1991-1997 (Member 1990-1997)

Co-convenor AGU Chapman Conference on Hydrochemical Response of Forested Catchments, Bar Harbor, Maine, September 1989
Co-convenor Gordon Conference on Hydrological/Geochemical/Biological Interactions in Forested Catchments, Plymouth, NH, 1-5 July 1991

Publications, George M. Hornberger

1. Books and book chapters

Remson, Irwin, G.M. Hornberger and F.J. Molz. 1971. ***Numerical Methods in Subsurface Hydrology***. John Wiley and Sons.

Hornberger, G.M., Raffensperger, J.P., Wiberg, P.L., and K. Eshleman. 1998. ***Elements of Physical Hydrology***. Johns Hopkins Press.

Hornberger, G.M. and P.L. Wiberg 2006. ***Numerical Methods in the Hydrological Sciences***, American Geophysical Union, Special Publications Series, Volume 57, 233 pages, e-book, 2006, ISBN 0-87590-725-1, AGU SP057F251

Hornberger, G.M. and John Stetkar 2008. Abrupt Climate Change. In: Garrick, B. J. ***Quantifying and Controlling Catastrophic Risks***, Academic Press.

Burger, J., Gochfeld, M., Powers, C.W., Kosson, D. and G. Hornberger 2010. Biological Assessment for Radionuclide Levels in Biota and Ecosystems. In: Harris, A.M. (ed.) ***Clean Energy: Resources, Production and Developments***, Nova Science Publishers.

Thabrew, L., Ries, R., and Hornberger, G.M. 2012. Transdisciplinary framework for trans-boundary watershed management, Chapter 13, pp 271-290. In C. N. Madu and C. Kuei (eds.), ***Handbook of Sustainable Management***, Imperial College Press**.** (ISBN 978-981-4354-81-3)

2. Refereed Articles

Remson, Irwin, A.A. Fungaroli and G.M. Hornberger. 1967. Numerical analysis of soil-moisture systems. ***Proc. ASCE, J. Irr. and Drainage Div., IR3:*** 153-166.

Hornberger, G.M., Irwin Remson and A.A. Fungaroli. 1969. Numerical studies of a composite soil moisture ground water system. ***Water Resources Research 5***: 797-802.

Hornberger, G.M., and Irwin Remson. 1970. A moving boundary model of a one-dimensional saturated-unsaturated transient porous flow system. ***Water Resources Research 6***: 898-905.

Hornberger, G. M., Janet Ebert and Irwin Remson. 1970 Numerical solution of the Boussinesq equation for aquifer-stream interaction. ***Water Resources Research 6***: 601-608.

Hornberger, G. M., and M. G. Kelly. 1972. The determination of primary production in a stream using an exact solution to the oxygen balance equation. ***Water Resources Bulletin 8***: 795-801.

Molz, F. J. and G. M. Hornberger. 1973. Water transport through plant tissues in the presence of a diffusable solute. ***Soil Sci. Soc. of Am. Proc. 37***: 833-837.

Kelly, M. G., G. M. Hornberger and B. J. Cosby. 1974. Continuous automated measurement of rates of photosynthesis and respiration in an undisturbed river community. ***Limnol. Oceanogr. 19***: 305-312.

Kelly, M. G. , M. R. Church and G. M. Hornberger. 1974. A solution of the inorganic carbon mass balance equation and its relation to algal growth rates**.** ***Water Resources Research 10***: 493-497.

Hornberger, G. M. and M. G. Kelly. 1974. A new method for estimating productivity in standing waters using free oxygen measurements. ***Water Resources Bulletin 10***: 265-271.

Hornberger, G. M. and M. G. Kelly. 1975. Estimation of atmospheric reaeration in a river using productivity analysis. ***J. Environ. Eng. Div., ASCE 101***: 729-739.

Tett, P. B., M. G. Kelly and G. M. Hornberger. 1975. A method for the spectrophotometric measurement of benthic microalgal chlorophyll-a and pheophytin-a using several extractions with methanol. ***Limnol. Oceanogr. 20***: 887-896.

Hornberger, G. M., M. G. Kelly and R. M. Eller. 1976. The relationship between light and photosynthesis rate in a river community and implications for water quality modeling**.** ***Wat. Resour. Res. 12***: 723-730.

Lederman, T. C., G. M. Hornberger and M. G. Kelly. 1976. The calibration of a phytoplankton growth model using batch culture data. ***J. Wat., Air and Soil Pollut. 5***: 431-442.

Hornberger, G. M., M. G. Kelly and B. J. Cosby. 1977. Evaluating eutrophication potential from river community productivity. ***Water Research 11***: 723-730.

Kelly, M. G., G. M. Hornberger and B. J. Cosby. 1977. Automated measurement of river productivity for eutrophication monitoring. In ***Biological Monitoring of Water and Effluent Quality***. Cairns, Dickson and Wesetlake (eds.). ***ASTM Spec. Tech. Pub. 607***.

Gallegos, C. L., G. M. Hornberger and M. G. Kelly. 1977. A model of river benthic algal photosynthesis in response to rapid changes in light. ***Limnol. Oceanogr. 22***: 226-233.

Tett, P., C. Gallegos, M. G. Kelly, G. M. Hornberger and B. J. Cosby. 1978. Relationships amongst substrate flow and microalgal pigment density, in the Mechums River, Virginia. ***Limnol. Oceanogr. 23***: 785-797.

Clapp, R. B. and G. M. Hornberger. 1978. Empirical equations for some soil hydraulic properties. ***Wat. Resour. Res. 14***: 601-604.

Whitehead, P. G., P. C. Young and G. M. Hornberger. 1979. A systems model of the Bedford-Ouse River - streamflow modeling. ***Water Research 13***:1155-1169.

Whitehead, P. G., G. M. Hornberger and R. E. Black. 1979. Effects of parameter uncertainty in a flood routing model. ***Hydrol. Sci. Bull. 24***:445-464.

Bolyard, T., G. M. Hornberger, R. Dolan and B. P. Hayden. 1979. Fresh water reserves of Mid-Atlantic coast barrier islands. ***Environ. Geol. 3***: 1-11.

Hillel, D. and G. M. Hornberger 1979. Physical model of the hydrology of sloping heterogeneous fields. ***Soil Sci. Soc. of Am. Proc. 43***: 434-439.

Hornberger, G. M. and R. C. Spear. 1980. Eutrophication in Peel Inlet: I. The problem defining behavior and a mathematical model for the phosphorous scenario. ***Water Research 14***: 29-42.

Spear, R. C. and G. M. Hornberger. 1980. Eutrophication in Peel Inlet: II. Identification of critical uncertainties via generalized sensitivity analysis. ***Water Research 14***: 43-49.

Hornberger, G. M. 1980. Uncertainty in dissolved oxygen prediction due to variability in algal photosynthesis. ***Water Research 14***: 335-361.

Ellis, F. W., Ramsey, F. V. and G. M. Hornberger 1980. Converging flow model applied to an urban catchment. ***J. Hyd. Div. ASCE 106***: 1457-1470.

Gallegos, C. L., G. M. Hornberger and M. G. Kelly 1980. Photosynthesis-light relationships of a mixed culture of phytoplankton in fluctuating light. ***Limnol. Oceanogr. 25***: 1082-1092.

Hornberger, G. M. and R. C. Spear 1981. An approach to the preliminary analysis of environmental systems. ***J. of Environ. Mgmt. 12***: 7-18.

Spear, R. C. and G. M. Hornberger 1981. A Technical Note on the SPS Energy Analysis of Herendeen et al. ***Space Solar Power Review 2***: 305-306.

Beven, K. J. and G. M. Hornberger 1982. Assessing the effect of spatial pattern of precipitation in modeling stream flow hydrographs. ***Water Resources Bulletin 18***(5): 823-829.

Gallegos, C. L., Church, M. R., M. G. Kelly and G. M. Hornberger 1983. Asychrony between rates of oxygen production and inorganic carbon uptake in a mixed culture of phytoplankton. ***Archiv. fur. Hydrobiol., 96***: 164-175.

Hornberger, G. M. and R. C. Spear 1983. An approach to the analysis of behavior and sensitivity in environmental systems. In: Beck, M. B. and G. van Stratten (eds.), ***Uncertainty and Forecasting of Water Quality***, Springer-Verlag, pp 101-116.

Clapp, R. B., Hornberger, G. M. and B. J. Cosby 1983. Estimating spatial variability in soil moisture with a simplified dynamic model. ***Wat. Resour.Res. 19***: 739-745.

Spear, R. C. and G. M. Hornberger 1983. Control of the DO level in a river under uncertainty. ***Water Resour. Res. 19***:1266-1270.

Humphries, R. B., G. M. Hornberger, R. C. Spear, and A. J. McComb 1984. Eutrophication in Peel Inlet: III. A retrospective look at the preliminary analysis. ***Water Research 18***: 389-395.

Whitehead, P. G. and G. M. Hornberger 1984. Modelling algal behavior in the River Thames. ***Water Research. 18***: 945-953.

Cosby, B. J. and G. M. Hornberger 1984. Identification of light-photosynthesis models for aquatic systems. I. Theory and Simulations. ***Ecol. Modelling. 23***:1-24.

Cosby, B. J., Hornberger, G. M. and M. G. Kelly 1984. Identification of light-photosysthesis models for aquatic systems. II. Application to a macrophyte dominated stream. ***Ecol. Modelling 23***:25-51.

Cosby, B. J., Hornberger, G. M., Clapp, R. B. and T. R. Ginn. 1984. A statistical analysis of the relationships of soil moisture characteristics to the physical properties of soils. ***Wat. Resour. Res. 20***:682-690.

Cosby, B. J., Hornberger, G. M., Galloway, J. N. and R. F. Wright 1985. Modelling the effects of acid deposition: Assessment of a lumped-parameter model of soil water and streamwater chemistry. ***Wat. Resour. Res. 21***:51-63.

Cosby, B. J., Wright, R. F., Hornberger, G. M. and J. N. Galloway 1985. Modeling the effects of acid deposition: estimation of long-term water quality responses in a small forested catchment. ***Wat. Resour. Res., 21***:1591-1601.

Hornberger, G. M., Beven, K. J., Cosby, B. J. and D. E. Sappington 1985. Shenandoah Watershed Study: Calibration of a topography-based, variable contributing area model to a small forested catchment. ***Wat. Resour. Res.,21***:1841-1850.

Hornberger, G. M. and B. J. Cosby 1985. Selection of parameter values in environmental models using sparse data: a case study. ***Applied Math. and Comp.,17***:335-355.

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Hornberger, G. M., Cosby, B. J. and J. N. Galloway 1986. Modeling the effects of acid deposition: uncertainty and spatial variability in estimation of long-term responses of regions to atmospheric deposition of sulfate. ***Water Resour. Res.,22***:1293-1302.

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Wright, R. F., Cosby B. J., Hornberger, G. M. and J. N. Galloway 1986. Interpretation of paleolimnological reconstructions using the MAGIC model of soil and water acidification. ***Water, Air and Soil Pollut. 30***:367-380.

Cosby, B. J., Hornberger, G. M., Wright, R. F., Rastetter, E. B. and J. N. Galloway 1986. Estimating catchment water quality response to acid deposition using mathematical models of soil ion exchange processes. ***Geoderma, 38***:77-95.

Herlihy, A. T., Mills, A. M., Hornberger, G. M. and A. E. Bruckner 1987. The importance of sediment sulfate reduction to the sulfate budget of an impoundment receiving acid mine drainage. ***Water Resour. Res., 23***:287:292.

McIntire,P.E., Mills,A.L. and G.M.Hornberger 1988. Interactions between groundwater seepage and sediment porewater sulfate concentration profiles in Lake Anna, Virginia**.** ***Hydrol. Proc., 2***:207-217.

Cosby,B.J., Hornberger,G.M. and R.F.Wright 1989. A regional model of surface water acidification in southern Norway: calibration and validation using survey data. In: Kämäri,J. (ed.) ***Environmental Impact Models to Assess Regional Acidification*** Reidel.

Hornberger,G.M., Cosby,B.J. and R.F.Wright 1989. A regional model of surface water acidification in southern Norway: uncertainty in long-term hindcasts and forecasts. In: Kämäri,J. (ed.) ***Environmental Impact Models to Assess Regional Acidification*** Reidel.

Wolock,D.M., Hornberger,G.M., Beven,K.J. and W.G. Campbell 1989. The relationship of catchment topography and soil hydraulic characteristics to lake alkalinity in the Northeastern United States. ***Water Resources Research 25***:829-837.

Webb,J.R., Cosby,B.J., Galloway,J.N. and G.M.Hornberger 1989. Acidification of native brook trout streams in Virginia. ***Water Resour. Res. 25***:1367-1377.

Bruckner,A.M., Hornberger,G.M. and A.L.Mills 1989. Field measurement and associated controlling factors for groundwater seepage in a Piedmont impoundment**.** ***Hydrological Processes 3***:223-235.

Ryan,P.F., Hornberger,G.M., Cosby,B.J., Galloway,J.N., Webb,J.R. and E.B.Rastetter 1989. Seasonal and interannual variation in the chemical composition of streamwater in two catchments impacted by acidic deposition. ***Water Resour. Res. 25***:2091-2099.

Hornberger,G.M., Cosby,B.J. and R.F.Wright 1989. Historical reconstructions and future forecasts of regional surface water acidification in southernmost Norway**.** ***Water Resour.Res. 25***:2009-2018.

Hornberger, G.M. 1989. Modelling complex natural processes with small observation sets: the case of acidification of surface waters in North America and Europe**.** ***Mathematics and Computers in Simulation 32***: 39-47.

Wolock, D.M., Hornberger G.M. and T. Musgrove 1990. Topographic controls on episodic streamwater acidification in Wales. ***J.Hydrology 115***:243-259.

Hornberger, G.M., Beven, K.J. and P.F. Germann 1990. Inferences about solute transport in macroporous forest soils from time series models. ***Geoderma 46***:249-262.

Scholl, M.A., Mills, A.L., Herman, J.S., and G.M. Hornberger 1990. The influence of mineralogy and solution chemistry on the attachment of bacteria to representative aquifer materials. ***J. Contaminant Hydrol. 6***:321-326.

Wolock, D.M. and G.M.Hornberger 1991. Direct and indirect effects of atmospheric CO_2 levels on catchment hydrological response. ***J. of Forecasting 10***:105-116.

Hornberger, G.M., Germann, P.G., and K.J. Beven 1991. Throughflow and solute transport in an isolated sloping soil block in a forested catchment. ***J. Hydrology 124***:81-99.

Castro, N.M. and G.M. Hornberger 1991. Surface-subsurface water interactions in an alluviated mountain stream channel. ***Water Resour. Res. 27***:1613-1621.

Fontes, D., Mills, A.L., Hornberger, G.M., and J.S. Herman 1991. Biological, chemical, and hydrological factors influencing microbial transport through porous media. ***Appl.Environ. Microbiol. 57***:2473-2481.

Wright, R.F., Cosby, B.J. and G.M. Hornberger 1991. A regional model of lake acidification in southernmost Norway. ***AMBIO 20***:222-225.

Hornberger, G.M., Mills, A.L., and J.S. Herman 1992. Bacterial transport in porous media: evaluation of a model using laboratory observations. ***Water Resour. Res. 28***:915-938.

Jakeman, A.J., Hornberger, G.M., Littlewood, I.G., Whitehead, P.G., Harvey, J.W., and K.E. Bencala 1992. A systematic approach to modelling the dynamic linkage of climate, physical catchment descriptors and hydrologic response components***. Mathematics and Computers in Simulation 33***:359-366.

Rastetter, E.M., King, A.W., Cosby, B.J., Hornberger, G.M., O'Neill, R.V., and J.E Hobbie 1991. Aggregating fine-scale ecological knowledge to model coarser-scale attributes of ecosystems. ***Ecological Applications 2***:55-70.

Jakeman, A.J. and G.M. Hornberger 1993. How much complexity is needed in a rainfall-runoff model? ***Water Resources Research 29***:2637-2649.

Jakeman, A.J., Chen, T.H., Post, D.A., Hornberger, G.M., Littlewood, I.G., and P.G. Whitehead 1993. Assessing uncertainties in hydrological response to climate at large scale. ***IAHS Pub. 214***: 37-47.

Saiers, J.E., J.F. McCarthy, P.M. Jardine, L. Liang, and G.M. Hornberger. 1993. Transport of amorphous TiO_2 through homogeneous and structurally heterogeneous porous media. (In) J.F. McCarthy and F.J. Wobber (eds.) Concepts for manipulating groundwater colloids for environmental restoration, Chelsea MI: Lewis Publishers Inc. pp. 309-313.

Saiers, J. E., Hornberger, G. M., and Liyuan Liang, 1994. First- and second-order approaches for modeling the transport of colloidal particles in porous media. ***Water Resour. Res. 30***:2499-2506.

Hornberger, G.M., Bencala, K.E. and D.M. McKnight 1994. Hydrological controls on the temporal variation of dissolved organic carbon in the Snake River near Montezuma, Colorado. ***Biogeochemistry 25***:147-165.

Saiers, J. E., Hornberger, G.M., and C. Harvey 1994. Colloidal silica transport through homogeneous and structured, heterogeneous porous media. ***J. Hydrol. 163***:271-288.

Mills, A.L., DeJesus, T., Herman, J.S., and G.M. Hornberger 1994. Adsorption of bacteria on clean and on iron-coated sand. ***Appl. Environ. Microbiol. 60***:3300-3306.

Chen TH, Hornberger GM, Jakeman AJ, Swank WT 1995. The performance of different loss models in the simulation of streamflow. ***Environmetrics 6***: 479-484

Weiss, T. H., Mills, A. L., Herman, J. S., and Hornberger, G. M. 1995. Effect of cell size, hydrophobic character and growth habit on transport of bacteria in porous media. ***Environ. Sci. Tech 29***:1737-1740.

Hornberger, G.M. and E.W. Boyer. 1995. Recent advances in watershed modelling. ***U.S. National Report to IUGG, 1990-1993, Reviews of Geophysics, Suppl:*** 949-957

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