

# Gregory W. Characklis

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## Personal

Married: Raquel (Ackerly)

Children: 3

Citizenship: USA

## Education

Ph.D. Environmental Science and Engineering, Rice University, Houston, TX, 1999.

M.S. Environmental Science and Engineering, Rice University, Houston, TX, 1994.

B.S. Materials Science and Eng., Johns Hopkins University, Baltimore, MD, 1989.

## Languages

Zertifikat Deutsch als Fremdsprache, Goethe Institut (1993), certifying functional fluency in German

French coursework through the A2/B1 level (Common European Framework)

## Professional Experience

*Director* Center for Watershed Science and Management, Institute for the Environment, University of North Carolina, Chapel Hill, 2011-present

*Assoc Professor* University of North Carolina, Chapel Hill, NC, 2007-present.

*Visiting Professor* École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, 2010-2011.

*Associate Editor* *Water Resources Research*, 2003-2010.

*Asst Professor* University of North Carolina, Chapel Hill, NC, 2001-2007.

*Director* Resource Development & Mgmt, Azurix Corp, Houston, TX, 1999–01.

*Fellow* National Academy of Engineering, Washington, DC, 1997-99.

## Professional Experience (cont'd)

*Visiting Scholar* Van Hall Institute, Groningen, Netherlands, May–July 1994.

*Assoc. Scientist* EG&G Idaho, Inc., Idaho National Engineering and Environmental Laboratory (INEEL), Idaho Falls, ID, 1990–91.

## Honors & Professional Activities

Committee on Water Resources, American Meteorological Society, 2011-present.

Task Force, A New Scientific Agenda for the Hydrologic Sciences, International Association of Hydrologic Sciences, 2011-present.

Vice-Chair, Committee on Water and Society, American Geophysical Union, 2011-present

Newton Underwood Award for Excellence in Teaching, University of North Carolina at Chapel Hill, 2012.

Fellow, Aldo Leopold Leadership Program, Stanford University, 2011

Co-Chair, Workshop on Integrating Economic and Financial Principles into Environmental Engineering Research and Education, National Science Foundation, Arlington, VA, January 2011.

Session Co-Chair, Spring Meeting of the European Geosciences Union, 2011, 2012.

Kenan Competitive Research Leave, University of North Carolina at Chapel Hill, 2010-2011.

Member, Working Group, “Toward a New Water Research Agenda”, National Science Foundation, 2010-2011.

Chair, Committee on Expanding Opportunities for Environmental Research using Economic, Financial, and Business Entrepreneurship Principles, Association of Environmental Engineering and Science Professors, 2009-2011.

Co-Chair, Session on “Role of Economics in the Future of Environmental Engineering Education and Research,” Bi-annual Meeting of the Association of Environmental Engineering and Science Professors (AEESP), Iowa City, IA, July 2009.

Invited Participant, German-American Frontiers of Engineering, National Academy of Engineering, Potsdam, Germany, April 2009.

Chair, Control Group, ASCE Environmental and Water Resources Committee, 2008, (Secretary, 2006; Vice-Chair, 2007; Past-Chair, 2009)

Technical Advisory Committee, North Carolina Water Resources Research Institute, 2003; 2006-present.

## Honors & Professional Activities (cont'd)

Chair, ASCE Committee on Systems Analysis and NSF Environmental Observatories, 2006-2008.

Co-Chair, "Managing Water Supplies in the Future: An Informal National Workshop for Practitioners and Academics," University of California-Davis, December 2007 and December 2008.

Session Co-Chair, Fall Meeting of the American Geophysical Union, 2005, 2006, 2007, 2008.

Invited Speaker, Frontiers of Engineering, National Academy of Engineering, Sept. 2003

Fellow, National Academy of Engineering, Washington, D.C., 1997-99.

Outstanding Doctoral Student, Environmental Science and Eng., Rice University, 1998.

Hudspeth Graduate Research Award, Delange Conference, Houston, TX, March 1997.

## Publications

### Book Chapters

Wiesner, M.R., G.W. Characklis and D. Brejchova, "Metals and Colloids in Urban Runoff", Chapter 2 in *Metals in the Environment*, ed. H. Allen, A.W. Garrison and G.W. Luther, III. Ann Arbor Press, 1998.

### National Research Council

Characklis, G. W. (2004). "Interface of Water Resource Engineering with Economics and Public Policy", *Frontiers of Engineering*, National Academy Press, Washington, D.C., pp. 11-18.

Characklis, G. W. (2003). "Interface of Water Resource Engineering with Economics and Public Policy", *The Bridge* (Journal of the National Academy of Engineering), Winter, pp. 4-9.

*Industrial Environmental Performance Metrics: Challenges and Opportunities* (1999). National Academy of Engineering/National Research Council, National Academy Press, Washington, DC, 252 pp.

### Peer-Review Articles (superscript indicates a student (M, D) or post-doc (P) working with Dr. Characklis)

Zeff, H.B.<sup>M</sup> and G. W. Characklis. "Managing Water Utility Financial Risks through Third-Party Derivative Contracts," *Water Resources Research*, (in review).

## Publications (cont'd)

Peer-Review Articles (cont'd) (superscript indicates a student (M, D) or post-doc (P) working with Dr. Characklis)

- Kirsch, B. R.<sup>D</sup>, Characklis, G. W. and H. B. Zeff<sup>M</sup>. "Evaluating the Impact of Alternative Hydro-climate Scenarios on Transfer Agreements: A Practical Improvement for Generating Synthetic Streamflows," *Journal of Water Resources Planning and Management*, (in review).
- Caldwell, C.<sup>M</sup> and G. W. Characklis. "Impact of Contract Structure and Risk Aversion on Inter-utility Water Transfer Agreements," *Journal of Water Resources Planning and Management*, (in review).
- Kern, J. D.<sup>M</sup>, Characklis, G. W., Doyle, M. D., Blumsack, S. and R. B. Whisnant (2011). "Influence of De-regulated Energy Markets on Hydropower Generation and Downstream Flow Regime," *Journal of Water Resources Planning and Management*, doi:10.1061/(ASCE)WR.1943-5452.0000183.
- Kasprzyk, J. R., Reed, P. M., Characklis, G. W. and B. R. Kirsch<sup>D</sup> (2011). "Many-Objective de Novo Water Supply Portfolio Planning Under Deep Uncertainty," *Environmental Modelling and Software*, doi:10.1016/j.envsoft.2011.04.003. (May 6, 2011)
- Characklis, G. W., Adriaens, P., Braden, J. B., Davis, J., Hamilton, B., Hughes, J. B., Small, M. J. and J. Wolfe (2011) "Increasing the Role of Economics in Environmental Research (or moving beyond the mindset that Economics = Accounting)", *Environmental Science & Technology*, 45, pp. 6235-6236.
- Russo, S. A.<sup>M</sup>, Hunn, J.<sup>M</sup> and G. W. Characklis (2011). "Considering Bacteria-Sediment Associations in Microbial Fate and Transport Modeling," *Journal of Environmental Engineering*, 137(8), pp. 697-706.
- Krometis, L. A.<sup>D</sup>, Characklis, G. W., Drummey, P. N.<sup>M</sup> and M. D. Sobsey (2010). "Comparison of indicator organism and *Salmonella* spp. partitioning behavior in an urban watershed," *Journal of Water and Health*, 8(1), pp. 44-59.
- Kasprzyk, J. R., Reed, P. M., Kirsch, B. R.<sup>D</sup>, and G. W. Characklis (2009). "Managing Population and Drought Risk Using Many-objective Water Portfolio Planning Under Uncertainty," *Water Resources Research*, 45, W12401.
- Krometis, L. A.<sup>D</sup>, Characklis, G. W. and M. D. Sobsey (2009). "Identification of particle size classes inhibiting protozoan recovery from surface water samples via USEPA Method 1623," *Applied Environmental Microbiology*, 75(20), pp. 6619-21.
- Krometis, L. A.<sup>D</sup>, Drummey, P. N.<sup>M</sup>, Characklis, G. W. and M. D. Sobsey (2009). "The Impact of Microbial Partitioning on Wet Retention Pond Effectiveness," *Journal of Environmental Engineering*, 135(9), pp. 758-767.
- Kirsch, B. R.<sup>D</sup>, Characklis, G. W., Dillard, K. E. M. and C. T. Kelley (2009). "More Efficient Optimization of Long-term Water Supply Portfolios," *Water Resources Research*, 45, W03414.

## Publications (cont'd)

Peer-Review Articles (cont'd) (superscript indicates a student (M, D) or post-doc (P) working with Dr. Characklis)

- Palmer, R. N.<sup>M</sup> and G. W. Characklis (2009). "Reducing the Costs of Meeting Regional Water Demand through Risk-based Transfer Agreements," *Journal of Environmental Management*, 90, pp. 1703-1714.
- Cizek, A. R.<sup>M</sup>, Characklis, G. W., Krometis, L. A.<sup>D</sup>, Hayes, J. A., Simmons, O. D., DiLonardo, S., Alderisio, K. A. and M. D. Sobsey (2008). "Comparing the Partitioning Behavior of *Giardia* and *Cryptosporidium* with that of Indicator Organisms in Stormwater Runoff," *Water Research*, 42, pp. 4421-4438.
- Characklis, G. W. and P. M. Reed (2008). "An Evolving Paradigm for Publication in the Water Resources Management Field," *Journal of Contemporary Water Research & Education*, 139, pp. 37-40.
- Fries, J. S.<sup>P</sup>, Characklis, G. W. and R. T. Noble (2008). "Sediment-Water Exchange of *Vibrio sp.* and Fecal Indicator Bacteria: Implications for Persistence and Transport in the Neuse River Estuary," *Water Research*, 42, pp. 941-950.
- Fries, J. S.<sup>P</sup>, Noble, R. T., Paerl, H. W. and G. W. Characklis (2007). "Particle Suspension as Indicators of Estuarine Water Quality in the Neuse River Estuary," *Estuaries & Coasts*, 30(2), pp. 359-364.
- LoBuglio, J. N.<sup>D</sup>, Characklis, G. W. and M. L. Serre (2007). "Cost-effective Water Quality Assessment through Integration of Monitoring Data and Modeling Results," *Water Resources Research*, 43(3), W03435.
- Krometis, L. A.<sup>D</sup>, Characklis, G. W., Simmons, O. D., Dilts, M. J.<sup>M</sup>, Likirdopoulos, C. A., and M. D. Sobsey (2007). "Intra-Storm Variability in Microbial Partitioning and Microbial Loading Rates", *Water Research*, 41, pp. 506-516.
- Characklis, G. W., Reed, P. M. and B. S. Minsker (2007). "The Role of Systems Analysis in NSF's Environmental Observatories," *Journal of Water Resources Planning and Management*, 133(1), pp. 1-3.
- Fries, J. S.<sup>P</sup>, Characklis, G. W. and R. T. Noble (2006). "Attachment of Fecal Indicator Bacteria to Particle Suspensions in Neuse River Estuary, North Carolina, USA," *Journal of Environmental Engineering*. 132(10), pp. 1338-1345.
- Traviglia, A. M.<sup>M</sup> and G. W. Characklis (2006). "Considering Location, Compliance, and Storage in Decisions on Brackish Water Resource Development", *Journal of Water Resources Planning and Management*, 132(6), pp. 514-520.
- Kirsch, B. R.<sup>M</sup> and G. W. Characklis (2006). "An Equilibrium Approach to Integrating Regional Surface Water Treatment and Limited Groundwater Pumping Capacity", *Journal of Water Resources Planning and Management*, 132(6), pp. 444-454.

## Publications (cont'd)

Peer-Review Articles (cont'd) (superscript indicates a student (M, D) or post-doc (P) working with Dr. Characklis)

- Lund, J. R., Cai, X. and G. W. Characklis (2006). "Economic Engineering of Environmental and Water Resource Systems", *Journal of Water Resources Planning and Management*, 132(6), pp. 399-402.
- Characklis, G. W., Kirsch, B. R.<sup>D</sup>, Ramsey, J.<sup>M</sup>, Dillard, K. E. M. and C. T. Kelley (2006). "Developing Portfolios of Water Supply Transfers", *Water Resources Research*, 42(5), W05403.
- Characklis, G. W., Dilts, M. J.<sup>M</sup>, Simmons, O. D., Likirdopoulos, C. A., Krometis, L. A.<sup>D</sup>, and M. D. Sobsey (2005). "Microbial Partitioning to Settleable Particles in Stormwater", *Water Research*, 39, pp. 1773-1782.
- Characklis, G. W., Griffin, R. C. and P. B. Bedient (2005). "Measuring the Long-term Regional Benefits of Salinity Reduction", *Journal of Agricultural and Resource Economics*, 30(1), pp. 69-93.
- Characklis, G. W. (2004) "Economic Decisionmaking in the Use of Membrane Desalination for Brackish Water Supplies", *Journal of the American Water Resources Association*, 40(2), pp. 615-630.
- Aitken, M. D., Novak, J. T., Characklis, G. W., Jones, K. L., and P. J. Vikesland (2004). "The Evolution of Environmental Engineering as a Professional Discipline", *Environmental Engineering Science*, 21(2), pp. 117-123.
- Griffin, R. C. and G. W. Characklis (2002). "Issues and Trends in Texas Water Marketing", *Water Resources Update*, 121, pp. 29-33.
- Characklis, G. W. and D. J. Richards (1999). "The Evolution of Industrial Environmental Performance Metrics", *Corporate Environmental Strategy*, 6(4), pp. 324-336.
- Characklis, G. W., Griffin, R. C. and P. B. Bedient (1999). "Improving the Ability of a Water Market to Efficiently Manage Drought", *Water Resources Research*, 35(3), pp. 823-831.
- Characklis, G. W. and M. R. Wiesner (1997). "Particles, Metals, and Water Quality in Runoff from a Large Urban Watershed", *Journal of Environmental Engineering*, 123(8), pp. 753-759.

## Reports and other Publications

- LoBuglio, J. N.<sup>D</sup> and G. W. Characklis (2010). *Burden of Disease from Drinking Water in National Strategy and Action Plan for Environmental Health*, United Arab Emirates, MacDonald-Gibson, J. and A. Brammer, Eds., Environment Agency- Abu Dhabi and University of North Carolina, Gillings School of Global Public Health.

## Publications (cont'd)

### Reports and other Publications (cont'd)

Krometis, L. A.<sup>D</sup>, LoBuglio, J. N.<sup>D</sup>, MacDonald-Gibson, J. and G. W. Characklis (2010). *Burden of Disease from Coastal Water Quality in National Strategy and Action Plan for Environmental Health*, United Arab Emirates, MacDonald-Gibson, J. and A. Brammer, Eds., Environment Agency-Abu Dhabi and University of North Carolina, Gillings School of Global Public Health.

*Operating Policies and Administrative Discretion at the John H. Kerr Project (Dam)* (2009), Division of Water Resources, North Carolina Department of Environment and Natural Resources, Raleigh, NC.

*Watershed Restoration Plan to Address Fecal Coliform Impairment of Northeast Creek in Durham, NC* (2009), North Carolina Dept. of Environment and Natural Resources, Division of Water Quality: TMDL program, Raleigh, NC.

Whisnant, R., Holman, B., Hughes, J. Kleczek, L., Characklis, G. W., Dimmitt, M., LoBuglio, J. N.<sup>D</sup>, Schwartz, N., Platt, J., Hughes, S., Eskaf, S., Westbrook, A., Guzman, A., Tate, S., Tiger, M. and H. Polikov (2009). *Report of the Water Allocation Study Team*. North Carolina Environmental Management Commission, Raleigh, NC.

University of North Carolina Institute for the Environment (2008), *Climate Change Committee Report. Prepared at the request of North Carolina State Senate*, Band, L.B. and D. Salvesen, Eds., University of North Carolina at Chapel Hill, Chapel Hill, NC.

Caldwell, C.<sup>M</sup> and G. W. Characklis (2008). "Optimizing Water Supply through Inter-utility Water Transfer Agreements," North Carolina Urban Water Consortium, Raleigh, NC, pp. 45.

Raucher, R. S., Cromwell, J., Henderson, J., Wagner, C., Rubin, S., Goldstein, J., Huber-Lee, A., Young, C., Characklis, G. W. and B. R. Kirsch<sup>D</sup> (2006). "Regional Solutions to Water Supply Provision", American Water Works Association Research Foundation and U.S. Environmental Protection Agency, IWA Publishing.

Traviglia, A. M.<sup>M</sup> and G. W. Characklis (2004). "An Expert System for Decisionmaking in the Use of Desalination for Augmenting Water Supplies", Desalination and Water Purification Research and Development Program, Bureau of Reclamation, U. S. Dept. of the Interior, Denver, June 2004, pp. 41.

Aitken, M. D., Novak, J. T., Characklis, G. W., Jones, K. L., and P. J. Vikesland (2003). "The Evolution of Environmental Engineering as a Professional Discipline", National Science Foundation/Association of Environmental Engineering and Science Professors, Toronto, Ontario, 23 pp.

## Invited Presentations

Woods Institute for the Environment, Stanford University, Palo Alto, CA, January 2012.

Eidgenössische Technische Hochschule (ETH), Institute for Environmental Engineering, Zurich, Switzerland, June 2011.

Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz (EAWAG-Kastanienbaum Laboratory), Kastanienbaum, Switzerland, May 2011.

Centre for Climate Change Mitigation Research, University of Cambridge, Cambridge, UK, April 2011.

Landolt Chair Symposium, School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, March 2011.

Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz (EAWAG), Dubendorf, Switzerland, December 2010.

Latsis Symposium on Ecohydrology, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, October 2010.

School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, October 2010.

North Carolina Urban Water Consortium, Durham, NC, June 2010.

New York Academy of Sciences, New York, NY, May 2010.

Virginia Water Resources Research Center, Virginia Tech University, April 2010.

Thomson-Reuters Water Markets Workshop, London, UK, November 2009.

School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, November 2009.

North Carolina Urban Water Consortium, Chapel Hill, NC, September 2009.

“Tribute to Bill Glaze”, American Chemical Society Meeting, Washington, DC, August 2009

North Carolina Water Resources Research Institute Advisory Board Meeting, Raleigh, NC, May 2009.

Rotary International, Chapel Hill, NC, May 2009.

Water CAMPWS Series, University of Illinois at Urbana-Champaign, May 2009.

UNESCO-IHE Institute for Water Education, Delft, Netherlands, April 2009.

Dept. of Civil and Environmental Engineering, Duke University, Durham, NC, April 2009.

## Invited Presentations (cont'd)

Dept. of Civil and Environmental Engineering, United Arab Emirates University, Al Ain, Abu Dhabi, UAE, February 2009.

National Risk Management Research Laboratory-Urban Wet Weather Flow Division, Edison, NJ, January 2009.

Global American South Conference, University of North Carolina, Chapel Hill, NC, April 2008.

Current Science Forum, Morehead Planetarium, University of North Carolina, Chapel Hill, NC, December 2007.

Dept. of Agricultural and Resource Economics, North Carolina State University, Raleigh, NC, November 2007.

Dept. of Civil and Environmental Engineering, Penn State University, State College, PA, October 2007.

Property and Environment Research Center (PERC), Bozeman, MT, July 2007.

Nicholas School for the Environment, Duke University, Durham, NC, March 2007.

Institute of Marine Sciences, University of North Carolina, Morehead City, NC, September 2006.

Property and Environment Research Center (PERC), Bozeman, MT, June 2006.

Global Institute of Sustainability, Arizona State University, Tempe, AZ, March 2006.

College of Civil Engineering, Georgia Institute of Technology, Atlanta, GA, April 2005.

Dept. of Civil and Environmental Engineering, Arizona State University, Tempe, AZ, March 2005.

Kenan-Flagler Business School, Water and Wastewater Executive Education Program, Chapel Hill, NC, February 2005.

Dept. of Earth & Environmental Engineering, Columbia University, New York, NY, November 2004.

Dept. of Geography & Environmental Engineering, Johns Hopkins University, Baltimore, MD, November 2004.

Dept. of Civil & Environmental Engineering, North Carolina State University, Raleigh, NC, October 2004.

CONCARIBE Environmental Conference, Cartagena, Colombia, May 2004.

Frontiers of Engineering Symposium, National Academy of Engineering, National Academies Beckman Center, Irvine, CA, September 2003.

## Invited Presentations (cont'd)

Earth Systems Engineering Workshop, National Academy of Engineering, Washington, DC, June 2000.

## Conference Papers & Presentations

Characklis, G. W., Caldwell, C., Zeff, H. B. and B. R. Kirsch, "Impacts of Risk Aversion on Water Supply Planning," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2012.

Kern, J. D. and G. W. Characklis, "Influence of Deregulated Electricity Markets on Hydropower Generation and Downstream Flow Regime," European Geosciences Union Annual Meeting, Vienna, Austria, April 2011.

Zeff, H. B. and G. W. Characklis, "Improving Water Utility Financial Stability in the Face of Extreme Weather," European Geosciences Union Annual Meeting, Vienna, Austria, April 2011.

Reed, P. M., Kasprzyk, J. R. and G. W. Characklis. "Many-Objective Risk-Based Planning Within Complex Engineering Systems: An Urban Water Planning Example," International Conference on Vulnerability and Risk Analysis and Management, American Society of Civil Engineers, Hyattsville, MD, April 2011.

Kasprzyk, J. R., Reed, P. M., Characklis, G. W. and B. R. Kirsch. "What is the Non-Dominated Solution? A Demonstration of de Novo Water Supply Portfolio Planning Under Deep Uncertainty," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2010.

Krometis, L-A. H., Kasturi, K. P. and G. W. Characklis. "Implications of Variation in Best Management Practice Effectiveness on the Selection of a Watershed Restoration Strategy for Microbial Contamination," Annual Meeting of the American Society of Agricultural and Biological Engineers, Pittsburgh, PA, June 2010.

Kasprzyk, J. R., Reed, P. M., Kirsch, B. R., and G. W. Characklis. "Managing Population and Drought Risks Using Many-objective Water Portfolio Planning Under Uncertainty," ASCE World Environmental and Water Resources Congress, Providence, RI, May 2010.

Kern, J. D., Characklis, G. W. and M. D. Doyle. "Influence of Electricity Markets on Hydropower Generation and Downstream Flow Regime," Annual Meeting of the North Carolina Water Resources Research Institute, Raleigh, NC, March 2010.

Kirsch, B. R. and G. W. Characklis. "Risk-based Transfer Responses to Climate Change Simulated through Autocorrelated Stochastic Methods," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2009.

## Conference Papers & Presentations (cont'd)

- Kasprzyk, J. R., Reed, P. M., Kirsch, B. R., and G. W. Characklis. "Sensitivity-Informed De Novo Programming for Many-Objective Water Portfolio Planning Under Uncertainty," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2009.
- Krometis, L-A. H., Characklis, G. W., Noble, R. T. and M. D. Sobsey. Quantification of *E. coli* partitioning via culture-based techniques and qPCR. American Society of Microbiology Annual General Meeting, Philadelphia, PA, May 2009
- Characklis, G. W., Kirsch, B. R., Ramsey, J., Dillard, K. E. M. and C. T. Kelley. "Developing Portfolios of Water Supply Transfers," German-American Frontiers of Engineering, National Academy of Engineering, Potsdam, Germany, April 2009.
- Caldwell, C. and G. W. Characklis. "Considerations of Risk Tolerance in Developing Probability-Based Inter-utility Transfer Agreements," Annual Conference North Carolina Water Resources Research Institute, Raleigh, NC, October 2008.
- Krometis, L-A. H. and G. W. Characklis. 2008. Use of indicator organisms as bacterial and protozoan pathogen surrogates in an urban watershed. American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting, Providence, RI, June 2008.
- Characklis, G. W. and C. Caldwell. "Using Water Transfers to Manage Supply Risk," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2007.
- Krometis, L-A. H., Characklis, G. W., P. N. Drummey and M. D. Sobsey. "Indicator Organism and Salmonella Partitioning in an Urban Watershed," International Water Association (IWA), 14<sup>th</sup> Annual International Symposium on Health-Related Water Microbiology, Tokyo, Japan, September 2007
- Characklis, G. W., Drummey, P. N., Krometis, L-A. H., Simmons, O. D. and M. D. Sobsey. "The Origins and Attachment Behavior of Nonpoint Source Microbial Contaminants," North Carolina Urban Water Consortium – Stormwater Group, Wilmington, NC, September 2007.
- Krometis, L-A. H., Characklis, G. W. and P. N. Drummey. "Microbial Partitioning in Urban Stormwaters," Association of Environmental Engineering and Science Professors (AEESP) Bi-annual Meeting, Virginia Tech, Blacksburg, VA, July 2007.
- Kirsch, B. R., Dillard, K. E. M., Characklis, G. W. and C. T. Kelley. "Improving the Efficiency of Optimizing Water Supply Portfolios," Association of Environmental Engineering and Science Professors (AEESP) Meeting, Virginia Tech, Blacksburg, VA, July 2007.

## Conference Papers & Presentations (cont'd)

- Fries, J, S. Noble, R. T. and G. W. Characklis. "Environmental Controls on Transport of Bacteria in Estuaries: Human Health Implications of Sediment Transport and Hurricanes," ASCE/EWRI World Water and Environmental Resources Congress, Tampa, FL, May 2007.
- Kirsch, B. R., Characklis, G. W., Palmer, R. N., Ramsey, J., Dillard, K. E. M. and C. T. Kelley. "Using Water Transfers to Manage Supply Risk," Annual Meeting of the American Water Works Association, San Antonio, TX, June 2006.
- Krometis, L. A. and G. W. Characklis. "Characterization of Particle Class Sizes Associated with Indicator Organisms in Stormwater," ASCE/EWRI World Water and Environmental Resources Congress, Omaha, NE, May 2006.
- LoBuglio, J. N. and G. W. Characklis. "Utilizing spatiotemporal random field theory and uncertain information to assess and reduce monitoring cost for surface waters subject to TMDLs," ASCE/EWRI World Water and Environmental Resources Congress, Omaha, NE, May 2006.
- Palmer, R. N. and G. W. Characklis. "Reducing the Cost of Meeting Water Demands with Inter-Utility Transfers," Annual Conference North Carolina Water Resources Research Institute, Raleigh, NC, April 2006.
- Characklis, G. W., Kirsch, B. R., Ramsey, J., Dillard, K. E. M. and C. T. Kelley. "Using Water Transfers to Manage Risk, UNC Symposium on Safe Drinking Water: Where Science Meets Policy, Chapel Hill, NC, March 2006.
- Characklis, G. W. "Microbial Partitioning and its Impact on Stormwater Management," , North Carolina Water Resources Research Institute Seminar Series, Raleigh, NC, January 2006.
- Characklis, G. W., Kirsch, B. R., Ramsey, J., Dillard, K. E. M. and C. T. Kelley. "Developing Portfolios of Water Supply Transfers," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2005.
- Fries, J. S., Noble, R. T., Paerl, H. W. and G. W. Characklis. "Turbidity and Particle Suspensions in the Neuse River Estuary: Identifying Contributions of Resuspension, Runoff, and Phytoplankton", 18<sup>th</sup> Biennial Conference of the Estuarine Research Foundation, Norfolk, VA, October 2005.
- LoBuglio, J. N. and G. W. Characklis. "Incorporating Uncertainty in Estimating Ecological Endpoints Using Regional Water Resource Models." ASCE Watershed Management Conference, Williamsburg, VA, July 2005.
- Kirsch, B. R., Characklis, G. W. and J. Ramsey. "Optimization of a Water Supply Portfolio in a Stochastic Supply/Demand Environment." ASCE/EWRI World Water and Environmental Resources Congress, Anchorage, AK, May 2005.

## Conference Papers & Presentations (cont'd)

- Characklis, G. W., Palmer, R. N. and C. Caldwell. "Reducing the Costs of Meeting Regional Water Demand through Risk-based Transfer Agreements," University Council on Water Resources (UCOWR) Annual Meeting, Boise, ID, July 2007.
- Characklis, G. W., "Water Resource Development: A Private Sector Approach", Dept. of Environmental Science and Engineering, Rice University, Houston, TX, November 2000.
- Krometis, L. A., Characklis, G. W., Dilts, M. J., Simmons, O. D., Sobsey, M. D. and C. A. Likirdopulos. "Intra-storm Variability in Water Quality and its Impact on Microbial Partitioning." ASCE/EWRI World Water and Environmental Resources Congress, Anchorage, AK, May 2005.
- Characklis, G. W., Dilts, M. J., Simmons, O. D., Likirdopulos, C. A., Krometis, L. A., and M. D. Sobsey, "Evaluating Differences in Microbial Partitioning Under Storm and Dry Weather Conditions." ASCE/EWRI World Water and Environmental Resources Congress, Anchorage, AK, May 2005.
- Krometis, L. A., Characklis, G. W., Dilts, M. J., Simmons, O. D., Likirdopulos, C. A. and M. D. Sobsey. "Variability in microbial partitioning to settleable particles in stormwater", 229th American Chemical Society (ACS) National Meeting, San Diego, CA, March 2005.
- Characklis, G. W., Dilts, M. J., Simmons, O. D., Likirdopulos, C. A., Krometis, L. A., and M. D. Sobsey. "Microbial Partitioning to Settleable Particles in Stormwater", North Carolina Urban Water Consortium, Raleigh, NC, March 2005.
- Fries, J. S., Characklis, G. W., Noble, R. T. and J. Hsieh. "Dynamics of Pathogen-Particle Interactions and Implications on the Transport and Ecology of Human Pathogens in the Neuse River Estuary," American Society of Limnology and Oceanography (ASLO) Winter Meeting, Salt Lake City, UT, February 2005.
- Characklis, G. W. and J. Ramsey. "An Integrated Hydrologic-Economic Model to Develop Minimum Cost Water Supply Portfolios," Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2004.
- Characklis, G. W. "Developing Strategies for Regional Water Resource Management", Dept. of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, Chapel Hill, NC, September 2004.
- Kirsch, B. R. and G. W. Characklis. "Reducing Water Supply Costs through Regionalized Surface Water Systems and Transferable Groundwater Permits", ASCE/EWRI World Water and Environmental Resources Congress, Salt Lake City, June 2004.
- J. S. Fries, G. W. Characklis, A. D. Blackwood, and R. T. Noble. "The Role of Particle-Mediated Transport in the Ecology of Human Pathogens in the Neuse River Estuary", American Society of Limnology and Oceanography (ASLO) Summer Meeting, Savannah, GA, June 2004.

## Conference Papers & Presentations (cont'd)

- Dilts, M. J., Characklis, G. W., and O. D. Simmons. "Impact Of Microbial-Particle Interaction On Microbial Fate and Transport in Stormwater," Annual Conference North Carolina Water Resources Research Institute, Raleigh, NC, April 2004.
- Characklis, G. W. and B. R. Kirsch, "Regional Water Supply Management in North Carolina", North Carolina Water Resources Research Institute Seminar Series, Raleigh, NC, January 2004.
- Traviglia, A. M. and G. W. Characklis, "Incorporating Consideration of Location, Compliance, and Reliability into Estimates of Brackish Resource Development Costs", Annual Conference of the American Water Resources Association, San Diego, CA, November 2003.
- Characklis, G. W., and B. R. Kirsch, "Regionalized Surface Water Treatment and Tradable Groundwater Permits in the Central Coastal Plain Capacity Use Area", North Carolina Water Resources Research Institute Advisory Committee Meeting, Raleigh, NC, May 2003.
- Kirsch, B. R. and G. W. Characklis. "An Integrated Analysis of Water Use Alternatives in the Central Coastal Plain Capacity Use Area", Annual Conference North Carolina Water Resources Research Institute, Raleigh, NC, April 2003.
- Kirsch, B. R. and G. W. Characklis. "An Analysis of Water Supply Alternatives in the Central Coastal Plain Capacity Use Area: A Regional Supply Model", Annual Meeting of the AWWA/WEA, NC Section, Winston-Salem, NC, November 2002. (*Graduate Research Award winner*)
- Characklis, G. W. and S. W. Durbin. "Improved Drought Management Through Use of Temporary Transfers", American Society of Civil Engineers (ASCE)- Environmental and Water Resources Institute (EWRI) Water Resources Planning and Management Conference, Roanoke, VA, May 2002.
- Durbin, S.W. and G. W. Characklis. "Optimizing Water Acquisition in the Edwards Aquifer Region", Annual Conference of the North Carolina Water Resources Research Institute, Raleigh, NC, April 2002.
- Characklis, G. W. "Water Marketing and Resource Development", WestWater Research Symposium, Houston, TX, December 2001.
- Characklis, G. W. and R. C. Griffin. "Evaluating Optimal Agricultural and Municipal Responses to Rising Salinity", American Water Resources Association (AWRA)/University Council on Water Resources (UCOWR) Conference on Water Resource Decision Support Systems, Snowbird, UT, June 2001.
- Characklis, G. W., "Industrial Environmental Performance Metrics: Current Practice and Recommendations for Improvement", Environmental Solutions Program, University of Texas at Austin, Austin, TX, November 1998.

## Conference Papers & Presentations (cont'd)

- Characklis, G. W., "Improving the Ability of a Water Market to More Efficiently Manage Drought in the Lower Rio Grande", DeLange Conference: Sustainable Development: Managing the Transition, Houston, TX, March 1997.
- Characklis, G. W., "The Effects of Market Inefficiencies on Water Resource Allocation in the Lower Rio Grande", The Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Washington, D.C., November 1996.
- Characklis, G. W., "Particles and Metals in Urban Runoff", USEPA Hazardous Substance Research Center (HSRC), Five Centers Conference, Salishan Lodge, OR, July 1995.
- Characklis, G. W., "Particles, Metals and Water Quality in Runoff from a Large Urban Watershed", Annual Meeting of the American Institute of Hydrology, Austin, TX, April 1994.
- Characklis, G. W., "Particles in Urban Runoff", Annual Meeting of the Water Environment Association, Austin, TX, June 1993.

## Funded Projects

- "Portfolio-based Approaches to Managing Climate Uncertainty in Urban Water Planning," National Oceanic and Atmospheric Administration (NOAA), \$300,000, 9/11-8/13, *Principal Investigator*.
- "Integrating Economic and Financial Principles into Environmental Engineering Research and Education," National Science Foundation, \$50,000, 9/10 - 8/12, *Principal Investigator*.
- "Ensuring Water Supply Reliability and Financial Stability for North Carolina Utilities," North Carolina Water Resources Research Institute and North Carolina Urban Water Consortium, \$50,000, 03/10 - 06/11, *Principal Investigator*.
- "Operating Policies and Administrative Procedures Governing Operations of the John H. Kerr Project on the Roanoke River", North Carolina Department of Environment and Natural Resources, \$74,282; 09/08 – 04/09, *co-Principal Investigator* (PI: Richard Whisnant).
- "Linkage of bacterial pathogens to human infectious disease in an estuary subjected to extreme climatic events", National Science Foundation, \$1,527,139, 9/08 – 08/12, *co-Principal Investigator* (PI: Rachel Noble).
- "National Strategy for Environment and Health for the United Arab Emirates," Environment Agency Abu Dhabi, \$4,562,312, 6/08 – 5/11, *co-investigator* (PI: Jacqueline MacDonald).

## Funded Projects (cont'd)

- "North Carolina Water Allocation Study", North Carolina Environmental Review Commission, \$100,000, 1/08 – 12/08, *co-Principal Investigator* (PI: Richard Whisnant).
- "Promoting North Carolina's Economic Development through Strategic Water Resource Management", North Carolina Research Competitiveness Fund, \$246,000, 12/07 – 12/08, *Principal Investigator*.
- "Evaluating Pathogen Partitioning in New York City Water Supply Reservoirs", U.S. Environmental Protection Agency/New York City Department of Environmental Protection, \$385,000, 8/06 – 9/07, *Principal Investigator*.
- "Improved Regional Supply Strategies using Probability-based Inter-utility Transfer Agreements," Research Triangle Utilities, \$80,000, 9/06-7/08, *Principal Investigator*.
- "Developing a Total Maximum Daily Load for a Biologically Impaired Waterbody", U.S. Environmental Protection Agency/North Carolina Dept. of Environment and Natural Resources, \$200,000, 7/06 – 6/09, *Principal Investigator*.
- "Identifying the Origins and Attachment Behavior of Non-point Source Microbial Contaminants", North Carolina Water Resources Research Institute/North Carolina Urban Water Consortium, \$49,000, 7/05 – 12/06, *Principal Investigator*.
- "Reducing the Cost of Maintaining Regional Water Supply Reliability", Progress Energy/North Carolina Urban Water Consortium, \$80,000, 6/04 – 6/06, *Principal Investigator*.
- "Regional Solutions to Developing Water Supplies", American Water Works Association Research Foundation (AWWARF) and USEPA, \$347,000, 10/03 – 9/05, *co-Principal Investigator* (PI: Stratus Consulting).
- "Impacts of Anthropogenic Change on the Ecology of Human Pathogens in a Eutrophic Estuary", National Science Foundation/National Institutes of Health, \$1,796,000, 9/03 – 8/08, *co-Principal Investigator* (PI: Crawford-Brown, D.).
- "Impact of Microbial-Particle Interaction on Microbial Fate and Transport in Stormwater", North Carolina Dept. of Environment and Natural Resources, \$75,000, 6/03-5/04, *Principal Investigator*.
- "Drought vulnerability in the Catawba River Basin", Duke Energy Foundation, \$100,000, 5/03 – 1/04, *co-Principal Investigator* (PI: Band, L.).
- "Reducing the Cost of Maintaining Reliability in Regional Water Supplies", IBM/UNC Junior Faculty Development Grant, \$5,000, 1/03 – 12/03, *Principal Investigator*.
- "An Expert System for Decisionmaking in the Use of Desalination for Augmenting Water Supply", U. S. Dept. of Interior/Bureau of Reclamation, \$60,000, 9/02 – 6/04, *Principal Investigator*.

## Funded Projects (cont'd)

“Developing a Minimum Cost Portfolio of Water Assets”, University Research Council, University of North Carolina at Chapel Hill, \$3,900, 5/02 – 4/04, *Principal Investigator*.

“Reduced Cost Strategies for Regional Integration of Surface and Ground-water Use”, North Carolina Water Resources Research Institute, \$80,000, 2/02 – 6/04, *Principal Investigator*.

“Minimizing Regional Cost of Conjunctive Use of Surface and Groundwater”, University Research Council, University of North Carolina at Chapel Hill, \$3,900, 12/01 – 11/03, *Principal Investigator*.

“Conversion from Conventional Treatment to Microfiltration in a Small Water System”, U. S. Environmental Protection Agency, \$115,000, 12/01 – 3/03, *co-Principal Investigator (PI: DiGiano, F. A.)*.

## Teaching & Advising

Courses Taught [ ] = graduate students enrolled

Analysis of Water Resource Systems (ENVR 755):	Fall 2002 [10] Spring 2004 [8] Spring 2005 [13] Spring 2006 [6] Spring 2007 [10] Spring 2008 [7] Spring 2009 [10] Spring 2010 [13] Fall 2011 [20]
Environmental Management and Policy Colloquium (ENVR 200):	Fall 2005 [7] Spring 2006 [7] Fall 2006 [6] Spring 2007 [6]
Design of Water Systems (ENVR 285):	Fall 2001 <sup>1</sup> [5]
Environmental Systems Analysis (ENVR 217):	Spring 2001 <sup>2</sup> [8] Spring 2002 <sup>1</sup> [7]
Surface Water Quality: Modeling and Policy (ENVR 850):	Fall 2003 [8] Fall 2005 [11] Spring 2012 [7]

<sup>1</sup> co-taught with Professor Don Lauria

<sup>2</sup> guest lecturer

## Teaching & Advising (cont'd)

Courses Taught (cont'd) [ ] = graduate students enrolled

Setting Environmental Priorities (ENVR 890)	Fall 2007 [8] Fall 2008 [9] Fall 2009 [5]
Unifying Concepts (ENVR 104/401):	Fall 2005 [12] Spring 2006 [5] Spring 2007 [28] Spring 2008 [14] Spring 2009 [19] Spring 2010 [16] Spring 2012 [19]

### Advising

*Current Students (Primary Advisor/Committee)*

Doctoral: 7 (3/4)

Masters: 2 (1/1)

*Students Graduated (Primary Advisor/Committee)*

Doctoral: 14 (3/11)

Masters: 40 (15/25)

### Faculty Advisor

Environmental Sciences and Engineering Student Organization (ENVRSO)

## Service Activities

### Journal Positions

Associate Editor, *Water Resources Research*, 2003-2010

### Journal Article Reviews

*Advances in Water Resources*

*Environmental Engineering Science*

*Environmental Science and Technology (ES&T)*

## **Service Activities (cont'd)**

### Journal Article Reviews (cont'd)

*Journal of the American Water Resources Association*

*Journal of Environmental Engineering*

*Journal of Environmental Management*

*Journal of Industrial Ecology*

*Journal of Water Resources Planning and Management*

*Optimization*

*Water International*

*Water Research*

*Water Resources Research*

### Book Reviews

Water Resource Economics: Scarcity, Policies and Projects, MIT Press

### Proposal Reviews

National Oceanic and Atmospheric Administration (NOAA)

National Science Foundation (NSF)

North Carolina Water Resources Research Institute

### Membership in Professional Societies

American Geophysical Union (AGU)

American Society of Civil Engineers (ASCE)

American Water Resources Association (AWRA)

Association of Environmental Engineering and Science Professors (AEESP)

### Committee Service

Committee on Water Resources, American Meteorological Society, 2011-present.

Faculty Search Committee, Curriculum on Ecology and the Environment, University of North Carolina at Chapel Hill, 2012.

## **Service Activities (cont'd)**

### Committee Service (cont'd)

Task Force, A New Scientific Agenda for the Hydrologic Sciences, International Association of Hydrologic Sciences, 2011-present.

Vice-Chair, Committee on Water and Society, American Geophysical Union, 2011-present

Session Co-Chair, Spring Meeting of the European Geosciences Union, April 2011.

Co-Chair, Workshop on Integrating Economic and Financial Principles into Environmental Engineering Research and Education, National Science Foundation, Arlington, VA, January 2011.

Working Group, "Hydrologic Synthesis: Toward a New Water Research Agenda", National Science Foundation, 2010-2011.

Chair, Committee on Expanding Opportunities for Environmental Research using Economic, Financial, and Business Entrepreneurship Principles, Association of Environmental Engineering and Science Professors, 2009-2011.

School of Public Health Committee on Designing a Financial Literacy Curriculum, University of North Carolina at Chapel Hill, 2007 - 2009.

Chair, Faculty Search Committee, Dept. of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, 2007 – 2008.

Invited Participant, NSF Workshop on Frontier Research Directions in Civil and Environmental Engineering, Arlington, VA, May 2007.

Elected Control Group Member (Secretary 2006; Co-Chair 2007; Chair 2008, Past-Chair 2009), ASCE Standing Committee on Environmental and Water Resource Systems.

Chair, ASCE Task Committee on the Role of Systems Analysis in NSF's Environmental Observatories, 2006 – 2008.

Ad Hoc Committee on the Establishment of a Global Water Institute, UNC School of Public Health, 2006 – 2008.

Environmental Sciences and Engineering Chair Search Committee, UNC School of Public Health, 2005-2006.

Technical Advisory Committee, North Carolina Water Resources Research Institute, 2003; 2006-2008.

Admissions Committee, Dept. of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, 2006-2010.

## **Service Activities (cont'd)**

### Committee Service (cont'd)

Strategic Planning Committee, Dept. of Environmental Sciences and Engineering,  
University of North Carolina at Chapel Hill, 2006-present.

Member/Rapporteur, Association of Environmental Engineering and Science Professors  
(AEESP), Workshop on the Evolution of Environmental Engineering as a  
Professional Discipline, July 2002.

### Media Interviews

Chapel Hill News

Charlotte Observer

Daily Tar Heel

Durham Herald-Sun

Winston-Salem Journal

WUNC Radio's "The State of Things" with Frank Stasio

### Paid Consulting Activities

American Water Corporation

California Regional Water Quality Control Board

Hazen & Sawyer, P.C.

Kenan-Flagler (UNC) Business School – Water and Wastewater Executive  
Education

Layne Water Development Services

Stratus Consulting

Western Water and Storage Development

### Unpaid Consultations

City of Cary, NC

City of Colorado Springs, CO

City of Durham, NC

**Service Activities (cont'd)**Unpaid Consultations (cont'd)

North Carolina Dept of Environment and Natural Resources, Div of Water Resources

North Carolina Rural Center

North Carolina Urban Water Consortium-Drinking Water & Stormwater Groups

Orange Water and Sewer Authority (OWASA), Chapel Hill, NC