May 2007

CURRICULUM VITAE

MIGUEL A. MEDINA, JR.

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CURRENT APPOINTMENTS

MIGUEL A. MEDINA, JR.

Professor
Department of Civil and Environmental Engineering
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Professor (secondary appointment)
Environmental Sciences and Policy Division
Nicholas School of the Environment and Earth Sciences
Duke University

Married: Margarita P. Medina, two sons, Miguel III and Rafael
Home address: 3802 Colorado Avenue, Durham, NC 27707
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EDUCATION

Ph.D.	(Water Resources and Environmental Engineering Sciences), University of Florida, 1976. Dissertation: "Interaction of Urban Stormwater Runoff, Control Measures and Receiving Water Response."
M.S.	(Civil Engineering), University of Alabama, 1972. Thesis: "Studies of Total Organic Carbon Analysis Utility for Water Resources Management."
B.S.	(Civil Engineering), University of Alabama, 1968.

PROFESSIONAL EXPERIENCE

A. Academic

Professor of Civil and Environmental Engineering, Duke University, April 1, 1998 - present.
Professor (secondary appointment), Environmental Sciences and Policy, Duke University, July 1, 2000 – June 30, 2010.
Director, Center for Hydrologic Science, Duke University, 2001- 2004.
Interim Chair, Department of Civil and Environmental Engineering, Duke University, July 1, 2000 – August 31, 2001.
Associate Professor of Civil Engineering, Duke University, July 1981 - March 1998.
Visiting Fulbright Scholar, Monash University, Melbourne, Australia, 1984.
Assistant Professor of Civil Engineering, Duke University, 1976 - June 1981.

B. Military Service

Commissioned in Field Artillery, U.S. Army, Fort Sill, Oklahoma. Distinguished Military Graduate, 1969.
558th Artillery Group S-2, Headquarters, U.S. Army, NATO, Turkey. Supervised 5 officers, 30 enlisted men. Security Clearance: U.S. Top Secret, NATO Cosmic Atomal, 1969-1970.
Assistant Post Engineer, Third U.S. Army, Ft. McPherson, Atlanta, Georgia, Project Officer for $200,000 water resources construction project, Lake Allatoona, Georgia, 1970-1971.
U.S. Army Commendation Medal, First Oak Leaf, 1971.
U.S. Army Commendation Medal, 1970.

PROFESSIONAL REGISTRATION

Certified Professional Hydrologist, Certificate No. 203, Board of Registration, American Institute of Hydrology, St. Paul, Minnesota since December 31, 1983.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Society of Civil Engineers, Fellow
American Geophysical Union
American Water Resources Association
American Institute of Hydrology
International Water Resources Association
International Association of Hydrological Sciences
Sigma Xi, Scientific Research Society of North America
Tau Beta Pi, National Engineering Honor Society
Chi Epsilon, National Civil Engineering Honor Society

HONORS, AWARDS and RECOGNITION

Earl I. Brown II Outstanding Civil Engineering Faculty Award, Duke University Chapter of Chi Epsilon, 2007.
Lead Evaluator, UNESCO World Water Assessment Program, 2006-2007.
President-Elect, American Institute of Hydrology, 2006.
Associate Editor, ASCE *Journal of Hydrologic Engineering*, 2006-2008.
Member, International Program Committee for the International Association of Science and Technology for Development (IASTED) International Conference on Environmental Modelling and Simulation, 2006.
External Evaluator, International Hydrological Programme, UNESCO, Paris, France, November 18, 2002 to October 22, 2003.
Vice-President for Institute Development, American Institute of Hydrology, 1998-2000; Chairman, R.K. Linsley Award Committee, 2005.
E.I. Du Pont De Nemours Company Award Plaque, July 27, 2000 for "outstanding contributions and dedication toward furthering the science of environmental modeling."

Scientific Board, International Conference on Environmental Engineering, Universidad Politécnica de Cartagena, Spain, 1999.

Technical Advisory Committee, Water Resources Research Institute of UNC, 1997-1999.
Fellow, American Society of Civil Engineers, 1996.
School of Engineering Distinguished Faculty Teaching Award, selected by the graduating undergraduate student body, 1995.
Board of Academic Advisors, Environmental Project, Universidad Austral, Buenos Aires, Argentina, 1995 - present.
U.S. Air Force Summer Research Fellow, Brooks AFB, Texas, 1990.
Environmental Management Commission, appointed to six-year term by Governor of North Carolina, James Martin, July 1989.
Earl I. Brown II Outstanding Civil Engineering Faculty Award, Duke University Chapter of Chi Epsilon, 1989.
President, Universities Council on Water Resources, 1987-1988. Congressional Testimony, U.S. House of Representatives Appropriations Subcommittee on the Department of the Interior, Feb. 25, 1988.
Distinguished Engineering Fellow, College of Engineering, University of Alabama, 150th Anniversary of College of Engineering, April 1988.
Chairman, International Technical Advisory Committee (ITAC) of the International Ground Water Modeling Center (IGWMC), Golden, Colorado and Delft, The Netherlands, 1988-1993, member 1987-1993.
Board of Directors, Universities Council on Water Resources, 1985-1988, President-Elect, 1986-1987.
UNESCO Lecturer in Central America and the Caribbean (Dominican Republic and Panama), Hydrologic and Water Quality Models, 1986.
President, N. C. Water Resources Association, 1986.
UNESCO Lecturer in Central America (Costa Rica, Guatemala, Honduras, El Salvador), Hydrologic and Water Quality Models, 1985.
President-Elect, N.C. Water Resources Association, 1985.
Fulbright Senior Scholar, Monash University, Australia, 1984.
Recipient of University of Florida College of Engineering Fellowship, 1972-1973.
U.S. Environmental Protection Agency Traineeship, 1971-1972.
William Simpson Keller Prize. Awarded to top senior in Civil Engineering in the State of Alabama, 1967-1968.

SPONSORED RESEARCH - Principal Investigator unless otherwise indicated.

"High Resolution Acoustic Groundwater Flow Monitor," U.S. Department of Agriculture SBIR, Phase II subcontract with Luna Innovations, Inc., Virginia. $69,990 (2005-2006).

"Mapping Hydrogeologic Processes in the Shallow Subsurface," U.S. Department of Energy, Phase I subcontract with Luna Innovations, Inc., Virginia. $30,000 (2005).

"High Resolution Acoustic Groundwater Flow Monitor," U.S. Department of Agriculture SBIR, Phase I subcontract with Luna Innovations, Inc., Virginia. $15,000 (2004).

"Stormwater Modeling and Management, Evaluation of Control Alternatives for Duke University," computer simulation in support of the development of a Duke University Stormwater Management Plan, Facilities Management Department. $92,091 (2003-2005).

"Parallel TABS-MDS Model for Simulating Large-Scale Environmental Transport Processes,"

MSRC NAVO PET Program, Naval Oceanographic Office, Stennis Space Center, Mississippi, enhancement of the TABS-MDS model by integrating the existing code with a robust iterative solver and high performance computing tools, to be able to model large-scale flows and pollutant transport. $314, 000 (2001-2002). (Co-PI with P. Rao)

"State-of-the-Art Review of Mixing Zone Concepts and Structure of a Conceptual Model," DuPont Engineering, Wilmington, Delaware, examining how contaminants originating from groundwater sources mix with surface waters, with special attention to the interfacial region (e.g., along river banks and bottoms, including sediment layers). $50,000 (2000).

"Investigation of Groundwater Contaminant Transport and Remediation Alternatives, Duke Forest Gate 11 Site," Duke University Office of Occupational and Environmental Safety, a $5 million investigation and remediation project. $418,257 (1992-2000).

"A Parallel Cluster for Multi-Scale Computation in Mechanics and Hydrologic Transport," (Co-PI with J. Dolbow and T. Laursen) Lord Foundation of North Carolina. $65,000 (2000).

"Simulation of Stormwater Flow and Pollutant Transport, and Evaluation of Control Alternatives for Duke University," Facilities Management, modeling East and West Campus. $110,000 (1993-1998).

"Investigation of Subsurface Gasoline Contamination, Transportation Pool," Duke University Facilities Management, analysis of field data, modeling and evaluation of risk of plume migration. $7,200 (1997-1998).

"Decision-Making Enhancements to the Department of Defense Groundwater Modeling System Under Conditions of Uncertainty," U.S. Army Corps of Engineers Waterways Experiment Station, Hydraulics Division, Vicksburg, Mississippi. $359,013 (1995-1997).

"Numerical Solution to Navier-Stokes Equations For Polar-Cylindrical Coordinates -- a Subproject of Characteristics of Transport Processes in the Cavernous and Conduit-Type Aquifers of Southern Florida," U.S. Geological Survey, Reston, Virginia. $20,000 (1996).

"Groundwater Contamination By Organic Carcinogens: Detection, Health Risk Assessment and Remedial Measures," World Health Organization, Geneva, Switzerland, preparation of guideline document, using U.S. (Duke Forest Gate 11 Site) and Italian (Fontanafredda) case studies. $5,000 (1995-1996).

"A State-of-the-Art Computer Workstation for Subsurface Contaminant Transport Modeling and Decision-Making," Lord Foundation of North Carolina and Richard C. Leach Fund. $11,000 (1995).

"Development of a Computer-Based AF Installation Restoration Workstation for Contaminant Transport Modeling and Decision-Making," Environics Division, Tyndall AFB, contract through Eglin AFB, Fla. $325,312 (1992-1994).

"Modeling the Injection, Storage and Recovery of Water through a Single Well in a Conduit-type Aquifer," fully funded research and training USGS fellowship for Vicente Quiñones-Aponte, U.S. Geological Survey, Reston, Va. $55,000 (1991).

"Mathematical Modeling and Decision-Making for Air Force Contaminant Migration Problems," evaluation of Air Force needs for surface and subsurface models for the Installation Restoration Program, Air Force Office of Scientific Research, Universal Energy Systems. $20,000 (1990-1991).

"Implementation of a Compliance Monitoring System for the Subsurface Environment," State of North Carolina, Department of Environment, Health and Natural Resources, enhancement of a groundwater quality modeling advisory system. $25,000 (1990-1991).

U.S. Air Force Summer Faculty Research Program, development and application of several contaminant transport models at Brooks Air Force Base, Occupational and Environmental Health Laboratory, San Antonio, Texas. $11,500, plus $6,600 for Graduate Student support, totaling $18,100 (1990).

"An Advisory System For North Carolina Groundwater Quality Modeling and Management Needs," Water Resources Research Institute of the University of North Carolina, and State of North Carolina (Division of Environmental Management, Department of Natural Resources and Community Development), Raleigh, N.C.; $94,000 (1985-1987).

"A Decision-Analytic Framework for Assessing the Impact of Hazardous Waste Sites on Groundwater," Water Resources Research Institute of the University of North Carolina. $18,800 (1984-1985).

"An Integrated Methodology For Instream Flow Strategies," Water Resources Research Institute of the University of North Carolina, developed for the N.C. Division of Environmental Management, Office of Water Planning. $20,000 (1982).

"Toward Developing Predictive Groundwater Transport Models," Richard C. Leach Fund, Duke University. $1300 (1982).

"Hydrologic and Water Quality Modeling for Optimization of Minimum Instream Flows," Richard C. Leach Fund, Duke University. $1800 (1981).

"Development of Carbonaceous Deoxygenation Rate Formulations for Surface Water Quality Modeling," Richard C. Leach Fund, Duke University. $1832 (1980).

"Hydrologic and Water Quality Modeling For Instream Flow Strategies," Office of Water Research and Technology, Department of Interior, and Water Resources Research Institute of the University of North Carolina. $20,000 (1980).

"Investigation of receiving water quality impacts in Ellerbe Creek," Commonwealth Subgrant, Duke University. $600 for monitoring equipment (1979).

"Impact of Point Source Discharges On Receiving Water Quality During Storm Events," Richard C. Leach Fund, Duke University. $1800 (1979).

"A Unified Approach to the Modeling of Transient Storage, Treatment and Transport of Urban Point and Nonpoint Water Pollutants," National Science Foundation Research Initiation Grant. $25,000 (1978).

"Receiving Water Quality Modeling for Urban Stormwater Management," U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory, Cincinnati, Ohio, and Edison, N. J. Subcontract from University of Florida Industrial and Experiment Station. $20,500 (1977).

FULBRIGHT AWARD

Research and teaching grant from the Australian-American Educational Foundation and the Council for International Exchange of Scholars, at Monash University, Clayton (Melbourne), Victoria, Australia. Conduct research on urban catchment models, develop a graduate course in water quality modeling, lecture extensively throughout Australia. $24,000 (January to August 1984).

RESEARCH-RELATED CONSTRUCTION GRANTS

Duke University Wetlands Project Dam – (Co-PI with **C. Richardson**, Nicholas School of the Environment and Earth Sciences) – Facilities Management Department and Office of Executive Vice President, Duke University, to supplement construction costs of Wetland dam, $300,000 (2005).

1Duke University Wetlands Project (Co-PI with **C. Richardson**, Nicholas School of the Environment and Earth Sciences) - Clean Water Management Trust Fund, $582,500 and the North Carolina Wetlands Restoration Program, $94, 531. This restoration project is designed to improve water quality and alleviate stormwater problems in the Sandy Creek watershed that drains into the New Hope Creek Corridor of Durham and Orange Counties. Duke University owns the 8,000-acre Duke Forest that receives a large portion of the Sandy Creek Watershed runoff from both urban and shopping areas in the City of Durham and the Duke Campus. The funding obtained is to construct the wetland and storm water improvement bioretention areas on Duke Forest. The project will greatly improve water quality in the New Hope Creek corridor by improving Sandy Creek water quality upstream. It integrates an innovative stream water restoration plan with stormwater bioretention, mathematical hydrologic simulation models and wetland restoration technologies. $677,031 (2000-2004).

Flooding of the Sarah P. Duke Gardens - Supervision of a comprehensive study (including analysis, field instrumentation, and design of hydraulic control structure), 1978. Based upon this study, a grant from the Duke Endowment Fund was made to begin construction

of a stormwater detention facility, authorized by the Chancellor and Provost. The facility was completed in 1984. $33,000 (1979).

EQUIPMENT GRANTS

Upgrade of Civil and Environmental Engineering Teaching Laboratory Equipment – Lord Foundation of North Carolina. $155,000 (2001-2002).

PUBLICATIONS

A. Articles in Refereed Journals

Kazezyılmaz-Alhan, C. M., and M. A. Medina, Jr., "The Effect of Surface/Ground Water Interactions on Wetland Sites with Different Characteristics," *Desalination*, (to appear, 2007)

Kazezyılmaz-Alhan, C. M., M. A. Medina, Jr., and C. Richardson, "A Wetland Hydrology and Water Quality Model Incorporating Surface/Ground Water Interactions," *Water Resources Research*, 43 (4), W04434, 1-16 (2007).

Kazezyılmaz-Alhan, C. M., and M. A. Medina, Jr., "Kinematic and Diffusion Waves: Analytical and Numerical Solutions to Overland and Channel Flow," *Journal of Hydraulic Engineering*, 133 (2) 217- 228 (2007).

Kazezyılmaz-Alhan, C. M., and M. A. Medina, Jr., "Stream Solute Transport Incorporating Hyporheic Zone Processes," *Journal of Hydrology*, 329 (1-2) 26-38 (2006).

Rao, P. and M.A. Medina, Jr., "Enhanced TABS-MDS Model for Simulating Large Scale Free Surface Flows," *Environmental Modeling and Software*, 21 (1) 98-106 (2006).

Rao, P. and M.A. Medina, Jr., "A Multiple Domain Algorithm for Modeling Two Dimensional Contaminant Transport Flows," *Applied Mathematics and Computation*, 174 (1) 117-133, (2006).

Lin, Y.C., M-S. Chang and M.A. Medina, Jr., "Methodology For Solute Transport In Unsteady, Nonuniform Streamflow With Subsurface Interaction," *Advances in Water Resources*, 28 (8) 871-883 (2005).

Rao, P. and M. A. Medina, Jr., "A Multiple Domain Algorithm for Modeling One Dimensional Transient Contaminant Transport," *Applied Mathematics and Computation*, 167 (1) 1-15 (2005).

Kazezyılmaz-Alhan, C. M., M. A. Medina, Jr., and P. Rao "On Numerical Modeling of Overland Flow," *Applied Mathematics and Computation*, 166 (3) 724-740 (2005).

Lin, Y.C. and M. A. Medina, Jr., "Incorporating transient storage in conjunctive stream-aquifer modeling," *Advances in Water Resources*, 26 (9) 1001-1019 (2003).

Rao, P. and M. A. Medina, Jr., "Evaluation of V and W multiple grid cycles for modeling one and two dimensional transient free surface flows," *Applied Mathematics and Computation*, 138 (1) 151-167 (2003).

Rao, P. and Medina, M.A., Jr., "An Improved Radiating Boundary Equation for Free Surface Flows," *Applied Mathematics and Computation*, 132(1), 73-86 (2002).

Medina, M.A., Jr., W. Thomann, J.P. Holland, Y.C. Lin, "Integrating Parameter Estimation, Optimization and Subsurface Solute Transport Modeling," *Hydrological Science and Technology*, 17(1-4), 259-282 (2001).

Liu, W.H., M.A. Medina, Jr., W. Thomann, W.T. Piver, and T.L. Jacobs, "Optimization of Intermittent Pumping Schedules for Aquifer Remediation Using a Genetic Algorithm," *Journal of the American Water Resources Association*, 36(6) 1335-1348 (2000).

Medina, M.A., Jr., Y. Li, and D.M. Meng, "Modeling Turbulent Solute Transport in a Cavernous Aquifer," *Hydrological Science and Technology*, 15 (1-4) 172-190 (1999).

Cassiani, G., Z.J. Kabala and M.A. Medina, Jr., "Flowing Partially Penetrating Well: a Solution of the Mixed-Type Boundary Value Problem via Dual Integral Equations**,"** *Advances in Water Resources*, 23 (1) 59-68 (1999).

Cassiani, G., and M.A. Medina, Jr., "Incorporating Auxiliary Geophysical Data into Groundwater Flow Parameter Estimation," *Ground Water*, 35(1) 79-91 (1997).

Mew, H.E., Jr., M.A. Medina, Jr., R.C. Heath, K.H. Reckhow, and T.L. Jacobs, "Cost-Effective Monitoring Strategies to Estimate Mean Water-Table Depth," *Ground Water* 35(6) 1089-1096 (1997).

Jacobs, T.L., M.A. Medina, Jr., and J.T. Ho, "A Chance Constrained Model for Reliability-Based Design and Rehabilitation of Stormwater Systems," *Journal of Water Resources Planning and Management*, 123(3) 163-168 (1997).

Piver, W.T., T.L. Jacobs, and M.A. Medina, Jr., "Evaluation of Health Risks for Contaminated Aquifers," *Environmental Health Perspectives*, 105(1) 127-143 (1997).

Medina, M.A., Jr., T.L. Jacobs, W. Lin, and K.C. Lin, "Groundwater Solute Transport, Optimal Remediation Planning and Decision-Making Under Uncertainty," *Water Resources Bulletin*, 32(1) 1-12 (1996).

Reich, Y., M.A. Medina, Jr., T. Shieh, and T.L. Jacobs, "Modeling and Debugging Engineering Decision Procedures with Machine Learning," *Journal of Computing in Civil Engineering*, 10(2) 157-166 (1996).

Cassiani, G., and M.A. Medina, Jr., "Two-pump System for NAPL Free-phase Recovery: Numerical Simulation of Downconing," *Hydrological Science and Technology*, 12(1-4) 39-51 (1996).

Jacobs, T.L., J.M. Warmerdam, M.A. Medina, Jr., and W.T. Piver, "Second Moment Method for Evaluating Human Health Risks from Groundwater Contaminated by Trichloroethylene," *Environmental Health Perspectives*, 104(8) 866-870 (1996).

Medina, M.A., Jr., T.L. Jacobs, and K.P. Wang, "A Comparison of Several Stochastic Methods for Quantifying Uncertainty in Ground Water Solute Transport," *Hydrological Science and Technology*, 11(1-4) 61-82 (1995).

Mew, H.E., M.A. Medina, Jr., T.L. Jacobs, and R. Heath, "Suitability of the Normal Data Distribution to Model Water Table Fluctuations: 2. Parameter Estimation, "*Hydrological Science and Technology*, 11(1-4) 83-103 (1995).

Quiñones-Aponte, V. and M.A. Medina, Jr., "Solute Transport Through Conduit-Type Flow Aquifers Using Equivalent Hydraulic Characteristics: Analytical and Numerical Solutions," *Hydrological Science and Technology*, 11(1-4) 122-139 (1995).

Mew, H.E., M.A. Medina, Jr., R. Heath, and T.L. Jacobs, "Suitability of the Normal Data Distribution to Model Water Table Fluctuations: 1. Model Development," *Hydrological Science and Technology*, 10(1-4) 90-109 (1994).

Jacobs, T.L., M.A. Medina, Jr., N. Kaufman, and D.M. Wood, "Optimal Long-Term Scheduling of Stormwater Drainage Rehabilitation," *Water Resources Bulletin*, 29(1) 47-54 (1993).

Butcher, J., M.A. Medina, Jr., and C.M. Marin, "Empirical Bayes Regionalization Methods for Spatial Stochastic Processes," *Water Resources Research*, 27(1) 7-15 (1991).

Marin, C.M., M.A. Medina, Jr., and J. Butcher, "Monte Carlo Analysis and Bayesian Decision Theory for Assessing the Effects of Waste Sites on Groundwater: Theory," *Journal of Contaminant Hydrology*, 5(1) 1-15 (1989).

Medina, M.A., Jr., J. Butcher, and C.M. Marin, "Monte Carlo Analysis and Bayesian Decision Theory for Assessing the Effects of Waste Sites On Groundwater: Applications," *Journal of Contaminant Hydrology*, 5(1) 15-31 (1989).

Medina, M.A., Jr., J. Butcher, and C.M. Marin, "An Advisory System for Groundwater Quality Modeling and Management," *Hydrosoft*, 1(4) 197-203 (1988).

Moreno, M. and M.A. Medina, Jr., *et al*. "Modeling the Performance of Deep Waste-Stabilization Ponds," *Water Resources Bulletin*, 24(2) 377-387 (1988).

Medina, M.A., Jr., and E. Burneson, "Integrating Statistically-Based and Deterministic Stormwater Models," *Hydrological Science and Technology*, 3(1-2) 1-10 (1987).

Medina, M.A., Jr., "Discussion: Water Quality Trap Efficiency of Stormwater Management Basins," *Water Resources Bulletin*, 17(1) 147-149 (1981).

Medina, M.A., Jr., W.C. Huber, J.P. Heaney, and R. Field, "River Quality Model for Urban Stormwater Impacts," *Journal of the Water Resources Planning and Management Division*, 107(WR1) 263-280 (1981).

Medina, M.A., Jr., W.C. Huber, and J.P. Heaney, "Modeling Stormwater Storage/ Treatment Transients - Theory," *Journal of the Environmental Engineering Division*, 107(EE4) 781-797 (1981).

Medina, M.A., Jr., W.C. Huber, and J.P. Heaney, "Modeling Stormwater Storage/ Treatment Transients - Applications," *Journal of the Environmental Engineering Division*, 107(EE4) 799-816 (1981).

Medina, M.A., Jr., and J. Buzun, "Continuous Simulation of Receiving Water Quality Transients," *Water Resources Bulletin*, 17(4) 549-557 (1981).

B. Books, Book Chapters and Articles (Peer Reviewed)

Chien, C. C., Medina, M.A., Jr., *et al.*, Editors, *Contaminated Groundwater and Sediment*: *Modeling for Management and Remediation*, CRC Press, (2003).

Chien, C. C., Medina, M.A., Jr., *et al.*, Editors, *Environmental Modeling and Management: Theory, Practice and Future Directions*, Today Media, Inc., Wilmington, DE, (2002).

Medina, M.A., Jr., *et al.* "Surface Water-Ground Water Interactions and Modeling Applications," Chapter 1, in *Environmental Modeling and Management: Theory, Practice and Future Directions*, Today Media, Inc., Wilmington, DE, (2002).

Medina, M.A., Jr., "Modeling Turbulent Transport of Subsurface Injection," *Book Honoring Prof. Joaquín Moreno Clavel*, Section 2: Scientific Contributions, Universidad de Murcia, Spain, ISBN 84-8371-104-4, 459-474 (1999).

Medina, M.A., Jr., and T.L. Jacobs, "Integration of Probabilistic and Physically-Based Modelling With Optimization Methods for Stormwater Infrastructure Rehabilitation," Chapter 14, *Stormwater and Water Quality Management Modelling*, Lewis Publishers, 221-241 (1994).

Jacobs, T.L., and M.A. Medina, Jr., "A Chance Constrained Optimization Model Using Kinematic Wave Routing for Stormwater Infrastructure Rehabilitation," *Urban Drainage Rehabilitation Programs and Techniques*, ASCE, special issue of

Water Resources Planning and Management Division, Sept. 1994, pp. 39-54. Note: one of only 16 papers selected by ASCE from 11 technical sessions (1988-1993), expanded and peer reviewed in 1993 and 1994.

Medina, M.A., Jr., T.L. Jacobs, and W. Lin, "Performance of Linear and Non-Linear Sorption Models In the Prediction of Solute Transport under Conditions of Uncertainty," *Computer Methods and Advances in Geomechanics*, Vol. II, Balkema Publishers, 1129-1135 (1994).

Medina, M.A., Jr., T.L. Jacobs, W. Piver, and W. Liu, "Incorporating Two-Dimensional Bayesian Updating and Monte Carlo Simulation Into Groundwater Remediation Planning," *Computer Methods and Advances in Geomechanics*, Vol. II, Balkema Publishers, 1137-1143 (1994).

Jacobs, T.L., M.A. Medina, Jr., K.L. Lin, and W. Piver, "Probabilistically-Based Optimal Groundwater Remediation Planning and Decision-Making," *Computer Methods and Advances in Geomechanics*, Vol. II, Balkema Publishers, 1091-1096, (1994).

Medina, M.A., Jr., "The Intricacies of Wet Weather Flows and Modelling," Chapter 6, *Successful Management of Pollution Control Planning*, Ontario Ministry of the Environment, Computational Hydraulics International, Guelph, 72-109 (1991).

Medina, M.A., Jr., "Water Quality Modeling and the Regulation Environment," Chapter 8, *Pollution Control Planning*, Ontario Ministry of the Environment, Computational Hydraulics International, 176-191 (1987).

Medina, M.A., Jr., "State-of-the-Art, Physically-Based and Statistically-Based Water Quality Modeling," *Urban Runoff Pollution*, Springer-Verlag, NATO ASI Series, Series G: Ecological Sciences, 10, 499-586 (1986).

Medina, M.A., Jr., and Buzun, J., "A Unified Approach to the Modeling of Transient Storage, Treatment and Transport of Urban Point and Nonpoint Water Pollutants," *Modeling Components of Hydrologic Cycle*, 383-404 (1982).

C. Peer Reviewed Reports and Articles in Proceedings

Medina, M.A., Jr., and Gary Ybarra, "Study and Work Abroad Opportunities for Engineering Students at Duke University," *Proceedings of Ninth International Conference on Engineering Education*, July 23-28, 2006, San Juan, Puerto Rico.

Medina, M.A., Jr., "Modeling Transport Phenomena Across The Hydrologic Cycle: The Special Case of Turbulent Dispersion in Subsurface Solute Transport," Proceedings of the Second International Colloquium on Hydrology and Water Management in the Humid Tropics, Panama, 22-26 March 1999, *International Hydrological Programme Technical Documents in Hydrology No. 52*, 175-188, UNESCO, Paris, France, 2002.

Medina, M.A., Jr., and T.L. Jacobs, "Decision-Making Enhancements To The Department of Defense Groundwater Modeling System Under Conditions of Uncertainty," *Technical Report HL-98*, March 1998.

Medina, M.A., Jr., and T.L. Jacobs, "Development of A Computer-Based Air Force Installation Restoration Workstation For Contaminant Transport Modeling and Decision-Making: Users Manual," *Report No. AL/EQ-TR-1994-0040*, Air Force Materiel Command, Tyndall AFB, Florida, 214 pages (March 1995).

Medina, M.A., Jr., and T.L. Jacobs, "Development of A Computer-Based Air Force Installation Restoration Workstation For Contaminant Transport Modeling and Decision-Making," *Report No. AL/EQ-TR-1993-0015*, Air Force Materiel Command, Tyndall AFB, Fla., 97 pages (January 1994).

Medina, M.A., Jr., J. Butcher, and C.M. Marin, "An Advisory System for North Carolina Groundwater Quality Management and Modeling Needs," Water Resources Research Institute of the University of North Carolina, *WRRI Technical Report No. 236*, Raleigh, N.C., 210 pages (February 1988).

Medina, M.A., Jr., "An Integrated Methodology for Instream Flow Strategies," Water Resources Research Institute of the University of North Carolina, *WRRI Report No. 210*, 220 pages (September 1983) Note: translated into Spanish by the UNESCO regional office in Guatemala, 1985.

Medina, M.A., Jr., "Hydrologic and Water Quality Modeling for Instream Flow Strategies," Water Resources Research Institute of the University of North Carolina, *WRRI Report No. 183*, 430 pages (December 1982).

Medina, M.A., Jr., "Continuous Receiving Water Quality Modeling for Urban Stormwater Management," *Proceedings of National Conference*, *EPA 600/9-80-056*, Municipal Environmental Research Laboratory, U.S. EPA, 466-501 (December 1980).

Medina, M.A., Jr., and K. Helfrich, "Evaluation of Infiltration Models in Kinematic Wave Approximation to Forested Watershed Overland Flow," *Proceedings of the Hydraulic Transport Modeling Symposium, ASAE Publication 4-80*, 218-233 (1980).

Medina, M.A., Jr., "Level III: Receiving Water Quality Modeling for Urban Stormwater Management," *EPA-600/2-79-100*, Municipal Environmental Research Laboratory, U.S. EPA, 210 pages (August 1979).

Medina, M.A., Jr., "Data Needs for Stormwater Modeling, Treatment and Control," *Proceedings of the First Membership Conference on the National Water Data Exchange*, U.S. Geological Survey Open-File Report 79-206, (1979).

Medina, M.A., Jr., "A Simplified Continuous Receiving Water Quality Model," *Proceedings of U. S. EPA and Ontario Ministry of Environment Stormwater Management Model (SWMM)*, *EPA-600/9-78-019*. Washington, D. C. (July 1978).

Sullivan, Richard H., M.J. Manning, J.P. Heaney, W.C. Huber, M.A. Medina, Jr., M.P. Murphy, S.J. Nix, and S.M. Hasan, "Nationwide Evaluation of Combined Sewer Overflows and Urban Stormwater Discharges. *Volume I: Executive Summary*, *EPA-600/2-77-064A* (September 1977).

Heaney, J. P., W.C. Huber, and M.A. Medina, Jr., *et al*., "Nationwide Evaluation of Combined Sewer Overflows and Urban Stormwater Discharges," *Volume II: Cost Assessment and Impacts, EPA-600/2-77-064* (March 1977).

Heaney, J. P., W.C. Huber, H. Sheikh, and M.A. Medina, Jr., *et al.*, Urban Stormwater Management Modeling and Decision-Making," *EPA-670/2-75-022* (May 1975).

Huber, W.C., J.P. Heaney, and M.A. Medina, Jr., *et al.*, "Stormwater Management Model - User's Manual Version II," *EPA-670-2-75-017* (March 1975).

Huber, W.C., M.A. Medina, Jr., H. Sheikh, and J.P. Heaney, "The EPA Stormwater Management Model (SWMM) - An Introduction," *Proceedings: Stormwater Management Workshop*, February 26-27, 1975, edited by M.P. Wanielista, Florida Technological University at Orlando.

D. Other Published Reports and Proceedings

Kazezyilmaz-Alhan C.M., and Medina M.A., Jr, "The effect of surface/ground water interactions on wetland sites with different characteristics," IWA DipCon 2006, 10th International Specialised Conference on Diffuse Pollution and Sustainable Basin Management, Book of Abstracts, Istanbul, Turkey, pp:247-248, 2006.

Medina, M.A., Jr., “Modeling Ground Water Contamination And Surface/Subsurface

Interactions," *Proceedings of International Conference on Water and Environment*, Regional Research Laboratory, Bhopal, India, December 15-18, 2003, pp. 401-418, Allied Publishers Pvt. Limited, 2003. (**Invited keynote paper**).

Medina, M.A., Jr., "Integration of Parameter Estimation, Optimization and Solute Transport for Remedial Strategies," *Proceedings of 1st Annual Environmental & Water Resources Systems Analysis Symposium*, ASCE-EWRI, Roanoke, VA, May 19-22, 2002. (**Invited paper**).

Medina, M.A., Jr., "Modeling Transport Phenomena across the Hydrologic Cycle: The Special Case of Turbulent Dispersion in Subsurface Solute Transport," *Proceedings, Second International Colloquium on Hydrology and Water Management in the Humid Tropics*, UNESCO-CATHALAC-IHP, March 22-26, 1999, Panama City, Panama. (**Abstract**).

Medina, M.A., Jr., G. Cassiani, T.L. Jacobs, and W-H. Liu, "Parameter Estimation, Groundwater Flow and Solute Transport Modeling, Optimization and Remediation Strategies at a Duke University Site," *Proceedings of International Congress on Environment/Climate*, Rome, Italy, UNESCO, (1996). (**Invited paper**).

Medina, M.A., Jr., and T.L. Jacobs, "Linear and Nonlinear Kinematic Wave Routing and Chance Constrained Optimization in Stormwater Modeling," *Proceedings of Water Management in Urban Areas*, 31st Annual Conference and Symposia, American Water Resources Association, Houston, Texas, 195-212, November 5-10, 1995.

Cassiani, G., W.H. Liu, M.A. Medina, Jr., and T.L. Jacobs, "Groundwater Pollution Remediation and Control: The Role of Global Optimizers and Exploitation of Available Information," *Proceedings of the 22nd Annual Conference, Integrated Water Resources Planning for the 21st Century*, M.F. Domenica (Ed.) ASCE, 690-693, May 7-11, 1995.

Ho, J.T., T.L. Jacobs, and M.A. Medina, Jr., "A Probabilistic-based Optimization Model for Stormwater Infrastructure Rehabilitation," *Proceedings of the 22nd Annual Conference, Integrated Water Resources Planning for the 21st Century*, M.F. Domenica (Ed.), ASCE, 682-685, May 7-11, 1995.

Lin, K.C., T.L. Jacobs, and M.A. Medina, Jr., "Stochastic Finite Element Model for Transient Advective-Dispersive Transport in an Uncertain Hydrodynamic Environment," *Proceedings of the 22nd Annual Conference, Integrated Water Resources Planning for the 21st Century*, M.F. Domenica (Ed.), 832-835, May 7-11, 1995.

Medina, M.A., Jr., "The International Honors Program in Engineering and Technology Transfer Activities," *Proceedings of 2nd Annual IPC Conference*, Santiago, Chile, September 1993.

Jacobs, T.L., and M.A. Medina, Jr., "A Chance Constrained Optimization Model Using

Kinematic Wave Routing for Stormwater Infrastructure Rehabilitation," *Proceedings of Water Forum '92 National Conference*, ASCE, 748-753, August 2-5, 1992.

Medina, M.A., Jr., "Mathematical Modeling and Decision-Making for Air Force Contaminant Migration Problems," *Report No. CEE-91-1*, Duke University, for Air Force Office of Scientific Research and Universal Energy Systems, Washington, D.C., and Dayton, Ohio. 150 pages, November 1991.

Quiñones-Aponte, V. and M.A. Medina, Jr., "Coupling Diffuse and Conduit Flow Models to Simulate Injection and Recovery of Water Through a Single Well," *Proceedings of Fifth Symposium On Artificial Recharge of Groundwater*, University of Arizona, 267-281, May 29-31, 1991.

Medina, M.A., Jr., "Fundamentals of Non-Point Source Impact Assessment Models," *Proceedings of Urban Non-Point Source Pollution and Stormwater Management Symposium*, University of Kentucky, 179-194, July 22-24, 1990 (**invited paper**).

Heath, R., and M.A. Medina, Jr., *et. al*, "Evaluation of The Effect of Ash Disposal at the Riverbend Plant of Duke Power Company on Groundwater and Surface-Water Quality," Kilkelly Environmental Associates, *Report No. I308*, Raleigh, North Carolina (December 1987).

Medina, M.A., Jr., J. Butcher and C. Marin, "An Advisory System for North Carolina Groundwater Quality Modeling and Management Needs," *Proceedings of 1988 Annual Conference*, Universities Council on Water Resources, Hilton Head, South Carolina, 191-211, July 29-August 1, 1987.

Medina, M.A., Jr., "Use of Continuous Simulation versus the Design Storm Concept for Water Quality," *Proceedings, Water Forum '86: World Water Issues In Evolution*, ASCE, 1, 949-957, 1986.

Medina, M.A., Jr., "Deterministic and Statistical Water Quality Modeling," *Proceedings of Computer Applications in Water Resources*, ASCE, 1100-1110, 1985.

Medina, M.A., Jr., and L.R. Mohns, "Kinematic Wave Approximation to Forested Watershed Overland Flow with Urban Hydrologic Models," *Proceedings of International Symposium on Urban Stormwater Management*, Lexington, Kentucky, July 1978.

Medina, M.A., Jr., "On Modeling the Transport of Urban Stormwater Runoff Pollutants, Control Systems and Receiving Water Quality," *Proceedings of ASCE Conference on Computing in Civil Engineering*, ASCE, June 1978.

Medina, M.A., Jr., W.C. Huber, and J.P. Heaney, "Impact of Urban Pollution Control and Receiving Water Quality," *Preprint No. 2859*, ASCE Spring Convention, Dallas, Texas, April 28, 1977.

Medina, M.A., Jr., "Data Needs for Stormwater Treatment and Control," *Proceedings Third Annual Environmental Short Course*, Florida Engineering Society, Lake

Buena Vista, Florida, October 8, 1974.

SELECTED PRESENTATIONS - National and International

Presenter(s) shown in boldface type for papers with several authors.

Medina, M.A., Jr., "International Waters and Global Contaminant Transport," Focus Program Interdisciplinary Discussion Course Lecture, Duke University, October 4, 2006, http://www.aas.duke.edu/firstyear/focus.html.

Medina, M.A., Jr., and **Gary Ybarra**, "Study and Work Abroad Opportunities for Engineering Students at Duke University," *Proceedings of Ninth International Conference on Engineering Education*, July 27, 2006, San Juan, Puerto Rico.

Achanta, A., J. Heyman, and **Medina, M.A., Jr.,** "High Resolution Acoustic Groundwater Vector Flow Monitor," Luna Innovations, Inc. and Duke University, SensorsGov Expo & Conference, Hampton, Virginia, December 6, 2005.

Medina, M.A., Jr., "Realities of Urban Development," Pratt School of Engineering Panel Discussion on *Engineering Paradigms for Natural Hazards*, October 4, 2005.

Kazezyılmaz-Alhan, C.M. and **Medina, M.A., Jr., "**A Wetland Model to Evaluate Stormwater Management Practices," Facilities Management Headquarters, Duke University, Durham, North Carolina, August 3, 2005. (**Invited**)

Richardson, C.J., J.W. Pahl, J.D. Edeburn and M.A. Medina, Jr. "Construction and goals of the Duke University Wetland Center's Southern Wetland Assessment & Management Park (SWAMP) in the North Carolina Piedmont," *26th Annual Meeting of the Society of Wetland Scientists*, Charleston, South Carolina, June 5-10, 2005.

Medina, M.A., Jr., C.M. Kazezyılmaz-Alhan, and Y-C. Lin, "Contaminant Transport Hydrology of Surface/Ground Water Interactions," Session H12B, *American Geophysical Union Fall Meeting*, San Francisco, California, December 13, 2004. (**Invited and Lead-Off Paper**)

Kazezyılmaz-Alhan, C.M. and Medina, M.A., Jr., "The Impact of Surface / Ground Water Interactions On Wetland Hydrology," Session H24A, *American Geophysical Union Fall Meeting*, San Francisco, California, December 13, 2004.

Medina, M.A., Jr., "Stormwater Modeling and Management at Duke University,**"** *Mechanics and the Environment Seminar Series*, Department of Civil and Environmental Engineering, Duke University, October 27, 2004.

Medina, M.A., Jr., "Stormwater Modeling and Management at Duke University," American Society of Civil Engineers Annual Conference, Session WR-7, Greensboro, North Carolina, September 24, 2004. (**Invited Paper**).

Medina, M.A., Jr., "The Role of Field Measurements in Subsurface Contaminant Transport Modeling," Environmental Measurements Session, Sensors.Gov Expo and Conference, Virginia Beach, Virginia, September 15, 2004.

Lin, Y.C. and M.A. Medina, Jr., "An Integrated Framework for Modeling Contaminant Transport in Conjunctive Stream-Aquifer Systems," *Mechanics and the Environment Seminar Series*, Department of Civil and Environmental Engineering, Duke University, January 14, 2004.

Medina, M.A., Jr., "Modeling Ground Water Contamination and Surface/Subsurface Interactions," *International Conference on Water and Environment*, Regional Research Laboratory, Bhopal, India, December 18, 2003. (**Invited keynote paper**).

Medina, M.A., Jr., "Integration of Parameter Estimation, Solute Transport and Optimization in Evaluation of Remedial Strategies for a Contaminated Aquifer," *Workshop on Strategies for the Development of Water Resources in Arid and Semi-Arid Zones of Latin America and the Caribbean*, CAZALAC, La Serena, Chile, January 15, 2003.

Medina, M.A., Jr., "Integration of Parameter Estimation, Optimization and Solute Transport For Remedial Strategies," Center for Environmental Quality, Monterrey Institute of Technology and Advanced Studies (ITESM), Monterrey, Mexico, October 1, 2002. (**Invited)**

Medina, M.A., Jr., "Hydrologic and Contaminant Transport Modeling," Department of Civil and Environmental Engineering, Duke University, January 30, 2002.

Medina, M.A., Jr., "Sending International Honors Program Engineering Students to Developing Nations," The Fourth Annual Colloquium on International Engineering Education, University of Rhode Island, Providence, RI, November 2, 2001, sponsored by German Academic Exchange Service (DAAD) – I**nvited paper**.

Medina, M.A., Jr., "Graphical Domain Modeling Concept for Solving the Two-Dimensional Advection-Dispersion Equation," American Geophysical Union 2001 Fall Meeting, San Francisco, CA, December 11, 2001.

Medina, M.A., Jr., W. Thomann and J.P. Holland, "Integrating Parameter Estimation, Optimization and Solute Transport Into Modeling and Managing A Subsurface Waste Site," American Institute of Hydrology Conference on Atmospheric, Surface and Subsurface Hydrology and Interactions, November 5-8, 2000, Research Triangle Park, North Carolina.

Lin, Yi-Chang and M.A. Medina**,** Jr., "A Model of Conjunctive Surface-Groundwater Mixing," American Institute of Hydrology Conference on Atmospheric, Surface and Subsurface Hydrology and Interactions, November 5-8, 2000, Research Triangle Park, North Carolina.

Medina, M.A., Jr., "Science View – Importance of Groundwater," Session on Freshwater Basin Issues, First GEF Biennial International Waters Conference, World Bank, October 17, 2000, Budapest, Hungary. (**Invited paper**).

Medina, M.A., Jr., "Mixing Zone: Discharge of Contaminated Groundwater into Surface Water Bodies," Panel Leader, Modeling and Management of Emerging Environmental Issues Workshop 2000, Penn State Great Valley School of Graduate Professional Studies, sponsored by E.I. Du Pont De Nemours Company, July 25-27, 2000, Malvern, Pennsylvania.

Medina, M.A., Jr., "Modeling Turbulent Solute Transport in a Cavernous Aquifer," Fourth USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology, American Institute of Hydrology, November 7-10, 1999, Cathedral Hill Hotel, San Francisco, California.

Medina, M.A., Jr., "Multi-Media Contaminant Transport Hydrology," Department of Civil and Environmental Engineering, Duke University, October 8, 1999.

Medina, M.A., Jr., "Modeling Turbulent Transport of Subsurface Injection," International Conference on Environmental Engineering, **Invited keynote paper**, plenary water session, September 9, 1999, Polytechnic University of Cartagena, Spain.

Medina, M.A., Jr., "Water and Health: Approaches to Hazards Mitigation," Third Inter-American Dialogue on Water Management, UNESCO, Facing the Emerging Water Crisis of the 21st Century, **panelist**, March 21-25, 1999, Panama City, Panama.

Medina, M.A., Jr., "Modeling Transport Phenomena across the Hydrologic Cycle: The Special Case of Turbulent Dispersion in Subsurface Solute Transport," Second International Colloquium on Hydrology and Water Management in the Humid Tropics, UNESCO - CATHALAC, March 23, 1999, Panama City, Panama.

Medina, M.A., Jr., "Global Hydrology and Contaminant Transport," Fuqua School of Business Global Interdependence Lecture Series, Duke University, February 18, 1999.

Medina, M.A., Jr., "The International Program in Engineering and University-Wide Internationalization," The Second Global Engineering Education Workshop, Global Engineering Education: Destinations and Directions, Virginia Tech, Ecole

Polytechnique Federale de Lausanne (Switzerland), Institut National Polytechnique de Grenoble (France), November 9-11, 1998, Crystal City, Virginia.

Medina, M.A., Jr., and X. Li, "A Turbulent Dispersion Model of Subsurface Solute Transport," U.S.G.S. Miami Water Resources Division; Hydrogeology and Hydrologic Systems Modeling Divisions, South Florida Water Management District, West Palm Beach, Florida, August 7, 1997.

Medina, M.A., Jr., "Basic Elements and Principles of Surface Water Quality Modelling," III International Course of Environmental Modelling, Polytechnic School of University of Murcia, sponsored by the Mediterranean Savings and Loan Bank, Cartagena, Spain, February 18, 1997.

Medina, M.A., Jr., "Incorporating Hydrologic Variability Into Urban Water Quality Modelling and Management," III International Course of Environmental Modelling, Polytechnic School of University of Murcia, sponsored by the Mediterranean Savings and Loan Bank, Cartagena, Spain, February 18, 1997.

Medina, M.A., Jr., "Basic Elements and Principles of Subsurface Contaminant Transport Modelling," III International Course of Environmental Modelling, Polytechnic School of University of Murcia, sponsored by the Mediterranean Savings and Loan Bank, Cartagena, Spain, February 19, 1997.

Medina, M.A., Jr., "Incorporating Uncertainty into Groundwater Contaminant Transport Modelling and Optimal Remediation Strategies," III International Course of Environmental Modelling, Polytechnic School of University of Murcia, sponsored by the Mediterranean Savings and Loan Bank, Cartagena, Spain, February 20, 1997.

Medina, M.A., Jr., "Decision-Making Enhancements to the Department of Defense Groundwater Modeling System Under Conditions of Uncertainty," Department of Civil and Environmental Engineering Graduate Seminar Series, Duke University, January 17, 1997.

Medina, M.A., Jr., "Decision-Making Enhancements to the Department of Defense Groundwater Modeling System under Conditions of Uncertainty," Hydraulics Division, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, October 17, 1996.

Medina, M.A., Jr., "Parameter Estimation, Groundwater Flow and Solute Transport Modeling, and Optimization of Remediation Strategies at a Duke University Site," UNESCO International Congress on Environment/ Climate, Rome, Italy, March 6, 1996.

Medina, M.A., Jr., "Movement of Contaminants: Part I, Modeling in the Surface Environment," Universidad Austral, Buenos Aires, Argentina, November 9, 1995.

Medina, M.A., Jr., "Movement of Contaminants: Part II, Modeling in the Subsurface Environment," Universidad Austral, Buenos Aires, Argentina, November 10, 1995.

Medina, M.A., Jr., "Linear and Nonlinear Kinematic Wave Routing and Chance Constrained Optimization in Stormwater Modeling," 31st Annual Conference and Symposia, American Water Resources Association, Houston, Texas, November 7, 1995.

Medina, M.A., Jr., "Incorporating Hydrologic Variability Into Urban Water Quality Modeling and Management: Theory and Applications," International Course of Environmental Modelling, Polytechnic School of University of Murcia and Mediterranean Cultural Savings and Loan Bank, Cartagena, Spain, November 21, 1994.

Medina, M.A., Jr., "Accounting for Uncertainty in Groundwater Quality Modeling, Optimal Remediation Planning and Decision-Making," International Course of Environmental Modelling, Polytechnic School of University of Murcia and Mediterranean Cultural Savings and Loan Bank, Cartagena, Spain, November 23, 1994.

Medina, M.A., Jr., "State-of-the-art in Hydrologic and Water Quality Modeling in the Caribbean, Central and South America," International Symposium - Assessing and Managing Health Risks from Drinking Water Contamination: Approaches and Applications, Istituto Superiore di Sanita, Rome, Italy, September 16, 1994.

Medina, M.A., Jr., and **T.L. Jacobs**, "A Groundwater Advisory System for Contaminant Transport and Decision Making," U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS, August 15, 1994.

Medina, M.A., Jr., "Urban Hydrology and Mathematical Models of Water Quality," intensive post-graduate short course in Spanish, University of Costa Rica and the Panamerican Inst. of Highways, San José, Costa Rica, July 18-22, 1994.

Medina, M.A., Jr., T.L. Jacobs, and W. Lin, "Performance of Linear and Non-Linear Sorption Models In The Prediction of Solute Transport Under Conditions of Uncertainty," Computer Methods and Advances in Geomechanics, Morgantown, West Virginia, May 23, 1994.

Medina, M.A., Jr., T.L. Jacobs, W. Piver, and W. Liu, "Incorporating Two-Dimensional Bayesian Updating and Monte Carlo Simulation Into Groundwater Remediation Planning," Computer Methods and Advances in Geomechanics, Morgantown, West Virginia, May 23, 1994.

Jacobs, T.L., M.A. Medina, Jr., **K.L. Lin**, and W. Piver, "Probabilistically-Based Optimal Groundwater Remediation Planning and Decision-Making," Computer Methods and Advances in Geomechanics, Morgantown, West Virginia, May 25, 1994.

Medina, M.A., Jr., and **T.L. Jacobs**, "Development of a Computer-Based Air Force Installation Restoration Workstation for Contaminant Modeling and Decision Making," Tyndall AFB, Panama City, Florida, April 22, 1994.

Medina, M.A., Jr., and **T.L. Jacobs**, "Development of a Computer-Based Air Force Installation Restoration Workstation for Contaminant Modeling and Decision Making," Tinker AFB, Oklahoma City, Oklahoma, February 1, 1994.

Medina, M.A., Jr., and **T.L. Jacobs**, "Development of a Computer-Based Air Force Installation Restoration Workstation for Contaminant Modeling and Decision Making," Brooks AFB, San Antonio, Texas, January 20, 1994.

Medina, M.A., Jr., and **T.L. Jacobs**, "Development of a Computer-Based Air Force Installation Restoration Workstation for Contaminant Modeling and Decision Making," Hill AFB, Utah, Layton, Utah, December 13, 1993.

Jacobs, T.L., and M.A. Medina, Jr., "Estimating the Reliability of Contaminant Transport Predictions and Remediation Alternatives," Mechanics and the Environment Seminar, Department of Civil and Environmental Engineering, Duke University, October 6, 1993.

Medina, M.A., Jr., "The International Honors Program in Engineering and Technology Transfer Activities," 2nd Annual Panamerican Institute of Highways Conference, Santiago, Chile, September 22, 1993.

Medina, M.A., Jr., and T.L. Jacobs, "Integration of Probabilistic and Physically-Based Modelling With Optimization Methods for Stormwater Infrastructure Rehabilitation," Stormwater and Water Quality Management Modelling Conference, Toronto, Canada, February 24, 1993.

Medina, M.A., Jr., and **T.L. Jacobs**, "Development of a Computer-Based Air Force Installation Restoration Workstation for Contaminant Modeling and Decision Making," HQ AFCEE, Brooks AFB, Texas, December 8, 1992.

Medina, M.A., Jr., "Groundwater Quality Modeling and Remediation Planning," Earth and Atmospheric Sciences, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, November 20, 1992.

Medina, M.A., Jr., and **T.L. Jacobs**, "Ground Water Quality: Modeling and Decision-Making," Mechanics and the Environment Seminar, Department of Civil and Environmental Engineering, Duke University, November 4, 1992.

Medina, M.A., Jr., and **T.L. Jacobs**, "Development of a Computer-Based Air Force Installation Restoration Workstation for Contaminant Modeling and Decision Making," HQ AFCESA/RAVC, Environics Division, Tyndall AFB, Florida, October 6, 1992.

Medina, M.A., Jr., and **T.L. Jacobs**, "Kinematic Wave Routing and Chance Constrained Optimization For Stormwater Infrastructure Rehabilitation," Department of Civil and Environmental Engineering Seminar, Duke University, October 2, 1992.

Medina, M.A., Jr., "Incorporating Uncertainty in Subsurface Contaminant Modeling - An Application to the Duke Forest Gate 11 Site," Medical Center Office of

Environmental Safety, Duke University, September 28, 1992.

Jacobs, T.L., and **M.A. Medina, Jr.**, "A Chance Constrained Optimization Model Using Kinematic Wave Routing for Stormwater Infrastructure Rehabilitation," Water Forum '92 National Conference, ASCE, Baltimore, Maryland, August 5, 1992.

Murray, L.C., and M.A. Medina, Jr., "A Simple One-Dimensional Solute Transport Model To Account For Transient Porewater Velocities In A Saturated Porous Medium," Geological Society of America, Southeastern Section, Winston-Salem, North Carolina, March 19, 1992.

Medina, M.A., Jr., "State-of-the-Art In Hydrologic and Water Quality Modeling In Mexico, Central America, the Caribbean and South America," Central American Environmental Nucleus, Program In International Development Research, Center for International Development Research, Institute of Policy Sciences and Public Affairs, Duke University, November 7, 1990.

Medina, M.A., Jr., "State-of-the-Art In Hydrologic and Water Quality Modeling In Latin America," UPADI 90, Washington, D.C., August 22, 1990.

Medina, M.A., Jr., "Fundamentals of Non-Point Source Impact Assessment Models," Urban Non-Point Source Pollution and Stormwater Management Symposium, University of Kentucky, Lexington, Kentucky, July 24, 1990.

Medina, M.A., Jr., "Water Quality Modeling: Part I, Transport Phenomena — Surface Water," Brooks Air Force Base, San Antonio, Texas, June 22, 1990.

Medina, M.A., Jr., "Water Quality Modeling: Part II, Transport Phenomena and Decision-Making — Ground Water," Brooks Air Force Base, San Antonio, Texas, June 29, 1990.

Medina, M.A., Jr., "Water Management and Modeling In Central America, the Caribbean and South America," Central American Environmental Nucleus, Program In International Development Research, Center for International Development Research, Institute of Policy Sciences and Public Affairs, Duke University, November 27, 1989.

Medina, M.A., Jr., "A Sequential Decision Analysis Framework for Groundwater Quality Management and Modeling," Holcomb Research Institute, International Groundwater Modeling Center, Butler University, Indianapolis, Indiana, November 14, 1988.

Medina, M.A., Jr., and **C. Marin**, "An Advisory System for Groundwater Quality Management and Modeling," Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona, November 4, 1987.

Medina, M.A., Jr., "Hydrologic and Water Quality Modeling for Water Resources Management In Latin America," International Water Resources Association and International Federation of Operations Research (IFORS XI), Buenos Aires, Argentina, August 13, 1987.

Medina, M.A., Jr., **J. Butcher** and C. Marin, "Preliminary Site Screening Methodologies and Site Suitability Evaluations for Permitting - An Advisory System for North Carolina Groundwater Quality Management and Modeling Needs," Groundwater Pollution and Risk Assessment Training Session, UNC Water Resources Research Institute and State of North Carolina Division of Environmental Management, Raleigh, N.C., December 5, 1986.

Medina, M.A., Jr., "Hydrologic and Water Quality Modeling," UNESCO Intensive Course in the Dominican Republic and Panama, October 1986.

Medina, M.A., Jr., "Hydrologic and Water Quality Modeling," UNESCO Intensive Course in Costa Rica, Guatemala, Honduras and El Salvador, October 1985.

Medina, M.A., Jr., "Basic Models For Use In Assessing Groundwater Flow and Pollutant Movement," Water Resources Research Institute Ground Water Seminar Series, N.C. State University, Raleigh, North Carolina, March 27, 1985.

Medina, M.A., Jr., "Emerging Computer Techniques In Water Management: Implications for Developing Countries," Water: The Ultimate Resource, Duke University Center for International Studies, Quail Roost Conference Center, Rougemont, North Carolina, March 15-16, 1985.

Medina, M.A., Jr., "Central America: Problems and Problem Solving," Canada and Its Hemispheric Nations, Canadian Studies Center, Duke University Center for International Studies, Quail Roost Conference, Rougemont, North Carolina, Dec. 6-7, 1985.

Medina, M.A., Jr., and **C. Marin**, "A Computer-Based Management System for Groundwater Quality," Conference on Groundwater Quality Management Issues, N.C. Water Resources Research Institute and N.C. Water Resources Association, Raleigh, North Carolina, December 14, 1985.

Medina, M.A., Jr., "State-of-the-Art, Physically-Based and Statistically-Based Water Quality Modeling," NATO Advanced Research Workshop on Urban Stormwater Pollution, Montpellier, France, August 26-30, 1985.

Medina, M.A., Jr., "Water Quality Modeling of Urban Runoff," School of Engineering, Department of Water Engineering, University of New South Wales, Sydney, New South Wales, Australia, July 25, 1984.

Medina, M.A., Jr., "The Conservation of Mass Equation and Deterministic Water Quality Modelling," School of Civil Engineering, Department of Water Engineering, University of New South Wales, Sydney, New South Wales, Australia, July 25, 1984.

Medina, M.A., Jr., "Deterministic Water Quality Modelling," Department of Civil and Systems Engineering, James Cook University of North Queensland,

Townsville, Queensland, Australia, July 23, 1984.

Medina, M.A., Jr., "Water Quality Modelling of Urban Runoff," Department of Civil and Systems Engineering, James Cook University of North Queensland, Townsville, Queensland, Australia, July 19, 1984.

Medina, M.A., Jr., "Urban Stormwater Quality Modelling," Water Engineering Panel, Institution of Engineers Australia, Brisbane, Queensland, Australia, July 18, 1984.

Medina, M.A., Jr., "Groundwater Contamination," Department of Local Government and Queensland Water Resources Commission, Brisbane, Queensland, Australia, July 18, 1984.

Medina, M.A., Jr., "Water Quality Modelling of Urban Runoff," Department of Civil Engineering, University of Adelaide, Adelaide, South Australia, June 22, 1984.

Medina, M.A., Jr., "The Conservation of Mass Equation and Deterministic Water Quality Modelling," Department of Civil Engineering Environmental Dynamics Seminar, University of Western Australia, Perth, Australia, June 20, 1984.

Medina, M.A., Jr., "Hydrology and Water Quality Modeling for Instream Flow Strategies," Centre for Resource and Environmental Studies (CRES), Australian National University, Canberra, Australia, April 26, 1984.

Medina, M.A., Jr., "Microcomputers and Water Quality Modelling," Australian Association for Computer Aided Design, ACADS, Melbourne, Australia, April 2, 1984.

Medina, M.A., Jr., and **W. James** (McMaster University, Canada), "Water Quantity and Quality Modelling In Urban Areas," an ESSO-MONASH Civil Engineering Workshop, Department of Civil Engineering, Monash University, Clayton (Melbourne), Victoria, Australia, February 14-16, 1984. (An intensive workshop on state-of-the-art applications of computer models to urban drainage systems.)

Medina, M.A., Jr., "Hydrologic and Water Quality Modeling for Instream Slow Strategies for 1983," Division of Environmental Management, North Carolina Department of Natural Resources and Community Development, Raleigh, North Carolina, March 31, 1983.

Medina, M.A., Jr., "Practical Aspects of Water Quality in Floodplain Management," Symposium on Floodplain Delineation and Management, ASCE, Houston, Texas, October 1983.

Medina, M.A., Jr., "Level III: Receiving Water Quality Modeling for Urban Stormwater Management," EPA Stormwater Model Workshop, Gainesville, Florida, January 10-11, 1980.

Medina, M.A., Jr., "Urban Runoff Quality Modeling," North Carolina Urban Stormwater Planning Workshop, Water Resources Research Institute, Raleigh, North Carolina, March 1979.

Medina, M.A., Jr., W.C. Huber, and J. P. Heaney, "Interaction of Urban Stormwater Runoff, Storage/Treatment Systems and Receiving Water Response," American Geophysical Union, Urban Hydrology Session, San Francisco, California; Abstract, *EOS, Transactions of American Geophysical Union*, December 1978.

Medina, M.A., Jr., "Solution Methodology: Impact of Urban Water Pollution Control on Receiving Water Quality," U.S. Environmental Protection Agency State of the Art Research Seminar Series, Waterside Mall T.V. Studio, Washington, D.C., November 3, 1976.

Medina, M.A., Jr., and **M.P. Murphy**, "The Costs of Stormwater Control," Technical Paper Presented at 1975 Annual Meeting, Florida Section, American Society of Civil Engineers, Gainesville, Florida, September 18-20, 1975.

Medina, M.A., Jr., "A Continuous Model to Study the Relative Importance of Storm, Combined, and DWF Sewer Runoff," Technical Paper Presented at 2nd Annual National Design, Extended Abstracts, Environmental Engineering Division of American Society of Civil Engineers, Gainesville, Florida, July 20-23, 1975.

Medina, M.A., Jr., and G.P. Whittle, "Utility of Total Organic Carbon Analysis for Waste Characterization," Technical Paper Presented at the Annual Conference of the Alabama Water and Pollution Control Association, Auburn, Alabama, August 20, 1972.

SERVICE TO DUKE

Member, Duke University Committee on Facilities and Environment, 2006 – 2009.
Director of Undergraduate Studies, Civil and Environmental Engineering, 2006 – 2009.
Chair, Duke University Standing Committee on Misconduct in Research, 2003 – 2005.
Member, Pratt School of Engineering Outreach/Visibility Strategic Planning Committee, 2005.
Director, Center for Hydrologic Science, Duke University, 2001 – 2004.
Director of Graduate Studies, Certificate in Hydrology, 2001-2004.
Member, Duke University Standing Committee on Misconduct in Research, 2002-2006.
Member, Provost's Dean of School of the Environment Search Committee, 2000-2001.
Chairman, School of Engineering Strategic Plan Working Group 5, Partnerships, 1999-2001.
Member, Executive Committee, Center for Global Change, 2000-2002.
Member, Provost's Dean of Engineering Search Committee, 1998-1999.
Member, Engineering-in-the-Future Task Force - appointed by Provost Strohbehn, chaired by Vice Chancellor Hammes, to provide the Provost with a long-term vision for the School of Engineering, a blueprint for a new Dean of Engineering, 1998.
Member, Investment Task Force - appointed by Dean Earl Dowell to review priorities for investment in the future of the School of Engineering, 1998.
Member, School of Engineering Appointments, Promotion and Tenure Committee, 1998-2000, 2001- present.
Member, International Affairs Committee, 1994 - 1996, 1998-2000. Advise the Provost and the Vice-Provost for Academic and International Affairs on international priorities and their implementation.
Member, Arts and Sciences Study Abroad Committee, 1996 – 2000.
Member, Site Advisory Group - appointed by President Brodie to study public health risks associated with Duke Forest disposal site, develop research and teaching potential of the site, May 1, 1991 - present.
Director, International Honors Program, School of Engineering, 1990 - present.
Co-Director, Joint MBA/MS Program with Fuqua School of Business, 1991 - present.
Steering Committee, Center for International Studies, 1989 - 1995.
Chairman, Self-Study Ad Hoc Committee I of Academic Priorities Committee — report to Provost on Interdisciplinary Activities at Duke, Self-Study for Southern Association of Schools and Colleges, 1987 - 1988.
Flooding of the Sarah P. Duke Gardens - Supervision of a comprehensive study (including analysis, field instrumentation, and design of hydraulic control structure), 1978. Based upon this study, a grant of $33,000 from the Duke Endowment Fund was made to construct a stormwater detention facility, authorized by the Chancellor and Provost, 1979.
University Research Council 1980-1986; Chairman, 1982 - 1986. Administration of $450,000 annual budget, faculty major and regular grant program, faculty fellowship program, faculty travel funds, advice to University Administration on research matters, coordination with Office of Research Support.
Engineering Admissions Committee 1979 - 1980, 1981 - 1983.
Lecturer, Engineering Economy, Engineer-in Training (E.I.T.) Lecture Series, 1978 - 1983.
Advisor, Chi Epsilon Chapter (National Civil Engineering Honor Society), 1984 -1989.
Advisor, N.C. Gamma Chapter, Tau Beta Pi (National Engineering Honor Society), 1980 - 1983.
Academic Council representative, 1980 - 1982.
Engineering Faculty Council, Member and Secretary, 1980 - 1981, 1987 - 1989.
Angier B. Duke Scholarship Interview Committee, 1977 - 1979, 1981, 1982, 1995.
Engineering Library Committee, 1977 - 1978.
Duke Environmental Center, Acting Director, January - September 1977.

COURSES TAUGHT

Graduate Level:

CE 225. Dynamic Engineering Hydrology
CE 226. Operational Hydrology
CE 227. Groundwater Hydrology and Contaminant Transport
CE 245. Pollutant Transport Systems

Undergraduate Level:

EGR 51. Computers in Engineering (currently designated as EGR 53)
CE 122. Fluid Mechanics
CE 123. Water Resources Engineering

LANGUAGES MASTERED

English and Spanish, both written and oral communication.

SERVICE TO THE PROFESSION

Consulting Hydrologist, 1976-present.
Editorial Board, *Journal of Hydrologic Engineering*, 2006-2008.
Editorial Board, *International Journal of Civil and Environmental Engineering*, N.Y. Digital Press, 2004-present.
Reviewer, National Institutes for Water Resources (NIWR) proposals, 2005.
Session Chairman, Environmental Measurements, Sensors.Gov Expo and Conference, Virginia Beach, Virginia, September 15, 2004.
Board of Directors, Consortium of Universities for the Advancement of Hydrologic Science, 2001-2004.
Vice Chair, Advisory Committee on Foreign Affiliates, Consortium of Universities for the Advancement of Hydrologic Science, 2001-2004.
External Reviewer, University of Miami Graduate School, Department of Civil, Architectural and Environmental Engineering graduate programs, March 12-13, 2001.
Chairman, Organizing Committee, American Institute of Hydrology International Conference, "Atmospheric, Surface and Subsurface Hydrology," November 5-8, 2000, Sheraton Imperial Hotel and Convention Center, Research Triangle Park, North Carolina. (1999-2000).
Panel Leader, "Mixing Zone: Discharge of Contaminated Groundwater into Surface Water Bodies," Modeling and Management of Emerging Environmental Issues Workshop 2000, Penn State Great Valley School of Graduate Professional Studies, sponsored by E.I. Du Pont De Nemours Company, July 25-27, 2000, Malvern, Pennsylvania.
Editorial Board, Annual Stormwater Modelling Conference, Toronto, Canada; Lewis Publishers, 1993 - 1998.
Session Chairman, Hydrology Modeling, Fourth USA/CIS Joint Conference on

Environmental Hydrology and Hydrogeology, American Institute of Hydrology, November 8, 1999, Cathedral Hill Hotel, San Francisco, California.

Committee of Visitors, National Science Foundation Hazard Mitigation Section, Directorate of Engineering, March 1996.

Reviewer, Ground Water Modeling Panel, National Science Foundation, NSF/EPA Partnership on Water and Watersheds, Final Panel, June 1995.

Co-Chairman, 13th Water Resources Systems Engineering Workshop, Duke University, October 1995.

Reviewer, Surface Hydrology Panel, U.S. Geological Survey Matching Grant Program, May 1988.

Reviewer, technical journal articles for *Water Resources Research*, *Hydrological Processes*, *Water Resources Bulletin*, *Journal of the American Water Resources Association*, *Journal of Water Resources Planning and Management*, *Journal of Environmental Engineering, Hydrological Science and Technology, Journal of Hydrologic Engineering, Journal of Environmental Management*, *Advances in Water Resources*.

Reviewer, U.S. EPA, Environmental Chemistry and Physics Peer Review Panel, Miami, Florida, April 1985; Exposure Assessment Technology and Watershed Management-Nonpoint Source Control programs; Predictive Modeling For Remedial Action Technology, SHWRD/MERL, Cincinnati, Ohio, August 1983.

Master of Ceremonies, Presiding Officer, "Climate Change and Water Research: Research Needs and Opportunities," Annual Meeting of Universities Council on Water Resources, Coeur d'Alene, Idaho, July 5-9, 1988.

Program Chairman, "University Participation in the Regulatory and Management Processes," Universities Council on Water Resources, Inc., Annual Conference, Hilton Head, South Carolina, July 28 - August 1, 1987.

Member, American Geophysical Union's Urban Hydrology Committee, Surface Hydrology Committee, Water Quality Committee (Hydrology Section) 1984-1986.

Member of U.S. Organizing Committee, Engineering Foundation Conference on Emerging Computer Techniques in Stormwater and Flood Management, Niagara-on-the-Lake, Ontario, Canada, October 30 to November 4, 1983.

Organizer and Moderator, Duke University, School of Engineering Annual Alumni Seminar - Water Management Issues, 1982.

Chairman, Water Resources Systems Simulation session, ASCE Convention, New Orleans, Louisiana, Fall 1982.

Chairman, Symposium on Impacts of Urban Runoff on Receiving Waters, American Geophysical Union Convention, Philadelphia, Pennsylvania, Spring 1982.

Chairman, Environmental Quality Modeling and Simulation session, ASCE Convention, Las Vegas, Nevada, Spring 1982.

Member, ASCE Urban Water Resources Research Council, Executive Committee, Media Committee Chairman, 1982-1988.

Member, ASCE Technical Council on Computer Practices (TCCP), State-of-the-Art of Computer Technology Committee, Control Group Member; Chairman of Education Committee of TCCP, 1982.

Member, Ohio River Basin Commission (ORBC) Committee on Instream Flow; analysis and criteria for minimum flows, 1982-1983.

Member, North Carolina Working Group on Urban Storm Drainage, Water Resources Research Institute, 1982-1983.

Duke University, Lead Delegate to Universities Council on Water Resources (UCOWR), 1982 - present.

Duke University, School of Engineering representative for the U.S. Geological Survey National Water Data Exchange (NAWDEX), 1979 - 1998.

INTERNATIONAL ACTIVITIES

Director, International Honors Program in Engineering, 1990 - present. Develop and negotiate work/study abroad programs (for example, Technical University of Berlin, Germany), attract foundation and other support (e.g., Lord Foundation, Power Curbers, Inc., Panamerican Institute of Highways), coordinate with other Duke international studies.

Presented about 30 technical papers in 16 foreign countries (listed under SELECTED PRESENTATIONS). Visits to 26 foreign countries: Argentina, Australia, Belgium, Brazil, Canada, Costa Rica, Chile, Dominican Republic, El Salvador, England, France, Germany, Greece, Guatemala, Honduras, Hungary, India, Italy, Mexico, Netherlands, Panama, Spain, Tahiti, Turkey, Uruguay, Venezuela.

Host Faculty Member for Fulbright Scholar from India, Dr. Himanshu Joshi, Associate Professor, Department of Hydrology, IIT-Roorkee, India (2006).

Member, International Program Committee for the International Association of Science and Technology for Development (IASTED) International Conference on Environmental Modelling and Simulation (2006).

Peer Reviewer, proposals to the Research Grants Council of Hong Kong (2003-2004).

External Reviewer, College of Engineering & Petroleum, Kuwait University, Kuwait (2004).

External Editor, *Arabian Journal for Science and Engineering* (AJSE) , "Potential Water Challenges and Solutions in the New Millennium in Arid Regions," (2005).

Peer Reviewer, proposals from Russian scientists to the US Civilian Research & Development Foundation (CRDF) (2004).

External Evaluator, UNESCO International Hydrological Programme. Paris, France – responsible for evaluating programs in North, Central and South America and the Caribbean, and overall global IHP-V effectiveness, 2002-2003. Site visits to La Serena, Chile and Brasilia, Brazil, including interviews with academics, foreign ministers, water and research agency heads. Assessment included data from 85 countries.

Dean of Engineering grant, funding to study expanding International Honors Program, $10,000 (1999-2000).

Member, International Affairs Committee, 1994 - 1996, 1998-2000. Advise the Provost and the Vice-Provost for Academic and International Affairs on international priorities and their implementation.

Member, Arts and Sciences Study Abroad Committee, 1996 – 2000.

Lord Foundation of North Carolina, funding for the International Honors Program, $5000 (2005-2006), $15,000 (1997-1998), $15,000 (1993), $25,000 (2001), $5,000 (2005), $5000 (2006). Total: $70,000. Funding for student travel and living expenses abroad (Germany, France, Spain, Italy, Argentina), program administration and exploration of distance learning to facilitate study abroad.

Third Inter-American Dialogue on Water Management, UNESCO, Facing the Emerging Water Crisis of the 21st Century, panelist for Water and Health: Approaches to Hazards Mitigation, March 21-25, 1999, Panama City, Panama.

Fuqua School of Business Global Interdependence Lecture Series, on Global Hydrology and Contaminant Transport, Duke University, February 18, 1999.

The Second Global Engineering Education Workshop, Global Engineering Education: Destinations and Directions, Virginia Tech, Ecole Polytechnique Federale de Lausanne (Switzerland), Institut National Polytechnique de Grenoble (France), participant, November 9-11, 1998, Crystal City, Virginia.

III International Course of Environmental Modelling, Polytechnic School of University of Murcia, sponsored by the Mediterranean Savings and Loan Bank, four technical lectures, Cartagena, Spain, February 18-20, 1997.

Undergraduate Thesis Advisor, Alejandro Valencia, Universidad Nacional de Colombia, Manizales, 1996-1997. Under Facilities Management sponsorship, in partial fulfillment of the requirements of a 5-year program, Valencia calibrated a stormwater model using precipitation and runoff data collected on the Duke campus.

Development of Contaminant Hydrology Program at Universidad Austral, Buenos Aires, Argentina. Sponsored by the Inter-American Development Bank, the Argentine Ministry of the Environment and Universidad Austral. Invited lectures on Surface and Subsurface Contaminant Transport, November 8-10, 1995. Appointed to the Board of Academic Advisors, Environmental Project, Nov. 20, 1995 by University Rector.

Steering Committee, Duke University Center for International Studies, 1989 - 1994.

Member, Provost's Executive Committee on International Affairs; Chair, Sciences and Engineering Task Force, 1993-1994. Advise the Duke Provost and President on the process for university internationalization.

Duke Representative, Panamerican Institute of Highways, Turner-Fairbank Highway Research Center, McLean, Va., 1993 - present.

International Course of Environmental Modelling, Polytechnic School of University of Murcia and Mediterranean Cultural Savings and Loan Bank, selected as one of five international lecturers, Cartagena, Spain, November 21-24, 1994.

International Symposium - Assessing and Managing Health Risks from Drinking Water Contamination: Approaches and Applications, Istituto Superiore di Sanita, Rome, Italy, September 16, 1994.

Invited Lecturer, Urban Hydrology and Mathematical Models of Water Quality, intensive post-graduate short course in Spanish, University of Costa Rica and the Panamerican Institute of Highways, San José, Costa Rica, July 18-22, 1994.

Panamerican Institute of Highways 2nd Annual Meeting, Santiago, Chile, September 18-26th, 1993.

Invited Speaker, Stormwater and Water Quality Management Modelling International Conference, Toronto, Canada, February 24, 1993.

Pan American Federation of Engineering Societies, UPADI 1990 Convention; August 20-23, Washington, D.C. **Invited paper**.

American Society of Civil Engineers, Water Resources Planning and Management Division, Committee on "Application of Water Resource Systems Methods in Latin America," 1987-present.

American Water Resources Association, ad hoc Committee on International Affairs, 1988.

Invited Speaker - Intricacies of Water Quality Modeling, Ontario Ministry of the Environment (Canada), Pollution Control Planning Conference, April 25-26, 1988, Toronto, Canada.

Council for International Exchange of Scholars (CIES), Washington, D.C.; Member of Discipline Screening Committee for Fulbright Scholar awards in Environmental Sciences, 1986-1989.

CIES Faculty Associate for Fulbright Scholar from Spain, Academic advisor for post-doctoral studies of Dr. Maria Moreno, University of Murcia, Murcia, Spain, 1985-1987.

International Technical Advisory Committee (ITAC), International Groundwater Modeling Center, (IGWMC) Colorado School of Mines (Golden, Colorado) and TNO-DGV Institute of Applied Geoscience (Delft, The Netherlands), 1987-1993; Chairman of ITAC, 1988-1993.

Invited Speaker - Receiving Water Impacts, Ontario Ministry of the Environment (Canada), Pollution Control Planning Conference, February 9-10, 1987, Toronto, Canada.

Convenor, International Water Resources Association (IWRA) and International Federation of Operations Research Societies (IFORS) conference on "The Use of Computer Methods For Water Resources Management In the Caribbean, Central, and South America," August 10-14, 1987, Buenos Aires, Argentina.

NSF Travel Grant to Argentina -- to establish contact with leading individuals and institutions in Argentina devoted to water resources research, investigate the feasibility of joint or collaborative research with U.S. counterparts, August 6-16, 1987, Buenos Aires, Argentina.

Pan American Health Organization and the Inter-American Development Bank, Washington, D.C. Evaluation of impact of water supply projects on hydrology and water quality of

Lake Valencia, Venezuela, planning for long-term program of sampling, model development and application, 1986, 1987.

UNESCO Lecturer in Central America -- Intensive post-graduate course on Hydrologic and Water Quality Models in Spanish 20 hours a week, four weeks, one week each in Costa Rica, Guatemala, Honduras and El Salvador, October 1985. [Proceedings in Spanish included translated version of WRRI Report No. 210].

UNESCO Lecturer in Central America and Caribbean (CRICA). Hydrologic and Water Quality Models, Dominican Republic and Panama, 1986.

Consultant to City of Madrid, Spain for U. S. Environmental Protection Agency under U.S.-Spain Scientific Exchange Cooperative Agreement, implementation of hydrologic and water quality models. Madrid, Spain, August 19-25, 1985.

Session Chairman and Invited Paper -- NATO Advanced Research Workshop on Urban Stormwater Pollution, Montpellier, France, August 26-30, 1985.

Fulbright Senior Scholar, 1984, Department of Civil Engineering, Monash University, Clayton, Victoria (Melbourne), Australia. Presented 20 seminars throughout Australia, modeled stormwater runoff over an instrumented urban catchment for the National Capital Development Commission and the Australian Department of Housing and Construction, Canberra, Australia.

Conference Committee Member, "Emerging Computer Techniques In Stormwater and Flood Management," Niagara-on-the-Lake, Ontario, Canada, October 29 to November 4, 1983.

Invited Speaker, U.S. EPA and Ontario Ministry of Environment Conference on Stormwater Management, Ottawa, Canada, July 1978.

CONSULTING ACTIVITIES

Lead Evaluator, UNESCO World Water Assessment Program, 2006-2007. Dr. Medina leads a team of 5 distinguished professionals from Austria, China, Hong Kong, Namibia and Saudi Arabia to evaluate the effectiveness of the UNESCO contribution to the World Water Assessment Program on a worldwide basis, reviewing both case study and non-case study countries, including regional visits. [http://www.unesco.org/water/wwap/]

External Evaluator, International Hydrological Programme, UNESCO, Paris, France. Evaluation of all global themes, particularly IHP-V programs in North, Central and South America and the Caribbean, site visits to Chile and Brazil, South America.

Peer Reviewer, US EPA Office of Research and Development, Cincinnati, Ohio; technical documents from the Urban Watershed Management Branch (US EPA NRMRL WSWRD) in Edison, New Jersey.

U.S. Environmental Protection Agency, Member of Environmental Chemistry and Physics Peer Review Panel, Office of Research and Development, Washington, D.C.

U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, Georgia. Technical review of Exposure Assessment Technology (EAT) and Watershed Management-Nonpoint Source Control (WSM-NPS) programs for the Technology Development and Applications Branch.

U.S. Environmental Protection Agency, Solid and Hazardous Waste Research Division, Municipal Environmental Research Laboratory, Office of Research and Development, Cincinnati, Ohio. Technical peer review of Predictive Modeling For Remedial Action Technology programs, under contract to Peer Consultants, Inc., Rockville, Maryland: evaluation of groundwater quality models, cost models, etc.

Marshall, Williams & Gorham, L.L.P., Wilmington, N.C.: modeling pesticide surface runoff and riverine contaminant transport to determine whether loads applied upstream resulted in concentrations downstream that violated State standards. Williams vs. King, Brunswick County, North Carolina.

Peeples, Earl & Blank, Attorneys at Law, Miami, Florida: review of the South Florida Water Management Model, the South Florida Regional Routing Model, the South Florida Water Supply Model, analysis of uncertainty in evapotranspiration rate predictions and other model parameters in determining the Everglades Agricultural Area water budget.

Miller & McCoy, Inc. and CBL & Associates, Inc., Chattanooga, Tennessee: Rainfall analysis for mall development, Inlet Square Mall (Murrells Inlet, S.C.) and Lakeshore Mall (Sebring, Florida.).

Long Lake Energy Corporation, New York City, N.Y.: evaluation of flow and hydroelectric power production at the Philadelphia, N.Y., hydrostation within an ungaged watershed; hydrologic evaluation of the Phoenix, Northumberland, and Stillwater, N.Y. projects.

CBL & Associates, Inc., Chattanooga, Tennessee: analysis of precipitation time series, simulation of surface runoff quantity and quality for proposed $70 million shopping center, evaluation of alternatives and impact to Oak Hollow Lake, High Point, N.C.

Pine Crest Inn: complete hydrologic analysis of flooding problems, computer simulation, Pinehurst, N.C.

Kilkelly Environmental Associates, Inc., consulting firm, Raleigh, N.C.: simulation of surface and groundwater quality for Duke Power Company, Riverbend Site.

Catalyst Energy, Inc., New York City, N.Y.: hydrologic analysis for B. Everett Jordan Dam hydropower project.

Inter-American Development Bank, Washington, D.C.: hydrologic and water quality modelling, water supply projects, university research in Latin America (Argentina, Venezuela).

Pan American Health Organization, Washington, D.C. -- evaluation of impact of water supply projects on the hydrology and water quality of Lake Valencia, Venezuela.

City of Madrid, Spain and U. S. Environmental Protection Agency -- under U.S.-Spain Scientific Exchange Cooperative Agreement, provided advice to City of Madrid on the implementation of surface hydrologic and water quality modeling strategies and data collection.

State of Virginia, Rappahannock Area Development Commission: modification of LEVEL III - Receiving model (Medina, 1979) to micro-computer version, application of model to predict urban nonpoint source pollution in the Rappahannock River Basin.

Spruill and Spruill, Attorneys-at-Law, Raleigh and Rocky Mount, N.C.: long-term simulation of rainfall, runoff and water quality of Ocean Isle Beach, N.C.; testimony before the N. C. Coastal Resources Commission on proposed Division of Environmental Management surface runoff guidelines.

University of Florida Industrial and Experiment Station, Gainesville, Florida. Nationwide assessment of receiving water quality impacts under contract with the U.S. EPA, Municipal Environmental Research Laboratory, Cincinnati, Ohio.

Blanchard, Tucker, Twiggs & Denson, Attorneys at Law, Raleigh, N.C. Technical advice on safety of Carolina Power & Light Company dam at Quaker Neck, near Goldsboro,

N.C.

Technical Advisory Service for Attorneys (TASA), Fort Washington, Pennsylvania.

Pfefferkorn & Cooley, Attorneys at Law, Winston-Salem, N.C. Analysis and testimony on hydrological and water quality aspects of proposed Duke Power Company Perkins Nuclear Power Plant on the Yadkin River, before the Atomic Safety and Licensing Board and Nuclear Regulatory Commission hearings in Mocksville District Court, N.C.

Billings, Burns and Wells, Attorneys at Law, Winston-Salem, N.C. Testimony on computer analysis of Potato Hill Dam failure, hydraulic computations of emergency spillways, site inspection.

Rosen, Oberman & Rosen, Attorneys at Law, Charleston, S.C. Technical advice on sanitary landfill leachate contamination of groundwater and water supply wells.

Malcolm Pirnie, Inc., Newport News, Virginia. Hydrologic and water quality modeling and data base needs in the Chowan River Basin, Virginia.

World Health Organization, International Programme on Chemical Safety, Inter-Regional Research Unit, Research Triangle Park, N.C. Establishment of an international groundwater quality research and technology transfer program, organization of international conferences and workshops.

Research Triangle Institute, Research Triangle Park, North Carolina. U.S. EPA contract to model groundwater contamination from sanitary landfills located in low permeability, saturated hydrogeologic formations.

Sutton-Kennerly & Associates, Greensboro, N.C. Hydrologic and water quality modeling, data base needs for urban stormwater management.

Black, Crow and Eidsness, Inc. (now CH_2M-Hill), Gainesville, Florida. Urban stormwater management studies, deep-well waste disposal systems and groundwater contamination.