

DONNA M. RIZZO

PROFESSIONAL PREPARATION

	MAJOR	DEGREE & YEAR
University of Connecticut, Storrs	Civil Engineering (Honors College)	B.S., 1984
University of Florence, Italy	Art and Archeology	N.A., 1985
University of California, Irvine	Civil Engineering	M.S., 1990
University of Vermont, Burlington	Civil & Environmental Engineering	Ph.D., 1994

APPOINTMENTS

2008-present	Associate Professor , Civil & Environmental Engineering, UVM, Burlington, VT. Secondary Appointment , Department of Computer Science, UVM, Burlington, VT.
Summer 2011	Subcontractor (VT Smart Grid Collaboration) , Sandia National Laboratory, Albuquerque, N.M.
2005-2009	Adjunct Faculty Member , School of Engineering, The University of Tasmania, Tasmania, AU.
2002-2008	Assistant Professor , Department of Civil & Environmental Engineering, UVM, Burlington, VT.
1994-2002	Co-founder , Subterranean Research, Inc., Burlington, VT. <i>Responsibilities</i> : highly focused, product-oriented research and development for optimal site investigations, remediation designs, performance assessment programs and other projects involving optimal allocation of water resources.
Summer 1998 & 2000	Local Expert Hire (Hydrologist) , FEMA (Federal Emergency Management Agency) VT. <i>Responsibilities</i> : assisted in streamlining the Hazard Mitigation Grant Program to expedite funds to sub-grantees; prepared damage survey reports (DSR) throughout the state.
1991-1994	Research Assistant , University of Vermont, Burlington, VT. <i>Research interests</i> : geohydrologic site characterization using artificial neural networks, optimal groundwater remediation design, highly-parallel implementation of numerical methods for geohydrological applications. Teaching assistant for ME 93 (Bioengineering) and ME 14 (Mechanics of Solids).
1992-1995	Instructor for the following PC Shortcourses , 1) <i>IBM PC Applications in Ground Water Pollution and Hydrology Short Course</i> , taught by R.W. Cleary, M.J. Unga, and G.F. Pinder. 2) <i>Princeton Transport Code Short Course</i> , with G.F. Pinder, S.A. Stothoff, J.F. Guarnaccia, and G.P. Karatzas; 3) <i>MODLP "Modflow with Linear Programming Short Course"</i> , with D. Ahfeld and D.E. Dougherty.
1992-1994	Participating Guest , Lawrence Livermore National Laboratory, Livermore CA.
1986-1990	Research Assistant and Graduate Teaching Assistant , University of California, Irvine, CA. <i>Research</i> : mathematical modeling of multi-phase flow and transport in unsaturated soils with DBCP (a pesticide) present; development of knowledge-based engineering systems for hazardous waste site evaluations. Teaching assistant for CE 172 (Hydraulics).
1986-1988	Civil Engineer , Born Barrett and Associates, Civil Engineering and Consulting Firm, Costa Mesa, CA. <i>Responsibilities</i> : preliminary site inspections; design of storm drain facilities; flood plain analysis; land surveying; preparation of trial exhibits.
1984-1985	Civil Engineer , State of Connecticut Department of Environmental Protection, Hartford, Connecticut. <i>Responsibilities</i> : conduct environmental impact assessments; computer modeling and analysis of stream data; field work (time of travel studies; stream data collection).

AWARDS AND HONORS

- Received the 2011 Jackie M. Gibbons Leadership Award, from the Vermont Women in Higher Education. The award honors women who demonstrate leadership ability, serve as models and mentors, develop innovative programs, and contribute significantly to an institution of higher learning and their profession.
- Nominated for the UVM Kroepsch-Maurice Excellence in Teaching Award in 2005, 2006, 2007 and 2012; this university-wide award highlights faculty for excellent classroom instruction.
- Nominated for the 2012 UVM George V. Kidder Outstanding Faculty Award; this university-wide award focuses on quality teaching and dedication to the enhancement of the academic experience for undergraduate students.
- Received the 2007 Outstanding Faculty Woman Award, Nominated by students; the award honors faculty who have made significant contributions to the lives of women on campus through service, teaching & scholarship.
- Received a 2005-2006 UVM Service-Learning Faculty Fellowship.
- One of 15 people selected in a national competition to attend a 12-week workshop at the Advanced Computing Laboratory at Los Alamos National Laboratory (Spring 1993).

- Member, Sigma Xi (national honor society for recognizing scientific achievement).
- Received the 1990-1991 Graduate Teaching Fellow of the Year, UVM Department of Civil & Mechanical Engineering.
- Received a GPOP Fellowship (Financed 100% of M.S. Degree), University of California, Irvine.
- UREP Scholarship, UC Berkeley, to participate in an archaeological excavation in Sardinia, Italy, 1987.
- Honors Program, University of Connecticut, Storrs, 1980-1984.
- Member, Chi Epsilon, Civil Engineering Honor Society since 1982.
- S.B. Penick Science Scholarship, 1980.
- AFS Scholarship to teach English in Turkey, 1980.

PROFESSIONAL DEVELOPMENT (SINCE TENURE-TRACK POSITION)

1. Participant in the NSF-Sponsored Workshop: *Becoming the Messenger* (Mar. 29-30, 2012).
2. Accepted to the UVM Sustainability Faculty Fellows Program (Jan. 11-12, 2011). The program and two-day workshop fosters a supportive learning community around common interests in sustainability.
3. Participated in a four-part workshop (8 hrs. total), *Enhancing Student Learning and Faculty Teaching in Engineering*. Sponsored by an NSF Department Level Reform grant, and organized/presented by two colleagues (Maureen Neumann, Sandy Lathem) in education.
4. Participant in the *Critical Thinking and Assessment Test (CAT)* training and coding workshop (Dec. 21, 2010). This training is part of a larger institutional research project conducted by the Center for Assessment and Improvement of learning at Tennessee Technological University (TTU).
5. Honors College Faculty three-day seminar entitled; *Neuroscience Beyond Biology and Medicine: The Role of Neuroscience in Nonscience Disciplines* led by Professors Donna Toufexis and Bill Falls. (Aug. 16-18, 2010).
6. *Concept Mapping* workshop, and the *CTL009: Book Group – The Art of Changing the Brain*, UVM Center for Teaching & Learning (March 2006, February 2010).
7. *Making Learning a Win/Win Experience for You and Your Students*, NSF Sponsored Workshop, UVM Center for Teaching & Learning; UVMCEE web site is: <http://sites.google.com/site/uvmcee> (Dec. 4, Feb. 19, Mar. 19, Apr. 9, 2010).
8. Invited to participate in the NSF Coalition of EPSCoR/IDeA (Young Investigators and Future Leaders) (March 4-5, 2008).
9. Wolfram's *A New Kind of Science* Conference, Burlington, VT (July 2007).
10. Participant in NSF IGERT (Integrative Graduate Education and Research Traineeship) meeting in Washington, DC (Feb. 21, 2007).
11. Accepted to the 2006 Faculty Fellows for Service-Learning program and training workshop (Jan.11-13, 2006).
12. NSF sponsored two-day workshop by Clyde Freeman Herreid on *Implementing Case Studies in Teaching in Science & Engineering* (May 2006).
13. International Summit on Environmental Software and Modeling and Software workshop by Ralf Wieland on *SAMT - Spatial Analysis Modeling Tool* (July 2006).
14. NSF sponsored two-day seminar and education assessment workshop by Diane Ebert-May on *A Systems Approach to Assessing Student Understanding* (February 2006).
15. UVM workshop: *Advanced Reflection*, UVM Community-University Partnerships in Service Learning (CUPS) program, (February 2006).
16. Awarded a Service Learning Faculty Fellowship for the UVM Community-University Partnerships in Service Learning (CUPS) program: One-week intensive training program on service-learning and critical reflection, (Winter 2006).
17. NSF Engineering and Computing Education Grantee meeting in Washington, D.C. (September 2003).
18. Honors College Faculty three-day seminar entitled, *Quality of Life: What is it, how do we measure it, and how do we enhance it?* led by Robert Costanza of the GUND Institute for Ecological Economics. (Aug. 15-17, 2005).
19. UVM Center for Teaching and Learning: 1) two-day workshop *Introduction to WebCT* and 2) one-day workshop *Creating Online Quizzes and Exams*, (Summer 2003).
20. ASCE World Water & Environmental Resources Congress, Philadelphia, PA. *Genetic Algorithms Short Course* (July 2003).

21. *Writing across the Curriculum and Collaborative Learning* Workshop, UVM (May 2002).
22. *Advanced MatLab® workshop*, The MATH WORKS, Natick MA, two-day short course (November 2002).
23. NSF SUCCEED Teaching Workshops: 1) *Planning Engineering Education Research* and 2) *The Freshman Programs Workshop*, Burlington, VT (Summer 2003).

SELECTED PROJECT EXPERIENCE PRIOR TO TENURE-TRACK POSITION

- Principal Investigator for DOE funded Small Business Innovation Research (SBIR) Phase I grant for long-term monitoring optimization integrated with remediation process optimization to reduce costs without significant changes in estimates of risk or uncertainty. 09/00 - 03/01.
- Principal Investigator for NSF funded SBIR Phase I grant for Geographic Information Systems (GIS)-based Decision Support Management. The project leads to increased productivity at environmental restoration sites through an application of GIS, databases, simulation modeling, and optimization. A hierarchy of artificial neural networks was developed to estimate uncertainty associated with different stakeholders' objectives and predict this uncertainty as a result of remediation decisions. 1/01-06/02.
- Project Manager under subcontract to Applied Research Associates for work supporting the development of frost penetration mapping activities for the State of Vermont Agency of Transportation. A statistical based methodology was used to analyze time series meteorological data for 9 weather observation stations in Vermont. The objective was to look for climatic trends in annual freezing degree-days. A procedure was then developed for creating a statewide coverage (map) of freezing degree-days using daily temperature data from all stations in Vermont with corrections for altitude using a standard adiabatic lapse rate. Summer 2000.
- Principal Investigator for DOE funded Small Business Innovation Research (SBIR) Phase I and Phase II grants for the development of tools for rapid joint inversion and imaging of interpreting multiple geophysical and geotechnical data types to characterize subsurface fluids and media. This includes optimization, artificial neural networks, regression and other statistical methods. Phase I – 9/97 - 3/98. Phase II – 10/98 - 06/00.
- Project Manager 1999-2001, for work supporting the development of a Long Term Monitoring Optimization (LTMO) Program for SSCOM in Natick, MA. Nonlinear optimization codes and geostatistical software were coupled with an existing 3-D groundwater flow and transport model to evaluate locations for additional extraction wells, changes in existing pumping rates, and to devise a LTM program for VOC concentrations at SSCOM given a variety of objectives from multiple stakeholders. 03/99 - 03/00.
- Principal Investigator for NSF-funded project for the development of three new methods (an artificial neural network approach, a total variation (TV) method, and an approximate extended Kalman filter method) for data inversion to reconstruct three-dimensional images of subsurface contaminant plumes, soil lithology, and optimal groundwater transport parameters. 1/97-11/98.
- Co-Investigator for NSF funded project for characterizing subsurface materials and properties using artificial neural networks. This project supported investigations using artificial neural networks in the solution of inverse problems to identify hydraulic properties from common field measurements. 10/93-9/95.
- Co-Investigator on a U.S. Air Force/Armstrong Laboratory Environics Directorate project to optimally integrate decision-making into field sampling equipment. Responsible for development of an artificial neural network software module for integrating field data into a map of properties.
- Co-Investigator on two Lawrence Livermore National Laboratory funded projects to conduct research and development on optimization of a water-saturated pump-and-treat system and to study subsurface characterization at LLNL. Novel optimization methods were applied to a pre-existing engineering flow and transport model of the Laboratory's Main Site.
- Consultant on Menifee Basin Groundwater Recharge Project, to NBS/Lowery and Associates, San Diego, CA. Integrated, basin-wide modeling using finite difference and finite element methods.
- Consultant on San Onofre Basin Groundwater Management Project, to NBS/Lowery and Associates, San Diego, CA. Integrated basin-wide water resources management modeling, including finite difference and finite element models.
- Peer Review, Member of EPA Project Review Panel for the Optimization of Contaminated Groundwater Extraction Systems, 1998.
- Peer Review, EPA Office of Solid Waste and Emergency Response. Reviewed final draft report and associated deliverables for a nation-wide industrial waste management project, 1999.

PEER-REVIEWED JOURNAL PUBLICATIONS***In Review/Revision:***

1. Stevens, L., **D.M. Rizzo**, J.C. Pizarro and D.E. Lucero, "Household model of Chagas disease vectors (Hemiptera: Reduviidae) considering domestic, peridomestic and sylvatic vector populations". *Journal of Medical Entomology*. In Review.
2. Lodh, N., **D.M. Rizzo**, B.L. Kerans, S. McGinnis and L. Stevens, "If you've seen one worm, have you seen them all? Spatial community and population genetic structure of tubificid communities in Montana watersheds", *Environmental Microbiology*, In Review.
3. Gaddis, E.J.B. A. Voinov, R. Seppelt and **D.M. Rizzo**, "Optimizing best management practices across a watershed", *Water Resources Management*", In Review.
4. Garvey, K., L.A. Morrissey, **D.M. Rizzo**, K. Underwood, B.C. Wemple and M. Kline, "Estimating streambank and channel erosion and deposition in the Browns River, Chittenden County, VT using multidecade LiDAR and imagery" *Progress in Physical Geography*, In Review.
5. Fytilis, N, and **D.M. Rizzo**, "Coupling Self-Organizing Maps with a Naïve Bayesian classifier: Stream classification studies using multiple assessment data", *Water Resources Research*, In Review.
6. Borg, J.L., P.R. Beirman, M.M Dewoolkar, **D.M. Rizzo** and D. Rood. "Meteoric ¹⁰Be adhered to suspended sediment: transport dynamics in a large New England watershed", *Journal of Geophysical Research – Earth Surface*, manuscript #: 2010JF001927, In Revision.
7. de la Rúa, N.M., M. Menes, D. Bustamante, M.C. Monroy, C.W. Kilpatrick, **D.M. Rizzo**, L. Stevens, S. Klotz, J. Schmidt, and P. Dorn, "New composition of species complexes in the North and Central American *Triatoma* based on statistical test of competing systematic hypotheses", *Molecular Phylogenetics and Evolution*, In Revision.
8. Pearce, A.R., M.C. Watzin, G. Druschel, L. Stevens and **D.M. Rizzo**, "Identifying conditions associated with cyanobacteria blooms in Missisquoi Bay, Lake Champlain, USA, using a modified Self-Organizing Map", *Environmental Science and Technology*, In Revision.
9. McCune-Sanders, W.J. and **D.M. Rizzo**, "Examining the potential of heat extraction from wood-based, static compost piles", *Compost Science and Utilization*, In Revision.

Published or accepted:

1. Fytilis, N., **D.M. Rizzo**, R. Lamb, B. L. Kerans, and L. Stevens, "Using real-time PCR and Bayesian analysis to estimate parasite transmission parameters for the invertebrate hosts of whirling disease", *International Journal of Parasitology*, In Press, 2013.
2. Hu, L.B., C.S. Savidge, **D.M. Rizzo**, N.J. Hayden, W. Hagadorn and M.M. Dewoolkar, "Commonly used porous building materials: Geomorphic pore structure and fluid transport", *Journal of Materials in Civil Engineering*, In Press, 2013.
3. Mathon, B.R., **D.M. Rizzo**, M. Kline, G. Alexander, S. Fiske, R. Langdon, and L. Stevens, "Assessing linkages in stream habitat, geomorphic condition and biological integrity using a generalized regression neural network", *Journal of the American Water Resources Association*, (JAWRA-12-0191-P.R1), Accepted 2012, In Press, 2013.
4. Lucero, D., L.A. Morrisey, **D.M. Rizzo**, A. Rodas, R. Garnica, L. Stevens, D.M. Bustamante, and M.C. Monroy, "Ecohealth interventions limit triatomine reinfestation following insecticide spraying in La Brea, Guatemala", *American Journal of Tropical Medicine and Hygeine*, doi: 10.4269/ajtmh.12-044888(4), 2013, pp. 630–637, 2013.
5. Portenga, E., P.R. Bierman, **D.M. Rizzo**, and D.H. Rood, "Low rates of bedrock outcrop erosion in the central Appalachian Mountains inferred from *in situ* ¹⁰Be", *The Geological Society of America Bulletin*, doi: 10.1130/B30559.1 v.125, (1-2) pp201-215, 2013.

6. Butryn, R.S., D.L. Parrish, and **D.M. Rizzo**. “Summer stream temperature metrics for predicting brook trout (*Salvelinus fontinalis*) distribution in streams”, *Hydrobiologia*, doi: 10.1007/s10750-012-1336-1, 703:47-57, 2013.
7. Manukyan, N., M.J. Eppstein and **D.M. Rizzo**, “Data-driven cluster reinforcement and visualization in sparsely-matched Self-Organizing Maps”, *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 23, No. 5, pp. 846-852, doi: 10.1109/2010TNNLS.2012.2190768, 2012.
8. Eppstein, M.J., D.K. Grover, J.S. Marshall and **D.M. Rizzo**, “An agent-based model to study market penetration of plug-in hybrid electric vehicles”, *Energy Policy*, doi:10.1016/j.enpol.2011.04.007, v. 39, (6) p. 3789-3802, 2011.
9. Pearce, A.R., **D.M. Rizzo** and P.J. Mouser, “Subsurface characterization of groundwater contaminated by landfill leachate using microbial community profile data and a non-parametric decision-making process”, *Water Resources Research*, 47, W06511, doi: 10.1029/2010WR009992, 2011.
10. Hayden, N.J., **D.M. Rizzo**, M.M. Dewoolkar, M.D. Neumann, S.A. Lathen and A. Sadek, “Incorporating a systems approach into civil and environmental engineering curricula: The effect on student work, student and faculty attitudes”, *Advances in Engineering Education*, Vol. 2, No. 4 (AEE-07-120), Summer Issue, available at: <http://advances.asee.org/vol02/issue04/04.cfm>, 2011.
11. Mouser, P.J., **D.M. Rizzo**, G. Druschel, S.E. Morales, P. O’Grady, N.J. Hayden and L. Stevens, “Enhanced detection of groundwater contamination from a leaking waste disposal site by microbial community profiles”, *Water Resources Research*, 46, W12506, doi: 10.1029/2010WR009459, 2010.
12. Lee, M., A. Drizo, **D.M. Rizzo**, G.K. Druschel, N.J. Hayden and E. Twohig. “Evaluating the efficiency and temporal variation of pilot-scale constructed wetlands and steel slag phosphorus removing filters for treating dairy wastewater”, *Water Research*, 44(14), pp. 4077-4086, doi: 10.1016/j.watres.2010.05.020, 2010.
13. Besaw, L.E., **D.M. Rizzo**, P.R. Bierman, and W. Hackett, “Advances in ungauged streamflow prediction using neural networks”, *Journal of Hydrology*, 386(1-4), p. 27-37, doi: 10.1016/j.jhydrol.2010.02.037, 2010.
14. Pearce, A.R., P.R. Bierman, G.K. Druschel, C. Massey, **D.M. Rizzo**, M.C. Watzin, B.C. Wemple, “Pitfalls and successes of developing an interdisciplinary watershed field camp”, *Journal of Geoscience Education*, v. 58, p. 213-220, 2010.
15. McBride, M., C.W. Hession and **D.M. Rizzo**, “Riparian reforestation and channel change: How long does it take?”, *Geomorphology*, 116(3-4): 330-340; doi:10.1016/j.geomorph.2009.11.014, 2009.
16. Dewoolkar, M.M., L. George, N.J. Hayden, and **D.M. Rizzo**, “Vertical integration of service learning into civil and environmental engineering curricula”, *International Journal of Engineering Education*, 25(6), 1257-1269, 2009.
17. Besaw, L.E., **D.M. Rizzo**, M. Kline, K.L. Underwood, J.J. Doris, L.A. Morrissey and K. Pelletier, “Stream classification using hierarchical artificial neural networks: A fluvial hazard management tool”, *Journal of Hydrology*, doi: 10.1016/j.jhydrol.2009.04.007, 373(1-2) : 34-43, 2009.
18. Kollat, J.B., P. M. Reed, and **D.M. Rizzo**, “Addressing model bias and uncertainty in three-dimensional groundwater transport forecasts for a physical aquifer experiment”, *Geophysical Research Letters*, 35(17), L17402, doi: 10.1029/2008GL035021, 2008.
19. McBride, M., W.C. Hession and **D.M. Rizzo**, “Riparian reforestation and channel change: A case study of two small tributaries to Sleepers River, Northeastern Vermont, USA”, *Geomorphology*, 102 (3-4) 445-459, doi: 10.1016/j.geomorph.2008.05.008, 2008.
20. Stevens, L. and **D.M. Rizzo**, “Local adaptation to biocontrol agents: A multi-objective data-driven optimization model for the evolution of resistance”, *Ecological Complexity*, doi: 10.1016/j.ecocom.2008.04.002, 5(3): 252-259, 2008.
21. Clark, J.S., **D.M. Rizzo**, M.C. Watzin, W.C. Hession, “Geomorphic condition of fish habitat in streams: An analysis using hydraulic modeling and geostatistics”, *River Research and Applications*, 24(7), pp.885-899, doi: 10.1002/rra.1085, 2008.
22. Costanza, R, P.B. Fisher, S. Ali, C. Beer, L. Bond, R. Boumans, N.L. Danigelis, J. Dickinson, C. Elliott, J. Farley, D.E. Gayer, L. MacDonald Glenn, T. Hudspeth, D. Mahoney, L. McCahill, B. McIntosh, B. Reed, S.A.T. Rizvi, **D.M. Rizzo**, T. Simpatico, and R. Snapp. 2008. “An integrative approach to quality of life

- measurement, research and policy”, *Surveys and Perspectives Integrating Environment and Society*. 1:1-5. Available online at: www.surv-perspect-integr-environ-soc.net/1/11/2008.
23. Doris, J.J., **D. M. Rizzo** and M.M. Dewoolkar, “Forecasting vertical ground surface movement from shrinking/swelling soils with artificial neural networks”, *International Journal for Numerical and Analytical Methods in Geomechanics*, 32 (10), 1229-1245, 2007.
 24. Besaw, L.E. and **D.M. Rizzo**, “Spatial prediction and stochastic conditional simulation using artificial neural networks”, *Water Resources Research*, 43(11), W11409, doi: 10.1029/2006WR005509, 2007.
 25. McBride, M. C.W. Hession, **D.M. Rizzo** and D.M. Thompson, “The influence of riparian vegetation on near-bank turbulence: A flume experiment”, *Earth Surface Processes and Landforms*, 32(13), 2019-2037, doi: 10.1002/esp. 1513, 2007.
 26. Langevin, H.M., **D.M. Rizzo**, J.R. Fox, G.J. Badger, J. Wu, E.E. Konofagou, D. Stevens-Tuttle, N.A. Bouffard and M.H. Krag, “Dynamic morphometric characterization of local connective tissue network structure in humans using ultrasound”, *BMC Systems Biology*, 1 (25), 2007.
 27. Costanza, R., P. B. Fisher, S. Ali, C. Beer, L. Bond, R. Boumans, N. L. Danigelis, J. Dickinson, C. Elliott, J. Farley, D. E. Gayer, L. MacDonald Glenn, T. Hudspeth, D. Mahoney, L. McCahil, B. McIntosh, B. Reed, S. A. Turab Rizvi, **D.M. Rizzo**, T. Simpatico and R. Snapp, “Quality of life: An approach integrating opportunities, human needs, and subjective well-being”, *Ecological Economics*, 61(2-3), 267-276, 2007.
 28. Cianfrani, C., W.C. Hession and **D.M. Rizzo**, “Watershed imperviousness impacts on stream channel condition in southeastern Pennsylvania”, *Journal of the American Water Resources Association*, 42 (4), 941-956, 2006.
 29. Rossman, A.J., N.J. Hayden and **D.M. Rizzo**, “Low temperature soil heating using renewable energy”, *Journal of Environmental Engineering*, 132 (5), 537-544, 2006.
 30. **Rizzo, D.M.**, P. Mouser, D. Whitney, C. Mark, R. Magarey and A. Voinov, “The comparison of four dynamic systems-based software packages: Translation and sensitivity analysis”, *Environmental Modelling and Software*, 21(10), 1491-1502, 2006.
 31. Mouser, P.J., **D.M. Rizzo**, W.F.M. Röling and B.M. van Breukelen, “A multivariate geostatistical approach to spatial representation of groundwater contamination using hydrochemistry and microbial community profiles”, *Environmental Science & Technology*, 39 (19), 7551-7559, 2005.
 32. Mouser, P.J., W.C. Hession, **D.M. Rizzo** and N.J. Gotelli, “Hydrology and geostatistics in Vermont, U.S.A. kettlehole peatland”, *Journal of Hydrology*, 301(1-4), 250-266, 2005.
 33. Mitchell, S. Gran, A. Matmon, P.R. Bierman, Y. Enzel, M. Caffee and **D.M. Rizzo**, “Displacement history of the Nahef East Fault, Northern Israel, using cosmogenic ³⁶Cl”, *Journal of Geophysical Research*, 106 (3), 4247-4264, 2001.
 34. **Rizzo, D.M.** and D.E. Dougherty, “Design optimization for multiple management period groundwater remediation”, *Water Resources Research*, 32 (8), 2549-2561, 1996.
 35. **Rizzo, D.M.** and D.E. Dougherty, “Characterization of aquifer properties using artificial neural networks: Neural Kriging”, *Water Resources Research*, 30 (2), 483-497, 1994.

Book Chapters:

36. **Rizzo, D.M.**, M.M. Dewoolkar and N.J. Hayden, “Transferable skills development in engineering students: analysis of service-learning impact”, Chapter 7 in *Transferable Skills Development in Engineering Students: An Analysis of the Impacts of Service-Learning*, P. Vermaas and D. Michelfelder (eds.), Springer Press, 2013.
37. **Rizzo, D.M.**, “Long-term ground water modeling”, Section of Book Chapter in *Environmental Modeling and Management: Theory, Practice and Future Directions*, C.C. Chien, et al. (eds.), Today Media Inc., 2002. (Now republished as *Contaminated Ground Water and Sediment: Modeling for Management and Remediation*, by Lewis Publishers, 2003.)
38. **Rizzo, D.M.** “Field studies of long-term monitoring design”, Book Chapter in *Long-Term Groundwater Monitoring: The State of the Art*. Prepared by The Task Committee on the State of the Art in Long-Term Groundwater Monitoring Design, ASCE, 2003.
39. **Rizzo, D.M.** and D.E. Dougherty, “Artificial neural networks in subsurface characterization”, Book Chapter in *Artificial Neural Networks in Hydrology*, R.S. Govindaraju and A.R. Rao (eds.), 111-133, 2000.

Report Publications:

1. Dewoolkar, M., N.J. Hayden, **D.M. Rizzo**, L.B. Hu and C.R. Savidge, *Prediction of agent fate in porous building materials*, submitted to The Defense Threat Reduction Agency, (Contract No.: HDTRA1-08-C-0021) 164 pages, 2010.
2. Brownell, M., M. Dewoolkar, N.J. Hayden, **D.M. Rizzo** and D. Porter, *Interactions of contaminating agents with building materials: Literature Review and preliminary experiments*, submitted to Los Alamos National Laboratory, 45 pages, 2006.
3. **Rizzo, D.M.** and D.E. Dougherty, *Rapid tools for joint inversion and imaging*, Final Report Prepared for the US Department of Energy Under Award No. DE-FG02-97ER82485, 2000.
4. Adler, J.L., **D.M. Rizzo** and S.G. Ritchie, *SITE Site Investigation and Training Expert Advisor*, Version 2.0 User's Manual and Reference Guide available through the California Department of Transportation, Sacramento, CA, 1990.
5. **Rizzo, D.M.**, S.I. Khan and S.G. Ritchie, *TANKS Tank Advisor and Knowledge System*, Version 2.0 User's Manual and Reference Guide, Institute of Transportation Studies, University of California, Irvine, 1990.

REFEREED CONFERENCE PROCEEDINGS (WITH PRESENTATIONS)**2012**

1. Fytilis, N. and **D.M. Rizzo**, “Bayesian Characterization of the Stream Habitat Community Structure using Genetic (PCR) Data”, *Proc. XIX International Computational Methods in Water Resources*, University of Illinois at Urbana-Champaign in Urbana, Illinois, June 17-21, 2012.
2. Krupa, J.S., S. Chatterjee, E. Eldridge, **D.M. Rizzo** and M.J. Eppstein, “Feature Selection for Classification: A Plug-In Hybrid Vehicle Adoption Application”, *Genetic and Evolutionary Computation Conference (GECCO)*, p. 1111-1118, Philadelphia, PA, July 7-11, 2012.
3. Manukyan, N., M.J. Eppstein, J.D. Horbar, K.A. Leahy, M.J. Kenny, S. Mukherjee and **D.M. Rizzo**, “Evolutionary Mining for Multivariate Associations in Large Time-varying Dataset: A Healthcare Network Application”, *Genetic and Evolutionary Computation Conference (GECCO)*, Philadelphia, PA, July 7-11, 2012.

2010

4. Hayden, N.J., **D.M. Rizzo**, M.M. Dewoolkar, L. Oka and M.D. Neumann, “Incorporating Systems Thinking and Sustainability within the Civil and Environmental Engineering Curriculum at UVM”, *Advances in Engineering Education*, St. Lawrence Section Mtg., Rochester Institute of Technology, March 26-27, 2010.
5. Besaw, L.E., **D.M. Rizzo**, M.J. Eppstein, M.B. Pellon, D.K. Grover and J.S. Marshall, “Up-scaling Agent-Based Discrete-Choice Transportation Models using Artificial Neural Networks”, *Transportation Research Board (TRB) 88th Annual Meeting*, Session 684 (10-3130) Washington, D.C., January 10-12, 2010.

6. Pellon, M.B., M.J. Eppstein, L.E. Besaw, D.K. Grover, **D.M. Rizzo** and J.S. Marshall, “An Agent-Based Model for Estimating Consumer Adoption of Plug-in Hybrid Vehicle Technology”, *Transportation Research Board (TRB) 88th Annual Meeting*, Session 684 (10-3303) Washington, D.C., January 10-12, 2010.
7. Hu, L., C. Savidge, **D.M. Rizzo**, N.J. Hayden, M. Dewoolkar, L. Meador and J.W. Hagadorn, “Characterization of Porous Media in Agent Transport Simulation: Examining building materials using X-ray CT scanner”, *3rd International Workshop on X-Ray CT for Geomaterials*, New Orleans, Louisiana, March 2010.

2009

8. Hu L.B., C.R. Savidge, **D.M. Rizzo**, N.J. Hayden and M.M. Dewoolkar, “Characterization of Porous Materials in Agent Transport Simulation”, *The 3rd International Workshop on X-ray CT for Geomaterials*, New Orleans, LA, 8pp. Spring 2009.

2008

9. Lee M, A. Drizo, **D.M. Rizzo**, G.K. Druschel, N.J. Hayden and E. Twohig, “Treating high BOD and P concentrated dairy effluent with pilot-scale integrated and hybrid constructed wetlands”, *11th International Conference on Wetland Systems for Water Pollution Control*, International Water Association Conference Proceedings, Indore, India, November 2008.
10. Pechenick, A. and **D.M. Rizzo**, “Using Artificial Neural Networks to Predict Local Disease Risk Indicators with Multi-Scale Weather, Land and Crop Data”, A.E Rizzoli (ed.), *International Congress on Environmental Modelling and Software*, M. Sanchez-Marre, J. Bejar, J. Comas, A.E. Rizzoli and G. Guariso (Eds.), International Environmental Modelling and Software Society, Barcelona, Spain, July 2008.
11. Kollat, J.B., P.M. Reed, and **D.M. Rizzo**, “Evaluation of a Bias Aware Ensemble Kalman Filter Using a Scaled Aquifer Transport Experiment”, R. W. Babcock Jr. and R. Walton (Eds.), *ASCE 2008 World Water & Environmental Resources Congress*, Environmental and Water Resources Institute, Honolulu, HI, May 2008.
12. **Rizzo, D.M.**, M. Paul, C.F. Farmer, P.N. Larson, J. Matt, K.M. Sentoff, I.M. Vazquez-Spickers and A.R. Pearce, “The Barrett Scholarships: Sponsoring Undergraduate Student Research in Environmental Engineering to Encourage Professional Problem Solving and Communication”, R. W. Babcock Jr. and R. Walton (Eds.), *ASCE 2008 World Water & Environmental Resources Congress*, Environmental and Water Resources Institute, Honolulu, HI, May 2008.
13. Besaw, L.E., K. Pelletier, **D.M. Rizzo**, L.A. Morrissey and M. Kline, “Advances in Watershed Management and Fluvial Hazard Mitigation using Artificial Neural Networks and Remote Sensing”, R. W. Babcock Jr. and R. Walton (Eds.), *ASCE 2008 World Water & Environmental Resources Congress*, Environmental and Water Resources Institute, Honolulu, HI, May 2008.
14. Pearce, A.R., P.J. Mouser, G.K. Druschel and **D.M. Rizzo** (2008), “Mapping Aquifer Zones Based on Microbial Ecology and Geochemistry in a Landfill Leachate Plume with a Self Organizing Map”, R. W. Babcock Jr. and R. Walton (Eds.), *ASCE 2008 World Water & Environmental Resources Congress*, Environmental and Water Resources Institute, Honolulu, HI, May 2008.

2007

15. Besaw, L.E. and **D.M. Rizzo**, “Counterpropagation Neural Network for Stochastic Conditional Simulation: An Application with Berea Sandstone”, *Seventh IEEE International Conference on Data Mining*, N. Ramakrishnam, O. Zaiane, Y. Shi, C. Clifton and X. Wu (Eds.), Omaha, NE DOI:10.1109/ICDMW.2007, 34, October 2007.
16. Frolik, J., F. Sansoz, **D.M. Rizzo** and A. Sadek, “A Multidisciplinary Curricular Effort Incorporating Wireless Sensors”, *ASEE Annual Conference: Multidisciplinary Engineering Division*, Honolulu, HI, June 2007.
17. Li, Z., **D.M. Rizzo** and N.J. Hayden, “Using an Extended Kalman Filter with a Flow and Transport Model to Identify Contaminant Source Locations”, *ASCE World Environmental & Water Resources Congress*, C. Kabblas (Ed.), Tampa FL, May 2007.
18. Besaw, L.E., **D.M. Rizzo** and M. Kline, “Artificial Neural Networks for the Prediction of Channel Geomorphic Condition and Stream Sensitivity”, *ASCE World Environmental & Water Resources Congress*, C. Kabblas (Ed.), Tampa FL, May 2007.
19. Clark, J.S., **D.M. Rizzo**, M.C. Watzin and W.C. Hession, “Evaluating the Influence of Geomorphic Conditions on Instream Fish Habitat using Hydraulic Modeling and Geostatistical Analyses”, *6th International Conference on Ecohydraulics*, New Zealand, February 2007.

2006

20. Li, Z., **D.M. Rizzo** and N. J. Hayden, "Utilizing Artificial Neural Networks to Backtrack Source Location", *International Summit on Environmental Modeling & Software*, A. Voinov, A.J. Jakeman and A.E. Rizzoli (Eds.), Burlington, VT, July 2006.
21. **Rizzo, D.M.** and L. Besaw, "Parameter Estimation and Conditional Simulation using Artificial Neural Networks", *International Summit on Environmental Modeling & Software*, A. Voinov, A.J. Jakeman and A.E. Rizzoli (Eds.), Burlington, VT, July 2006.
22. Clark, J.S., W.C. Hession, **D.M. Rizzo**, J.P. Liable and M.C. Watzin, "Two-Dimensional Hydraulic Modeling Approach to Linking Stream Morphology and Aquatic Habitat Quality", *International Summit on Environmental Modeling & Software*, A. Voinov, A.J. Jakeman and A.E. Rizzoli (Eds.), Burlington, VT, July 2006.
23. Besaw, L.E., **D.M. Rizzo** and P.J. Mouser, "Application of an Artificial Neural Network for Analysis of Subsurface Contamination at the Schuyler Falls Landfill, NY", *International Summit on Environmental Modeling & Software*, A. Voinov, A.J. Jakeman and A.E. Rizzoli (Eds.), Burlington, VT, July 2006.
24. Langevin, H.M., Y. Bar-Yam, **D.M. Rizzo** and J.R. Fox, "Science Meets Eastern Medicine: Connective Tissue, "Qi" and Network Connectivity", *International Conference on Complex Systems (ICCS2006)*, New England Complex Systems Institute, Cambridge, MA, June 2006.
25. Besaw, L.E., **D.M. Rizzo** and P.J. Mouser, "Parameter Estimation using an Artificial Neural Network to incorporate Multiple Types of Data", *ASCE 2006 World Water & Environmental Resources Congress*, Randall Graham (ed.), Omaha, NE, May 2006.
26. Besaw, L.E. and **D.M. Rizzo**, "Parameter Estimation using a Counterpropagation Artificial Neural Network with Multiple Types of Data", *ASCE 2006 GeoCongress: Geotechnical Engineering the Information Technology Age*, D.J. DeGroot, J.T. DeJong, and D. Frost (eds.), Atlanta, GA, February 2006.
27. Li, Z., **D.M. Rizzo**, N.J. Hayden and L. Stevens, "Using Geostatistics and Artificial Neural Networks to Determine the Location of a Contaminant Source", *ASCE 2006 GeoCongress: Geotechnical Engineering the Information Technology Age*, D.J. DeGroot, J.T. DeJong, and D. Frost (eds.), Atlanta, GA, February 26 – March 1, 2006.

2005

28. Mouser, P.J., **D.M. Rizzo** and L. Besaw, "Improving Site Characterization and Classifying Attenuation Processes using Microbiological Profiles, Geochemistry, and Artificial Neural Networks, from Landfill-Leachate Contaminated Groundwater", *ASCE 2005 World Water & Environmental Resources Congress*, R. Walton (ed.), Anchorage, AK, May 2005.

2004

29. Doris, J.J., K. Underwood and **D.M. Rizzo**, "A Watershed Classification System using Hierarchical Artificial Neural Networks for Diagnosing Watershed Impairment at Multiple Scales", *ASCE 2004 World Water & Environmental Resources Congress*, Salt Lake City, UT, June 2004.
30. Mouser, P.J. and **D.M. Rizzo**, "Long-term Monitoring Implications using Combined Geostatistics of Hydrochemistry and Microbial Community Fingerprinting at Waste Disposal Sites", *ASCE 2004 World Water & Environmental Resources Congress*, Salt Lake City, UT, June 2004.
31. Mark, C., A.W. Sadek and **D.M. Rizzo**, "Predicting Experienced Travel Time with Neural Networks: A PARAMICS Simulation Study", *Proceedings of the 7th International IEEE Conference on Intelligent Transportation Systems*, Washington, D.C., 2004.

2003

32. **Rizzo, D.M.** and S. Conklin, "Using Artificial Neural Networks to Predict Local Disease Risk Indicators with Multi-Scale Weather, Land & Crop Data", *ASCE 2003 World Water & Environmental Resources Congress*, Philadelphia, PA, June 2003.
33. Underwood, K. and **D.M. Rizzo**, "Classification ANNs to Support Modeling of Sediment Transport in Geomorphically Unstable Alluvial Channels", *ASCE 2003 World Water & Environmental Resources Congress*, Philadelphia, PA, June 2003.
34. Weber, E.P., L. Stevens and **D.M. Rizzo**, "The Ecology and Evolution of Local Adaptation", *Genetic and Evolutionary Computation Conference GECCO*, Chicago, IL, July 2003.

35. Dougherty, D.E., S. Young, **D.M. Rizzo** and T. Budge, "Multiple Objective Optimized Design of a Groundwater Extraction Network", *ASCE 2003 World Water & Environmental Resources Congress*, Philadelphia, PA, June 2003.
36. Dougherty, D.E., S. Young, **D.M. Rizzo** and T. Budge, "Bayesian Approach to Support Design of a Groundwater Long Term Monitoring Plan", *ASCE 2003 World Water & Environmental Resources Congress*, Philadelphia, PA, June 2003.

2002

37. Yu, M., **D.M. Rizzo** and D.E. Dougherty, "Devising Groundwater Mitigation Strategies for Different Objectives using ECP Optimization", *Proc. Congress of International Association for Hydraulic Research*, vol. 29, Theme A, 209-214, September 2001.
38. **Rizzo, D.M.**, D.E. Dougherty and M. Yu, "Devising Groundwater LTM Strategies for Different Objectives using Optimization", Bridging the Gap, *Proc. ASCE 2001 Joint World Water & Environmental Resources Congress*, American Society of Civil Engineers, DOI: 10.1061/40569(2001)59, Orlando, FL, May 2001.
39. **Rizzo, D.M.**, D.E. Dougherty and M. Yu, "An Adaptive Monitoring and Operations System (aLTMOs™) for Environmental Management", *Proc. ASCE 2000 Joint Conference on Water Resources Engineering and Water Resources Planning & Management*, Minneapolis, MN, August 2000.
40. Yu, M., **D.M. Rizzo** and D.E. Dougherty, "Multi-period Objectives and Groundwater Remediation using SAMOA: Tandem Simulated Annealing and Extended Cutting Plane Method for Containment and Cleanup", *Proc. XII International Computational Methods in Water Resources*, L.R. Bentley, J.F. Sykes, C.A. Brebbia, W.G. Gray, G.F. Pinder (eds.), A.A. Balkema Pubs., Alberta, Calgary, June 2000.
41. Eppstein, M.J. and **D.M. Rizzo**, "Rapid 3-D Bayesian Site Characterization: A Tandem Strategy", *Proc. XII International Computational Methods in Water Resources*, L.R. Bentley, J.F. Sykes, C.A. Brebbia, W.G. Gray, G.F. Pinder (eds.), A.A. Balkema Publishers, Alberta, Calgary, June 2000.
42. Sullivan, P.A., **D.M. Rizzo** and D.E. Dougherty, "Hierarchical Artificial Neural Networks for Regionalized Cokriging", *Proc. XII International Conference on Computational Methods in Water Resources*, Vol. I, Crete, 1998.
43. **Rizzo, D.M.** and D.E. Dougherty, "Solving Groundwater Inverse Problems Using Artificial Neural Networks", in (Aldama *et al.*, Eds.) *Proc. XI Intl. Conference on Computational Methods in Water Resources*, Vol.1, Computational Mechanics Publications, 313-319 Cancun, Mexico, 1996.
44. **Rizzo, D.M.** and D.E. Dougherty, "Design Optimization for Multiple Management Groundwater Remediation", Computational Mechanics Publications, South Hampton, SO40 7AA (UK), pp.313-319, 1996.
45. **Rizzo, D.M.**, T.P. Lillys and D.E. Dougherty, "Comparisons of Site Characterization Methods Using Mixed Data", in (Shackelford, *et al.*, Eds.) *Uncertainty in the Geologic Environment: From Theory to Practice*, Vol. 1, ASCE Proc. for the 1996 GED Specialty Conference, 167-179, Madison, Wisconsin, 1996.
46. **Rizzo, D.M.** and D.E. Dougherty, "Application of Artificial Neural Networks for Site Characterization Using 'Hard' and 'Soft' Information", in (Peters *et al.*, eds.) *Proc. X International Computational Methods in Water Resources*, Vol. 1, Kluwer Academic Publishers, 793-799, Heidelberg, Germany, 1994.
47. **Rizzo, D.M.**, D.E. Dougherty and T.P. Lillys, "Site Characterization at LLNL using Artificial Neural Networks", *Water Policy and Management: Solving the Problems*, *Proc. of the 21st Annual ASCE Conference of Water Resources Planning and Management Division*, 250-253, Denver, CO, May 1994.
48. **Rizzo, D.M.** and D.E. Dougherty, "Characterization of Porous Media using 'Hard' and 'Soft' Information", *IX International Computational Methods in Water Resources, Vol. I: Numerical Methods in Water Resources*, T.F. Russell, R.E. Ewing, C.A. Brebbia, W.G. Gray, and G.F. Pinder (eds.), CMP/Elsevier, 449-455, Denver, CO, 1992.
49. Ritchie, S.G., **D.M. Rizzo** and J.L. Adler, "Knowledge Acquisition for Management of Hazardous Waste Sites in the California Department of Transportation", *Proc. for the TRB Annual Meeting*, Vail, CO, 1991.

INVITED TALKS

1. **Rizzo, D.M.**, "Artificial Neural Networks and Multi-Objective Bayesian Optimization", Sandia National Laboratory, Albuquerque, New Mexico, July 27, 2011.

2. **Rizzo, D.M.**, “Complex Systems Tools for Describing Spatiotemporal Changes in Microbial Community Dynamics in Freshwater Environments”, NSF Vermont EPSCoR Conference on Infrastructure Development for Research & STEM Education: Focus on the Lake Champlain Basin, Burlington, VT, June 2-3, 2011.
3. **Rizzo, D.M.** and P.J. Mouser, “Complex Systems Tools for Describing Spatiotemporal Changes in Microbial Community Dynamics in Subsurface Environments”, Rensselaer Polytechnic Institute, The University at Albany, March 9, 2011.
4. **Rizzo, D.M.**, “Mining Geospatial Datasets using Geostatistics and Artificial Neural Networks”, Montana State University, Billings, MT, August 6, 2010.
5. **Rizzo, D.M.**, “Mining Surface and Subsurface Hydrochemical Datasets using Geostatistics and Artificial Neural Networks”, Universidad de San Carlos de Guatemala, Ciudad de Guatemala, Guatemala, June 6, 2010.
6. **Rizzo, D.M.**, “Using Artificial Neural networks to Draw Dirty Pictures”, St. Mikes College, Essex, VT, February 1, 2010.
7. **Rizzo, D.M.**, “Compromising Positions: Multi-objective Heuristic Optimization”, Michigan Tech, Houghton, MI, April 6, 2009.
8. **Rizzo, D.M.**, “Seeing the Forest for the Trees: Identifying Model Structure and Scale Dependencies in Complex Systems”, University of Nebraska, Lincoln, NE, March 9, 2009.
9. **Rizzo, D.M.**, “Scale Dependencies in Complex Environmental Systems”, 2nd Environmental Protection Bureau Delegation from Chongqing, China, Burlington, VT, December 5, 2008.
10. **Rizzo, D.M.**, “Identifying Model Structure and Scale Dependencies in Complex Systems”, NSF Vermont EPSCoR Water Dynamics Workshop, Burlington, VT, November 11, 2008.
11. Dewoolkar, M. M., N.J. Hayden, **D.M. Rizzo**, D. Porter, M. Brownell, and D. Yang, “Contaminant Transport in Common Porous Materials”, DTRA-CBT-TAS Computational Chemistry Workshop, Maui, HI, August 14, 2007.
12. **Rizzo, D.M.**, “Identifying Model Structure and Scale Dependencies in Complex Systems”, NSF Vermont EPSCoR Conference (5-yr summary of iRWE initiative), Burlington, VT, March 28, 2007.
13. Dewoolkar, M. M., N.J. Hayden, **D.M. Rizzo**, D. Porter, M. Brownell and D. Yang, “Contaminant Transport in Buildings Briefing”, Defense Threat Reduction Agency, Ft. Belvoir, VA, October 18, 2006.
14. **Rizzo, D.M.**, “Adaptive Prediction of Local Disease Risk Indicators using Multi-scale Weather, Land and Crop Data”, Water Resources Engineering Seminar, Penn State, University Park, PA, April 14, 2006.
15. **Rizzo, D.M.**, “Drawing Dirty Pictures using Geostatistics and Artificial Neural Networks”, Plant and Soil Science Seminar, University of Vermont, Burlington. January 20, 2006.
16. **Rizzo, D.M.**, “Identifying Model Structure and Scale Dependencies in Biocomplex Systems”, National Science Foundation and the Chinese Academy of Sciences Symposium: Ecological Complexity and Ecosystem Services, University of Vermont, Burlington, VT, October 21-22, 2005.
17. **Rizzo, D.M.**, “Adaptive Parameter Estimation using Sparse Data”, US Army Cold Regions Research & Engineering Lab (CRREL), Hanover, NH, September 8, 2005.
18. **Rizzo, D.M.** (with M. Frey, and K. Ockunzzi), “Careers in Academia versus Industry”. Panel Discussion sponsored by the North Country and UVM Sections of Society of Women Engineers. University of Vermont, Burlington, VT, October 26, 2005.
19. Mouser, P.J. and **D.M. Rizzo**, “Comparison of Site Characterization Methods using Microbiological Profiles.” Center for Environmental Biotechnology, University of Tennessee, Knoxville, November 2004.
20. **Rizzo, D.M.** and P.J. Mouser, “Data Sufficiency Analysis before and after Detection of a Leachate Plume from a Municipal Landfill in Northeastern New York State.” SERDP Conference on Accelerating Site Close Out, Improving Performance, and Reducing Cost Through Optimization, Dallas, TX, June 2004.
21. **Rizzo, D.M.**, “Devising Groundwater Long-Term Monitoring (LTM) Strategies for Different Objectives Using Optimization”, The Department of Environmental Engineering Fall 2003 Seminar Series, University of Massachusetts, Amherst, MA, November 21, 2003.

22. **Rizzo, D.M.**, L. Stevens and E. Weber, "Solving Groundwater Inverse Problems using Genetic Algorithms." Interdisciplinary Workshop in Evolutionary Computing, Burlington, VT, May 2003.
23. **Rizzo, D.M.**, "Using Artificial Neural Networks to Predict Local Disease Risk Indicators with Multiple Scale Weather, Land and Crop Data", The Department of Earth Sciences Graduate Seminar Series, Dartmouth College, Hanover, NH, May 20, 2003.
24. **Rizzo, D.M.**, "Field Application of Long-Term Monitoring Designs", Graduate Contaminant Hydrogeology Class, Dartmouth College, Hanover, NH, May 20, 2003.
25. **Rizzo, D.M.**, Invited Speaker for the Society of Women Engineers professional dinner, Co-sponsored by the Norwich University and UVM, Burlington, VT, November 2003.
26. **Rizzo, D.M.**, "Nontraditional Careers for Women: Celebrating the Road Less Traveled", Women's Economic Opportunity Conference, Vermont Technical College, Randolph Center, September 2002.
27. **Rizzo, D.M.**, "The Art of Public Speaking", Girls Rule 2000 conference, Stoweflake Resort, Stowe VT, November 2000.
28. **Rizzo, D.M.**, "Optimization, Characterization, and Monitoring Technologies for Environmental Management", HydroGeoLogic, Inc. Brown Bag Seminar, Herndon, VA, September 1999.
29. **Rizzo, D.M.**, "Decision Making under Uncertainty: Energy and Environmental Models", The Institute for Mathematics and Its Applications (IMA) Workshop, The University of Minnesota, July 1999.
30. **Rizzo, D.M.**, "Teaching Neural Networks to Draw Dirty Pictures or Site Characterization using Artificial Neural Networks", Earth Science Joint Colloquium Series, Rensselaer Polytechnic Institute, The University at Albany, March 1996.
31. **Rizzo, D.M.**, "Site Characterization using 'hard' and 'soft' data", First Annual Meeting of the Center for Groundwater Remediation and Design at the University of Vermont, Essex Junction, VT, May 1994.
32. Dougherty, D.E. and **D.M. Rizzo**, "Design optimization for subsurface characterization and management", American Association of Petroleum Geologists, Annual Convention, San Diego, CA, May 19-22, 1996.
33. **Rizzo, D.M.**, "Multiple Management Period Remediation Designs using Simulated Annealing", FOCUS Conference on Eastern Regional Ground Water Issues, National Ground Water Association, Burlington, Vermont, October 3-5, 1994.
34. **Rizzo, D.M.**, "Optimal Groundwater Remediation Designs using Simulated Annealing and Neural Network Kriging", Fluid Flow and Seismology Seminar Series, Los Alamos National Lab, TA 3, SM 100, May 1993.
35. **Rizzo, D.M.** and D.E. Dougherty, "Optimal Groundwater Remediation Using Simulated Annealing and Artificial Neural Networks", Lawrence Livermore National Laboratory, Livermore, CA, June 1991.
36. **Rizzo, D.M.**, "TANKS: Tank Advisor and Knowledge System", TRB Annual Meeting Vail, CO, January 1990.
37. **Rizzo, D.M.**, "Multiphase Transport of DBCP in Unsaturated Soils", Department of Civil Engineering, University of California, Irvine, CA, November 1989.
38. **Rizzo, D.M.**, "SITE and TANKS: Two Knowledge-Based Expert Systems for Management of Hazardous Waste Sites", WTS National Conference, San Francisco, CA, May 1989.
39. **Rizzo, D.M.**, "Optimal Groundwater Remediation using Artificial Neural Networks", Second Annual Meeting of the Research Center for Groundwater Remediation Design, University of Vermont, Essex Junction, Vermont, May 1995.
40. Dougherty, D.E. and **D.M. Rizzo**, "Large-Scale Constrained Combinatorial Optimization for Environmental Restoration", Workshop on Algorithms for Constrained Approximation and Optimization, Sponsored by the College of Engineering and Mathematics, Stowe, Vermont, May 23-26, 1993.

CONFERENCE ABSTRACTS (WITH PRESENTATIONS OR POSTERS)

2013

1. Lamb, R. D., N. Fytilis, B.L. Kerans, L. Stevens, and D.M. Rizzo, "Disease Patterns from Field Assays: Linkages Between Tubificid Community Composition and Myxobolus Cerebralis Transmission, the Cause of Salmonid

Whirling Disease”, *Society for Freshwater Science Annual Meeting (formerly NABS)*, Jacksonville, FL, USA, May 19–23, 2013.

2. Pechenick, A., **D.M. Rizzo**, L.A. Morrissey, K.M. Garvey, K. Underwood and B.C. Wemple, “A Multi-Scale Approach to Assess the Hydrological Connectivity of Road and Stream Networks”, NEARC Northeast Arc Users Group Conference, Amherst, MA, May 14, 2013.
3. Garvey, K.M., L.A. Morrissey, **D.M. Rizzo**, K. Underwood, B.C. Wemple, M. Kline, “Estimating channel erosion and deposition using multi-data LIDAR and orthophotography: a case study in the Browns River, Chittenden County, VT, *24th Annual Northeastern Nonpoint Source Conference*, Burlington, VT, May 14-15, 2013.
4. Druschel, G., N. Shufelt, L. Lee, A. Schroth, J. Hill, **D.M. Rizzo**, C. Giles and M. Watson, “Dynamic redox oscillations in freshwater lake sediments driving phosphate flux through iron and manganese oxide transformations”, *245th ACS (American Chemical Society) National Meeting & Exposition*, New Orleans, LA, April 7-11, 2013.

2012

5. Fytilis, N. and **D.M. Rizzo**, “Coupling Self-Organizing Maps with a Naive Bayesian Classifier”, *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2012.
6. Hanley, J., S. Stevens-Goodnight, S. Kulkarni, D. Bustamante, N. Fytilis, P. Goff, C. Monroy, L.A. Morrissey, L. Orantes, L. Stevens, P. Dorn, D. Lucero, J. Rios and **D.M. Rizzo**, “Training Systems Modelers through the Development of a Multi-scale Chagas Disease Risk Model”, *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2012.
7. Pechenick, A., **D.M. Rizzo**, L.A. Morrissey, K.M. Garvey, K. Underwood and B.C. Wemple, “Hydrological connectivity of road and stream networks: Implications for channel morphology”, *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2012.
8. Morrissey, L.A., K.M. Garvey, **D.M. Rizzo**, K. Underwood, B.C. Wemple and M. Kline, “Estimating Channel Erosion and Deposition using Multi-date LIDAR and Orthophotography: A Case Study in the Browns River, Chittenden County, VT”, *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2012.
9. Wemple, B., K.M. Garvey, L.A. Morrissey, A. Pechenick, **D.M. Rizzo** and D. Ross. “Assessing the Effects of Unpaved Road Networks on Downstream Water Quality in a Forested, Upland landscape: A Multi-scale Approach”, *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2012.
10. Wemple, B., K.M. Garvey, L.A. Morrissey, A. Pechenick, **D.M. Rizzo** and D. Ross. “Hydrological Connectivity of Road and Stream Networks and Implications for Material Transfer and Channel Morphology”, *Geophysical Research Abstracts*, EGU General Assembly, Vol. 14, EGU2012-13765, Vienna, Austria, April 26, 2012.
11. Lamb, R., B. Kerans, N. Fytilis, L. Stevens and **D.M. Rizzo**. “Non-host Tubificids Alter the Transmission Dynamics of *Myxobolus cerebralis*, the Causative Agent of Salmonid Whirling Disease”, *Society for Freshwater Science Annual Meeting (formerly NABS)*, Louisville, KY, May 20-24, 2012.

2011

12. Manukyan, N., M.J. Eppstein and **D.M. Rizzo**, “Improved Cluster identification and Visualization in high-dimensional Data using Self-Organizing Maps”, *EOS Transactions*, American Geophysical Union, Abstract H34D-07 Fall Meeting, San Francisco, CA, December 2011.
13. Fytilis N., R. Lamb, B. Kerans, L. Stevens and **D.M. Rizzo**, “Examination of the relationship between host worm community structure on transmission of the parasite, *Myxobolus cerebralis* by developing of taxon-specific probes for multiplex qPCR to identify worm taxa in stream communities”, *EOS Transactions*, American Geophysical Union, Abstract H53D-1451 Fall Meeting, San Francisco, CA, December 2011.
14. Kerans, B., L. Stevens and **D.M. Rizzo**. “Does Biodiversity of the Alternative Host Influence Whirling Disease Dynamics?”, *American Fisheries Society*, Seattle, Washington, 2011.

2010

15. **Rizzo D.M.**, M.M. Dewoolkar, N.J. Hayden, L. Oka and A.R. Pearce, “Analysis of Student Service-Learning Reflections for the Assessment of Transferable-Skills Development”, *EOS Transactions*, American

- Geophysical Union, Abstract ED53B-06 (Oral Presentation), Fall Meeting, San Francisco, CA, December 2010.
16. Pearce, A.R., M.C. Watzin, P.J. Mouser, L. Stevens, N.J. Hayden, G. Druschel and **D.M. Rizzo**, “Using Self-Organizing Maps to explore hydrochemical and biological datasets”, *EOS Transactions*, American Geophysical Union, Abstract H11E-0865, Fall Meeting, San Francisco, CA, December 2010.
 17. Fytilis N., R. Lamb, L. Stevens, L.A. Morrissey, B. Kerans and **D.M. Rizzo**, “Linking spatially distributed biogeochemical data with a two-host life-cycle pathogen: A model of whirling disease dynamics in salmonid fishes in the Intermountain West”, *EOS Transactions*, American Geophysical Union, Abstract H11D-0837, Fall Meeting, San Francisco, CA, December 2010.
 18. Fytilis N., S. Wyman, R. Lamb, L. Stevens, B. Kerans and **D.M. Rizzo**, “Training the next generation of scientists: Modeling Infectious Disease and Water Quality of Montana Streams”, *EOS Transactions*, American Geophysical Union, Abstract ED13A-0603, Fall Meeting, San Francisco, CA, December 2010.
 19. Pearce, A., M.C. Watzin, G. Druschel, L. Stevens and **D.M. Rizzo**, “Exploring contributing factors to cyanotoxin production in Missisquoi Bay, Lake Champlain using a modified Self-Organizing Map”, *The Lake Champlain 2010: Our Lake, Our Future*, Lake Champlain Research Consortium, Burlington, VT, June 7-8, 2010.
 20. Mathon B.R., N. Fytilis, L. Stevens, M. Kline, G. Alexander and **D.M. Rizzo**, “Using a generalized regression neural network to link geomorphic and habitat assessments in the Missisquoi River watershed”, *The Lake Champlain 2010: Our Lake, Our Future*, Lake Champlain Research Consortium, Burlington, VT, June 7-8, 2010.
 21. Garvey, K.M., L.A. Morrissey, **D.M. Rizzo** and M. Kline, Streambank Erosion in Chittenden County, VT: Application of Very High Resolution Remote Sensing and GIS Modeling, *Lake Champlain 2010 Conference: Our Lake, Our Future*, Lake Champlain Research Consortium, Burlington, VT, June 7-8, 2010.
 22. **Rizzo D.M.**, N.J. Hayden, M.M. Dewoolkar, “Analysis of Student Service-Learning Reflections for the Assessment of Transferrable-Skill Development” 2010 Forum on Philosophy, Engineering & Technology, Colorado School of Mines, Golden, CO, May 2010.
 23. Garvey, K.M., L. A. Morrissey, **D.M. Rizzo**, and M. Kline, Quantifying Sediment Loading due to Streambank Erosion in Impaired and Attainment Watersheds in Chittenden County, VT, *Vermont Geological Society Winter Meeting*, Norwich University, Northfield, Vermont, February 6, 2010.
 24. Butryn, R.S., D.L. Parrish, **D.M. Rizzo** and B.C. Wemple, “Summer temperatures and the distribution of brook trout in Vermont streams”, *Northeast Fish and Wildlife Conference*, Newton, MA, April 2010.

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25. **Rizzo D.M.**, N.J. Hayden, M.M. Dewoolkar, M. Neumann and S. Lathem, “Curricular Reform: Systems Modeling and Sustainability in Civil and Environmental Engineering at the University of Vermont”, *EOS Transactions*, American Geophysical Union, 90 (52), Abstract ED23A-0541, San Francisco, CA, Fall Meeting, December 2009.
26. Townsend L., C. Savidge, L. Hu, **D.M. Rizzo**, N.J. Hayden and M. Dewoolkar, “Studying the Variation in Gas Permeability of Porous Building Substrates”, *EOS Transactions*, American Geophysical Union, 90 (52), Abstract NS23A-1100, Fall Meeting, San Francisco, CA, December 2009.
27. Fytilis N., B. Mathon, **D.M. Rizzo**, L. Stevens and L.A. Morrissey, “Integrating geomorphic and habitat assessments to classify streams using artificial neural networks”, *EOS Transactions*, American Geophysical Union, 90 (52), Abstract H51G-0850, Fall Meeting, San Francisco, CA, December 2009.
28. Stevens L. and **D.M. Rizzo**, “A Mentoring Program in Environmental Science for Underrepresented Groups”, *EOS Transactions*, American Geophysical Union, 90 (52), Abstract ED53B-0537, Fall Meeting, San Francisco, CA, December 2009.
29. Portenga, E.W. P.R. Bierman and **D.M. Rizzo**, “A Global Summary and Analysis of Exposed Bedrock Erosion Rates Estimated using In Situ ¹⁰Be”, *Geological Society of America Abstracts with Programs*, Vol. 41, No. 7, Session No. 244: Geomorphology (Poster), Paper No. 244-1, Portland OR, October 21, 2009.
30. Smith, L.G., P.R. Bierman, G.K. Druschel, A. Pearce, **D.M. Rizzo**, M. Watzin and B. Wemple, “An Interdisciplinary Approach to Teaching Watershed Field Science”, *Geological Society of America Abstracts*

with *Programs*, Vol. 41, No. 7, Session No. 113: Field Geology Education—Historical Perspectives and Modern Approaches (Poster), Portland OR, October 19, 2009.

31. Hackett, W.R., P.R. Bierman and **D.M. Rizzo**, “Increasing Precipitation, Runoff, Forests, and Pavement over the Last 70 Years, the Winooski River Basin”, *Geological Society of America Abstracts with Programs*, Session No. 8: Climate Signals in Rivers and Streams, (Presentation), Paper No. 8-3, Portland OR, October 2009.
32. Hackett, W.R., P.R. Bierman, **D.M. Rizzo** and L.E. Besaw, Increasing precipitation and runoff interact with land use change over the last 70 years in the Winooski River basin, northern Vermont, WRCC annual meeting, Amherst, Massachusetts, 2009.
33. Butryn, R.S., D.L. Parrish, **D.M. Rizzo**, and B.C. Wemple, “Predicting brook trout distribution with thermal stress events”, *139th Annual Meeting of the American Fisheries Society*, Nashville, TN, Aug. 31- September 3 2009.

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34. Besaw, L.E., **D.M. Rizzo**, P.R. Bierman and W.R. Hackett, “Daily stream flow forecasting with Artificial Neural Networks: Application in the Winooski River Basin, Vermont”, *EOS Transactions*, American Geophysical Union, 89 (53), Abstract H31C-0888, Fall Meeting, San Francisco, CA, December 2008.
35. Pearce, A.R., M.C. Watzin and **D.M. Rizzo**, “Application of a Modified Self-Organizing Map Incorporating Auto-Correlated Data for Hydrochemical Analyses”, *EOS Transactions*, American Geophysical Union, 88(53), Fall Meeting, Abstract H33F-1076, San Francisco, CA, December 2008.
36. Hackett, W.R., P.R. Bierman, **D.M. Rizzo** and L.E. Besaw, “Increasing Precipitation and Runoff Over the Last 70 Years, the Winooski River Basin”, Vermont. Paper Number 301-1. Geological Society of America, Vol. 40, No. 6, p. 468. (POSTER and Invited Presentation), p. 301-1, Houston, TX, October 2008.
37. Butryn, R.S., D.L. Parrish, **D.M. Rizzo** and B.C. Wemple. “Biological relevance of summer stream temperatures for brook trout in Vermont”, *138th Annual Meeting of the American Fisheries Society*, Ottawa, Ontario, Canada, August 17-21, 2008.
38. Besaw, L.E. and **D.M. Rizzo**, “Stochastic Conditional Simulation of Berea Sandstone Geophysical Properties with a Counterpropagation Neural Network”, R. W. Babcock Jr. and R. Walton (Eds.), *ASCE 2008 World Water & Environmental Resources Congress*, Environmental and Water Resources Institute, Honolulu, HI, May 2008.

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39. Besaw, L.E., K. Pelletier, N.J. Hayden, L.A. Morrissey and **D.M. Rizzo**, “Investigating Spatial Interpolation of Light Detection and Ranging Data for Analyzing Fluvial Geomorphic Properties of Streams”, *EOS Transactions*, American Geophysical Union, Abstract 1549, H43E-1667, Fall Meeting, San Francisco, CA, December 2007.
40. Kollat, J.B., P.M. Reed and **D.M. Rizzo**, “Evaluation of a Bias Aware Ensemble Kalman Filter Using a Scaled Aquifer Transport Experiment”, *EOS Transactions*, American Geophysical Union, 88(52) Abstract H23B-1307, Fall Meeting, San Francisco, CA, December 2007.
41. Pearce, A.R., P.R. Bierman, G.K. Druschel, C. Massey, **D.M. Rizzo**, M. Watzin and B. Wemple, “Teaching a New Generation of Students: Developing an Interdisciplinary Watershed Field Course”, *EOS Transactions*, American Geophysical Union, 88(52) Abstract ED14B-0487, Fall Meeting, San Francisco, CA, December 2007.
42. **Rizzo, D.M.**, M. Paul, C.F. Farmer, P.N. Larson, J. Matt, K.N. Sentoff, I. Vasquez-Spickers and A.R. Pearce, “The Barrett Foundation: Undergraduate Research Program for Environmental Engineers and Scientists”, *EOS Transactions*, American Geophysical Union, 88(52) Abstract ED1 ED33B-122, Fall Meeting, San Francisco, CA, December 2007.
43. Pearce, A.R., P.R. Bierman, G.K. Druschel, C. Massey, **D.M. Rizzo**, M.C. Watzin and B.C. Wemple, “Developing a Watershed Field Course to Inspire Interdisciplinary Learning”, *Geological Society of America Abstracts with Programs*, 39(6), p.621, Paper No 233-5, October 2007.
44. Morrissey, L.A. K. Pelletier, **D.M. Rizzo**, L.E. Besaw, M. Kline and B. Cahoon, “High Resolution Remote Sensing to Characterize Geomorphic Stability of River Reaches”, NEARC Northeast Arc Users Group 22nd Annual Conference, Burlington, VT, November 4-7, 2007.

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45. Besaw, L.E., **D.M. Rizzo** and G.N. Boinott, "Spatial Estimation, Data Assimilation and Stochastic Conditional Simulation using the Counterpropagation Artificial Neural Network", *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2006.
46. **Rizzo D.M.**, Z. Li, N.J. Hayden, X. Wei, J. Doris, G.F. Pinder and A.J. Rossman, "Modeling Contaminant Transport in a Large-Scale Groundwater Tank with Media Heterogeneity", *EOS Transactions*, American Geophysical Union, Fall Meeting, San Francisco, CA, December 2006.
47. Mouser, P.J., **D.M. Rizzo**, P. O'Grady, G. Druschel, N.J. Hayden, and L. Stevens, "Using Microbial Community Profiles for Delineation and Long-Term Monitoring of a Landfill Leachate-Contaminated Aquifer", *GSA. T29*. Vol. 38, No. 7, p.28, Philadelphia PA, October 21-25, 2006.
48. Mouser, P.J., **D.M. Rizzo**, P. O'Grady, S. E. Morales, N.J. Hayden, G. Druschel and L. Stevens, "Improved Site Assessment of the Delineation and Attenuation of a Landfill-Leachate Plume using Microbial Community Profiles." The 22nd Annual International Conference on Soils, Sediments and Water, Amherst, MA, October 16-19, 2006.
49. Hayden, N.J., M.D. Neumann, **D.M. Rizzo**, M.M. Dewoolkar and A. Sadek, "Integrating Catamount Community Service-Learning Projects within Civil and Environmental Programs at the University of Vermont", Proceedings of the Northeast Region American Society of Engineering Educators (ASEE) *Engineering Education and Practice for the Global Community*, WPI Worcester MA, March 2006.
50. Dewoolkar, M.M., N.J. Hayden, **D.M. Rizzo**, A. Sadek and M.D. Neumann. "Catamount communities: integrated service-learning projects within civil and environmental engineering curricula at the University of Vermont", National Conference on Service Learning in Engineering, (Poster) Washington, D.C., May 2006.
51. Bentley, L.R., E. Burns, **D.M. Rizzo** and L.E. Besaw, "Characterizing the Paskapoo Formation Aquifer System with Down Hole Geophysics", SEG Hydrogeophysics Workshop, Session I: Characterization of Aquifers and Reservoirs at the Regional Scale, Vancouver, BC Canada, July 31-August 2, 2006.
52. McBride, M., W.C. Hession, **D.M. Rizzo** and D.M. Thompson, "Riparian Vegetation Influences on Stream Channel Dimensions: Key Driving Mechanisms and their Timescales", *EOS Transactions*, American Geophysical Union, Joint Assembly, Session Watershed Management and Policy, Baltimore, MD, May, 2006.
53. Clark, J.S., **D.M. Rizzo**, W.C. Hession, M.C. Watzin and J.P. Laible, "Evaluating the Influence of Geomorphic Conditions on In-stream Fish Habitat using Hydraulic Modeling and Geostatistical Analyses". *EOS Transactions*, American Geophysical Union, Joint Assembly, Hydrology Session H19: Geomorphic and Hydraulic Templates for Ecological Processes in Streams, Baltimore, (Abstract #: 1019, Paper #: H52C-06) MD, May, 2006.

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54. Druschel, G.K., G.W. Lorenson, **D.M. Rizzo**, D. Rogers and K.J. Edwards, "Field, Lab and Computational Tools and Techniques for Linking Geochemical and Microbial Process in a Range of Environments", *Geochimica et Cosmochimica Acta*, (Vol. 69, No. 10, Suppl., pp. 229), May 2005.
55. **Rizzo, D.M.** and L. Besaw, "Conditional Simulation using an Artificial Neural Network.", *EOS Transactions*, American Geophysical Union, (Abstract #: 5163, Paper #: H53F-0542, Poster), Fall Meeting, San Francisco, CA, December 2005.
56. **Rizzo, D.M.** and P.J. Mouser, G. Druschel, P. O'Grady, N.J. Hayden and L. Stevens, "Innovative Methods for Integrating Knowledge for Long-Term Monitoring of Contaminated Groundwater Sites: Understanding Microorganism Communities and their Associated Hydrochemical Environment.", *EOS Transactions*, American Geophysical Union, (Abstract #: 5220, Paper #: H41F-0477, Poster), Fall Meeting, San Francisco, CA, December 2005.
57. McBride, M., D.M. Thompson, T.E. Owen, A.R. Pearce, W.C. Hession and **D.M. Rizzo**, "Riparian Vegetation Effects on Near-Bank Turbulence during Overbank Flows: A Flume Experiment", *EOS Transactions*, American Geophysical Union, (Abstract #: 2602, Paper #: H51H-06), Fall Meeting, San Francisco, CA, December 2005.

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58. **Rizzo, D.M.**, P.J. Mouser and L.E. Besaw, "Improved Site Characterization using Microbiological Community Profiles from Landfill-Leachate Contaminated Groundwater and Artificial Neural Networks", *EOS Transactions*, American Geophysical Union 85(47), Fall Meeting, San Francisco, CA, December 2004.
59. Doris, J.J., **D.M. Rizzo**, and M. Dewoolkar, "Artificial Neural Network Prediction of Soil Swelling/Shrinking", *EOS Transactions*, American Geophysical Union 85(47), (Abstract NS33A-12) Fall Meeting, San Francisco, CA, December 2004.
60. Mouser, P.J. and **D.M. Rizzo**, "Data Sufficiency Analysis and Assessment of Uncertainty Before and After Detection of a Leachate Plume from a Municipal Landfill", *EOS Transactions*. AGU, 85(17), Joint Assembly, Session Near-Surface Geophysics: Applications in Contaminant Hydrology, Montreal, Canada, May 2004.
61. Doris, J.J., **D.M. Rizzo** and M. Dewoolkar, "Estimating Vertical Surface Movement using Artificial Neural Networks", *EOS Transactions*, American Geophysical Union, 85(17), (Abstract H23A-1126) Joint Assembly, Session Near-Surface Geophysics: Applications in Contaminant Hydrology, Montreal, Canada, May 2004.

2000 (or prior)

62. Yu, M., D.E. Dougherty and **D.M. Rizzo**, "ECP and Multi-period Groundwater Remediation Optimization", *EOS Transactions*, American Geophysical Union, Spring Meeting, Washington D.C., May 2000.
63. Yu, M., **D.M. Rizzo** and D.E. Dougherty, "Devising Groundwater mitigation strategies for objectives using ECP Optimization", *XXIX International Association of Hydraulic Engineering and Research*, Beijing, China, September 16-21, 2001.
64. **Rizzo, D.M.** and G.P. Karatzas, "Optimal Design of a Groundwater Remediation System at LLNL using Simulated Annealing and Outer Approximation", Fourth Conference on Mathematical and Computational Issues in the Geosciences, Albuquerque, New Mexico, June 16-19, 1997.
65. **Rizzo, D.M.** and D.E. Dougherty, "Inverting Groundwater-Related Observations for Large-Scale Problems", *EOS Transactions*, American Geophysical Union, Vol. 77, No. 46, p.278, Fall Meeting, San Francisco, CA, December 1996.
66. Dougherty, D.E. and **D.M. Rizzo**, "Multiple Management Period Groundwater Remediation Design", 4th International Water Congress, American Society of Civil Engineers, Anaheim, CA, June 1996.
67. Dougherty, D.E. and **D.M. Rizzo**, "Design Optimization for Subsurface Characterization and Management", AAPG Meeting, San Diego, CA, May 1996.
68. **Rizzo, D.M.** and D.E. Dougherty, "Applying Neural Networks to Groundwater Inverse Problems", SIAM Symposium on Inverse Problems: Geophysical Applications, Yosemite CA, December 16-19, 1995.
69. **Rizzo, D.M.** and D.E. Dougherty, "Optimal Groundwater Remediation Using Simulated Annealing at LLNL", SIAM Conference on Mathematical and Computational Issues in the Geosciences, Houston Texas, April 1993.
70. **Rizzo, D.M.** and D.E. Dougherty, "Neural Kriging", *EOS Transactions*, American Geophysical Union, Vol. 72, No. 44, p.210, Fall Meeting, San Francisco, CA, December 1991.

OTHER CONFERENCE PRESENTATIONS, ABSTRACTS AND POSTERS (SINCE 2004)

1. Fytilis, N., **D.M. Rizzo**, L. Stevens, R. Lamb and B.L. Kerans, "A Bayesian approach to genetic data (PCR) to better understand fish disease dynamics", *2012 UVM Student Research Conference*, Burlington, VT, April 19, 2012.
2. Krupa, J., **D.M. Rizzo** and M.J. Eppstein, "Consumer Survey Data Analysis for Market Adoption of Plug-in Hybrid Vehicles", *2012 UVM Student Research Conference*, Burlington, VT, April 19, 2012.
3. Frolik, J., P.G. Flikkema and **D.M. Rizzo**, "Overcoming the Challenges of Multi-X Collaborations", *AESS's 2011 Annual Meeting and Conference "Confronting Complexity"*, June 23-26, Burlington, VT, 2011.
4. Lodh N., L. Stevens, B.L. Kerans, and **D.M. Rizzo**, "The 18S rRNA and ITS-1 variability of *Myxobolus cerebralis*, the causative parasite of Whirling Disease", *New England Association of Parasitologists*, Massachusetts, USA, November 2010.

5. Lodh, N., L. Stevens, **D.M. Rizzo**, B. Mathon and B. Kerans, "A multiplex qPCR assay to identify tubificid taxa in stream communities". *2010 Vermont National Science Foundation Experimental Program to Stimulate Competitive Research (VT NSF EPSCoR) Annual Conference: Water Systems and Land Use Interactions*. Burlington, VT, 2010.
6. Eppstein, M.J., D.K. Grover, J.S. Marshall and **D.M. Rizzo**, "An agent- based model to study market penetration of plug-in hybrid electric vehicles", *2nd Annual Complexity in Business Conference*, University of Maryland, Washington, D.C., November 12, 2010.
7. Hu, L.B., Savidge, C., **D.M. Rizzo**, N.J. Hayden, M. Dewoolkar, L. Meador and J.W. Hagadorn, "Characterization of porous media in agent transport simulation", *Geox2010: 3rd International Workshop on X-Ray CT for Geomaterials*, New Orleans, LA, November 2010.
8. Fytilis, N., R. Lamb, B. Kerans, L. Stevens and **D.M. Rizzo**, "Identifying Aquatic Worm Taxa using Artificial Intelligence to Determine the Health and Water Quality of Montana Streams". *The New England Association of Parasitologists*. University of Amherst, November 13, 2010.
9. Mathon B. R., N. Fytilis, L. Stevens, M. Kline, G. Alexander and **D.M. Rizzo**, "Classifying Vermont stream habitat condition using a generalized regression neural network", *Vermont Geological Society Winter Meeting: Geologic Controls on River Systems in the Northeastern U.S*, Norwich University, Northfield, Vermont, February 6, 2010.
10. Garvey, K.M., L. A. Morrissey, **D.M. Rizzo** and M. Kline, " Quantifying Sediment Loading due to Streambank Erosion in Impaired and Attainment Watersheds in Chittenden County, VT", *Annual Vermont Geological Society conference*, Norwich VT, February 6, 2010.
11. Hobson, J., S. Desu, A. Krymkowski, D. Lucero, **D.M. Rizzo** and L. Stevens, "Development and parameterization of a model on Chagas disease using STELLA®", *NIMBioS Undergraduate Research Conference*, Knoxville, TN, 2009.
12. Hu, L.B., C.R. Savidge, N.J. Hayden, **D.M. Rizzo** and M.M. Dewoolkar, "Rapid Prediction of Agent Transport in Porous Building Materials", *Defense Threat Reduction Agency (DTRA) Agent Fate Workshop Chemical and Biological Defense Science & Technology Conference*, New Orleans, LA, November 2008.
13. Hu, L.B., C.R. Savidge, M. Brownell, N.J. Hayden, **D.M. Rizzo** and M.M. Dewoolkar, "Prediction of Agent Transport in Porous Materials", Presented at *The Chemical and Biological Defense Science & Technology Conference*, New Orleans, LA, November 2008.
14. Stevens, L., N. Lodh, **D.M. Rizzo**, B. Mathon and B. Kerans, "A DNA based method to identify oligochaete taxa in stream communities in the Madison River, MT, USA". *The Eleventh International Symposium on Aquatic Oligochaete Biology*. Antalya, Turkey, October 5-12, 2009.
15. **Rizzo, D.M.**, M.M. Dewoolkar, M. Neumann, S.A. Lathen and N.J. Hayden, "Curriculum Reform: Systems Modeling and Sustainability within Civil and Environmental Engineering Programs at UVM", 2009 *Symposium on Engineering and Liberal Education: Educating the Stewards of a Sustainable Future*, Union College, Schenectady, N.Y. June 5-6, 2009.
16. Lodh N., L. Stevens, B.L. Kerans and **D.M. Rizzo**, "Genetic Variability of *Tubifex tubifex*, the Intermediate Host of Whirling Disease", *North American Benthological Society*, Wisconsin, USA, May 2009.
17. Hayden, N.J., M.M. Dewoolkar, **D.M. Rizzo**, A. Sadek and M.D. Neumann, (*Poster*) "A Systems Approach for Civil and Environmental Engineering Education: Integrating Systems Thinking, Inquiry-based Learning and Catamount Community Service-learning Projects", *Department Level Reform Path Forward Workshop*, National Science Foundation, Washington, D.C., May 2008.
18. Yu, J., L. Stevens, **D.M. Rizzo**, A. Pearce, L. Morrissey, N. Lodh, and B. Kerans, "Investigating the Spatial Distribution of the Host of *Myxobolus cerebralis*, *Tubifex tubifex* and Other Stream Macro-Invertebrates", *Society of Mathematical Biology Annual Meeting*, Toronto, Canada, August 2008.
19. Barker, J., N. Pollica, D. Lucero, J.C. Pizarro, **D.M. Rizzo**, A. Pearce and L. Stevens, "Classifying Parasitic Infections in Chagas Diseases Vectors Using Artificial Neural Networks", *Society of Mathematical Biology Annual Meeting*, Toronto, Canada, August 2008. (**Best Student Paper Award.**)

20. Baldwin, S., L. Stevens, **D.M. Rizzo** and A. Pechenick, “Automation of triactinomyxon (TAM) counting using several MATLAB functions”, *Society of Mathematical Biology Annual Meeting*, Toronto, Canada, August 2008.
21. Stevens, L. B. Kerans, N. Lodh and **D.M. Rizzo**, “Counterpropagation Neural Networks to Predict Tubificid Biodiversity and Disease Risk. Vermont”, *2008 NSF VT EPSCoR Annual Meeting*, Burlington VT. June 2008.
22. Morrissey, L.A., K. Pelletier, **D.M. Rizzo**, L.E. Besaw, M. Kline and B. Cahoon, “High Resolution Remote Sensing to Characterize Geomorphic Stability of Stream Reaches”, *NEARC (northeast Arc Uses Group)*, November 2007.
23. Hayden, N.J., M.M. Dewoolkar, **D.M. Rizzo**, A. Sadek, M.D. Neumann and L. George, (Poster) “Service-learning Projects in Civil and Environmental Engineering Senior Capstone Design Course”, *Engineering Projects in Community Service Conference (EPICS)*, San Diego, CA, May 2007.
24. George, L., N.J Hayden, M.M Dewoolkar, **D.M. Rizzo**, A. Sadek and M. Neumann, (Poster) “Service-learning Projects in the First-year Introduction to Civil and Environmental engineering Course”, *Engineering Projects in Community Service Conference (EPICS)*, San Diego, CA, May 2007.
25. Dewoolkar, M., N.J. Hayden, **D.M. Rizzo**, A. Sadek and M. Neumann, (Poster) “Catamount Communities: Integrated Service-learning Projects within Civil and Environmental Engineering Curricula at the University of Vermont”, National Conf. on Service Learning in Engineering, Washington DC, May 2006.
26. Clark, J., W.C. Hession, **D.M. Rizzo**, M. Watzin and J. Laible, (Presentation) “Studying Velocity Distribution Influence on Habitat Parameters using Two-Dimensional Modeling of Small Vermont Streams”, *Massachusetts Water Resources Research Center 3rd Annual Conference Research to Practice: Science for Sustainable Water Resources*. University of Massachusetts Amherst, October 2005.
27. Mouser, P.J. and **D.M. Rizzo**, “Improving Site Characterization and Classifying Attenuation Processes using Microbiological Profiles, Geochemistry, and Artificial Neural Networks, from Landfill-Leachate Contaminated Groundwater in New York”, *Lake Champlain Research Consortium*, April 23, Saint Michael’s College, Colchester, VT, 2005.
28. Mouser, P.J., **D.M. Rizzo**, P. O’Grady, L. Stevens, N. Hayden, G.K. Druschel and B. Schwartz, (Presentation) “Innovative Methods for Integrating Knowledge for Long-Term Monitoring of Contaminated Groundwater Sites: Understanding Microorganism Communities and their Associated Hydrochemical Environment”, *Annual Vermont EPSCoR Meeting: People, Ideas & Tools, Three Years of Science & Technology Infrastructure Improvements in Vermont*. Burlington, VT, August 2005.
29. Druschel, G.K., G.L. Lorenson, P.J. Mouser, D. Rogers, H. Oduro, A. Hartmann and **D.M. Rizzo**, “Using voltammetry in the environment to constrain microbial activity”. *Annual Vermont EPSCoR Meeting: People, Ideas & Tools, Three Years of Science & Technology Infrastructure Improvements in Vermont*. Burlington, VT, August 2005.
30. Besaw, L.E., **D.M. Rizzo** and G. Bussod, (Poster) “Subsurface Characterization and Monitoring: Optimization and Integration of Data using Counterpropagation Artificial Neural Networks”, *Vermont EPSCoR: People, Ideas & Tools, Three Years of Science & Technology Infrastructure Improvements in Vermont*. Burlington, VT, August 2005.
31. Li, Z., **D.M. Rizzo**, L. Stevens, N. J. Hayden and X. Wei, (Poster) “Using Geostatistics and Artificial Neural Networks to Determine the Location of Contaminant Sources”, *Vermont EPSCoR: People, Ideas & Tools, Three Years of Science & Technology Infrastructure Improvements in Vermont*, Burlington. VT, August 2005.
32. Pearce, A.R., W.C. Hession, **D.M. Rizzo** and B.W. Sweeney, (Poster) “Riparian Forest Impacts on Aquatic Habitat Variability” *ASCE Watershed: Managing Watersheds for Human and Natural Impacts: Engineering, Ecological, and Economic Challenges*, Williamsburg, VA. July 2005.
33. Mouser, P.J., **D.M. Rizzo**, P. O’Grady and L. Stevens, (Presentation) “Classifying Attenuation Processes using Microbiology Profiles, Geochemistry, and Artificial Neural Networks from Landfill-Leachate Contaminated Groundwater” *Annual North Atlantic Chapter Regional Society of Environmental Toxicology and Chemistry Meeting (NAC SETAC)*, Burlington, VT, June 2005.
34. Druschel, G.K., G.L. Lorenson, **D.M. Rizzo**, D. Rogers and K. Edwards, “Field, lab and computational tools and techniques for linking geochemical and microbial processes in a range of environments”. Presented at the *2005 Goldschmidt Conference*, Moscow, ID, May 2005.

35. Mouser, P.J. and **D.M. Rizzo**, (*Presentation and Poster*) “Combined Hydrochemistry and Microbial Community Fingerprinting for Monitoring Contamination at a Waste Disposal Site” *University of Vermont Graduate College Research Day*, April 2005.
36. Mouser, P.J. and **D.M. Rizzo**, (*Presentation*) “Long-term Groundwater Monitoring Implications and Geostatistics from Combined Hydrochemistry and Microbial Community Fingerprinting at a Waste Disposal Site” *Fall Conference of the New England Section of the Air and Waste Management Association (NES AWMA)*, Boston, MA, November 2004.
37. Doris, J.J., **D.M. Rizzo** and K.L. Underwood. (*Poster*) “Application of Artificial Neural Networks to Classification of Stream Reaches” *Proceedings of the New England Estuarine Research Society*, Burlington, VT, March 2004. (**Awarded the Dean Award for Best Graduate Student Poster**)

THESIS & DISSERTATION

M.S. Thesis: *Multiphase Transport of DBCP in Unsaturated Soils*, Thesis Advisor: Gary L. Guymon

Dissertation: *Optimal Groundwater Remediation Design & Characterization of Aquifer Properties using Artificial Neural Networks* Ph.D. Advisor: David E. Dougherty

PROCURED FUNDING

After receiving my Ph.D. in 1994, I co-founded a small business to speed the diffusion of research and new technologies from universities and national laboratories into environmental practice. I had a strong record of accomplishment in research and development, having won five Small Business Innovation Research (SBIR) grants from the Federal government (NSF, DOE and USDA) over the five-year period.

Since joining UVM in 2002, I have been awarded a total of **\$7,972,466** in funding (\$6,779,432 in external grants and \$1,193,034 in internal); I have been the PI or Co-PI on \$7,435,466 of these funds.

The total above does not include the three grants (numbered 4, 11 and 14 below) totaling an **additional \$28.8 M**; as I am not a PI or Co-PI. However, I am part of the core faculty for these proposals and contributed significantly in the authorship, planning process, and responses to reviewers' comments.

External Funding:

1. **Title:** *MRI: Acquisition of a 3-D Terrestrial Laser Scanner for the Temporal-Morphological Study of Manmade and Natural Structures*
Agency: National Science Foundation: MRI
Contribution: **Senior Personnel** [PI: Jeff Frolik (Electrical Engineering)]
Amount: \$162,000 (\$69,500 UVM match)
Award Period: Sept. 1, 2012 (no end date. This grant is for the purchase of equipment)
2. **Title:** *Prediction and Mitigation of Scour for Vermont Bridges*
Agency: Vermont Agency of Transportation: AOT (Proposal # CA0228)
Contribution: **Co-PI** with [PI: Mandar Dewoolkar, Co-PIs: Dryver Huston (Mechanical Engr.) and Jeff Frolik (Electrical Engr.)]
Amount: \$273,466 (+\$37,012 TRC match)
Award Period: 36 mos., 09/12 – 08/15
3. **Title:** *Collaborative Research: Modeling disease transmission using spatial mapping of vector-parasite genetics and vector feeding patterns*
Agency: National Science Foundation: BCS (Proposal # 1216193)
Contribution: **PI** with [Co-PIs: Lori Stevens (UVM Biology), Leslie Morrissey (UVM Rubenstein School of the Environment and Natural Resources (RSENr)), Patricia Dorn (Loyola University) and Carlotta Monroy (University of San Carlos in Guatemala)]
Amount: \$2,500,000
Award Period: 60 mos., 07/12 – 06/17
4. **Title:** *Adaption to Climate Change in the Lake Champlain Basin: New Understanding through Complex Systems Modeling*
Agency: National Science Foundation: VT EPSCoR Research Infrastructure Improvement (RII) (EPS-1101317)
Contribution: **Core Faculty & contributing author** [PI: Judith Van Houten (UVM VT EPSCoR director)]

- Amount:** \$20,800,000
Award Period: 60 mos., 09/11– 08/16
5. **Title:** *Collaborative Research: Engineering Applications to Historic Preservation*
Agency: United States Department of Interior National Park Service
Contribution: Co-PI with [Thomas Visser (UVM Historic Preservation)]
Amount: \$0 (This is a 5-year cooperative agreement to perform collaborative research; individual proposals are written on a year-by-year basis.)
Award Period: 60 mos., 09/11 – 08/16
 6. **Title:** *Analysis of a collaborative worldwide network of neonatal ICUs.*
Agency: National Institute of Child Health and Human Development/NIH/DHHS (1R21HD068296-01)
Contribution: Senior Personnel [Co-PIs: Jeffrey Horbar (UVM College of Medicine), Margaret Eppstein (UVM Computer Science), and Stuart Kauffman (UVM College of Medicine)]
Amount: \$419,000
Award Period: 24 mos., 04/11 – 03/13
 7. **Title:** *Collaborative Research: Biodiversity and Infectious Disease Risk*
Agency: National Science Foundation: DEB (Proposal # 0842099)
Contribution: PI with [Co-PIs: Lori Stevens (UVM Biology) and Billie Kerans (Montana State University)]
Amount: \$310,870
Award Period: 36 mos., 03/09 – 06/12
 8. **Title:** *This was an REU supplement to the NSF DEB grant (item 3 above).*
Agency: National Science Foundation: DEB Research Experience for Undergraduates (REU)
Contribution: Co-PI with [PI: Lori Stevens (UVM Biology)]
Amount: \$24,000
Award Period: 12 mo., 05/11 – 04/12
 9. **Title:** *Assessing Habitat of Chagas Disease Vectors Integrating Genetics and Geospatial Technologies*
Agency: National Geographic Committee for Research & Exploration
Contribution: Co-PI with [PI: Lori Stevens (UVM Biology), Co-PI: Leslie Morrissey (UVM RSEN)]
Amount: \$25,000 (Covers costs associated with travel and data collection in Bolivia).
Award Period: 12 mos., 01/12 – 12/12
 10. **Title:** *Reliable and Rapid Prediction of Agent Fate and Transport in Porous Materials*
Agency: Defense Threat Reduction Agency (DTRA)
Contribution: Co-PI with [PI: Mandar Dewoolkar, Co-PI: Nancy Hayden ((both UVM Civil & Environ. Engr.)
Amount: \$524,570
Award Period: 24 mos., 02/08 – 01/10
 11. **Title:** *Complex Systems Thinking and Modeling for Ecosystem Analysis*
Agency: National Science Foundation: VT EPSCoR Research Infrastructure Improvement (RII)
Contribution: Core Faculty & contributing author, [PI: Judith Van Houten (UVM VT EPSCoR director)]
Amount: \$6,750,000
Award Period: 36 mos, 09/07 – 08/10
 12. **Title:** *Historic Preservation Engineering: Curriculum Development*
Agency: National Center for Preservation Technology and Training
Contribution: Co-PI with [PI: Jeffrey Marshall (UVM Mechanical Engr.), Co-PIs: Mandar Dewoolkar (UVM Civil & Environ. Engr.) and Doug Porter (UVM Historical Preservation & School of Engr.)]
Amount: \$49,835
Award Period: 24 mos., 06/07 – 05/09
 13. **Title:** *Piloting an Interdisciplinary Watershed Field Camp*
Agency: National Science Foundation (Proposal # 0611544)
Contribution: Co-PI with [PI: Paul Beriman (UVM Geology), Co-PIs: Greg Druschel (UVM Geology), Mary Watzin (UVM RSEN) and Beverley Wemple (UVM Geography)]
Amount: \$151,522
Award Period: 24 mos. with 1-year cost extension, 09/06 – 08/10

- 14. Title:** *Soft Tissue Biomechanical Behavior during Acupuncture in Low Back Pain*
Agency: National Center for Complementary and Alternative Medicine/NIH/DHHS (5 R01 AT003479/01-05)
Contribution: Senior Personnel, [PI: Helene Langevin (College of Medicine)]
Amount: \$1,250,000
Award Period: 48 mos., 08/06 – 07/10
- 15. Title:** *Studies to Characterize Interactions between Common Building Materials and Chemical Contaminants*
Agency: Los Alamos National Laboratory
Contribution: Co-PI with [PI: Mandar Dewoolkar, Co-PIs: Nancy Hayden and Doug Porter (all UVM School of Engr.)]
Amount: \$35,930
Award Period: 24 mos., 05/06 – 09/06
- 16. Title:** *A Systems Approach for Civil and Environmental Engineering Education: Integrating Systems Thinking, Inquire-based Learning and Catamount Community Service-learning Projects*
Agency: National Science Foundation: EEC (Proposal # 0530469)
Contribution: Co-PI with [PI: Nancy Hayden, Co-PIs: Mandar Dewoolkar, Adel Sadek (all UVM Civil & Environ. Engr.) and M. Neumann (UVM Education)]
Amount: \$860,000
Award Period: 36 mos., 09/05 – 08/08
- 17. Title:** *Diversity and Excellence in Environmental Biology*
Agency: National Science Foundation: UMEB (Proposal # 0405409)
Contribution: Co-PI with [PI: Lori Stevens (UVM Biology)]
Amount: \$438,000
Award Period: 48 mos., 07/04 – 08/08
- 18. Title:** *The Richard Barrett Scholarships: Promoting Undergraduate Expertise in Environmental Engineering*
Agency: The Barrett Foundation (Proposal #s 22281 & 22282)
Contribution: PI
Amount: \$479,000
Award Period: 05/01/2004 – present
- 19. Title:** *Investigating NAPL Source Removal from Low Permeable Silt Layer*
Agency: National Science Foundation: CBET (Proposal # 0229147)
Contribution: Co-PI with [PI: Nancy Hayden (UVM Civil & Environ. Engr.)]
Amount: \$263,006
Award Period: 24 mos., 10/03 – 09/05
- 20. Title:** *Extended Kalman Filter for the On-line Calibration of Traffic Simulation Models*
Agency: New England University Transportation Center (NEUTC)
Contribution: Senior Personnel [PI: Adel Sadek]
Amount: \$56,058
Award Period: 12 mos., 09/03 – 08/04
- 21. Title:** *Environmental Statistical Analysis of Data for a Fuel Oxygenate Study: Part 1 and 2*
Agency: VT Agency of Natural Resources
Contribution: PI
Amount: \$7,500
Award Period: 12 mos., 05/03 – 04/04
- 22. Title:** *Developing a Research-Based Undergraduate Experience Focused on 'Systems' Thinking, Information Technology and Laboratory Applications*
Agency: National Science Foundation: EEC (Proposal # 0230554)
Contribution: Co-PI with [PI: Nancy Hayden, Co-PIs: W. Cully Hession and Adel Sadek (all UVM Civil & Environ. Engr.)]
Amount: \$99,675
Award Period: 12 mos., 08/02 – 07/03
- 23. Title:** *Evolutionary Algorithms for Pathogen Defense*
Agency: National Science Foundation: SGER (Proposal # 0233901)
Contribution: Co-PI with [PI: Lori Stevens (UVM Biology)]
Amount: \$100,000
Award Period: 12 mos., 08/02 – 07/03

Internal Funding:

24. **Title:** *Assessing Road Drainage Impacts to Lake Champlain Water Quality*
Agency: Lake Champlain Basin Program & Environmental Protection Agency
Contribution: Senior Personnel [PI: Beverley Wemple (UVM Geography), Co-PI: Leslie Morrissey (UVM RSENK)]
Amount: \$100,000
Award Period: 24 mos., 10/10 – 09/12
25. **Title:** *Regulatory Control Prediction for Transportation Alternative Energy Usage via a Multiscale Agent-Based Model*
Agency: UVM Transportation Center, (Signature Project #5).
Contribution: Co-PI [PI: Margaret Eppstein (UVM Computer Science), Co-PI: Jeffrey Marshall (UVM Mechanical Engr.)]
Amount: \$336,992
Award Period: 36 mos., Start date: 10/08 – 06/13 (two-year no-cost extension)
26. **Title:** *Linking Roads in Forested Watersheds to Stream Stability and Stream Health: Tools for Assessing Road Impacts and Restoration Options*
Agency: NSRC (Northeastern States Research Cooperative)
Contribution: Co-PI [PI: Leslie Morrissey (UVM RSENK), Co-PI: Beverley Wemple (UVM Geography)]
Amount: \$186,837
Award Period: 36 mos., 09/09 – 08/12
27. **Title:** *Development of Metrics to Assess the Quality of Riverine Habitat for Coldwater Fish Based on Stream Temperature*
Agency: State of Vermont Agency of Natural Resources, Fish and Wildlife Dept.
Contribution: Co-PI [PI: Donna Parrish (VT Cooperative Fish and Wildlife Research Unit)]
Amount: \$91,667
Award Period: 24 mos., 10/06 – 09/09 (1-year no cost extension)
28. **Title:** *An Adaptive Management System using Hierarchical Artificial Neural Networks and Remote Sensing for Fluvial Hazard Mitigation*
Agency: United State Geological Survey and Vermont Agency of Natural Resources
Contribution: Co-PI [PI: Leslie Morrissey (UVM RSENK)]
Amount: \$191,841
Award Period: 24 mos., 03/06 – 02/08
29. **Title:** *Geospatial Analysis of Disease Risk*
Agency: UVM Office of the Vice President for Research: Proposal Development Fund
Contribution: Co-PI [PI: Lori Stevens (UVM Biology), Co-PI: Leslie Morrissey (UVM RSENK)]
Amount: \$25,000
Award Period: 12 mos., 10/09 – 09/10
30. **Title:** *Quantifying Sediment Loading due to Stream Bank Erosion in Impaired and Attainment Watersheds in Chittenden County, VT*
Agency: United State Geological Survey (USGS) and Vermont Agency of Natural Resources (VT ANR)
Contribution: Senior Personnel [PI: Leslie Morrissey (UVM RSENK), Co-PI: Don Ross (UVM Plant and Soil Science)]
Amount: \$86,274
Award Period: 24 mos., Start date: 05/09 – 04/11
31. **Title:** *Geospatial Analysis of Disease Risk*
Agency: UVM Graduate College
Contribution: Co-PI [PI: Lori Stevens (UVM Biology), Co-PI: Leslie Morrissey (UVM RSENK)]
Amount: \$18,000
Award Period: 12 mos., 02/09 – 01/10
32. **Title:** *Complex Systems Modeling to Link Biodiversity and Disturbance*
Agency: NSF VT EPSCoR GRA Grant
Contribution: PI [Co-Is: George Pinder (UVM Civil & Environ. Engr.) and Lori Stevens (UVM Biology)]
Amount: \$45,000 (Graduate Research Assistantship for Bree Mathon)
Award Period: 18 mos., 09/08 – 02/10

- 33. Title:** *Using Computational Models for Research on Water in the Environment*
Agency: NSF VT EPSCoR GRA Grant
Contribution: PI [Co-I: Lori Stevens]
Amount: \$45,000 (Graduate Research Assistantship for Andrea Pearce)
Award Period: 18 mos., 09/08 – 02/10
- 34. Title:** *Proposed VACC Focal research area in Biocomplexity*
Agency: UVM Center for Teaching and Learning
Contribution: **Senior Personnel** [PI: Margaret Eppstein (UVM Computer Science), Co-I: Lori Stevens, Charles Goodnight, Jane Molofsky and Jim Hoffmann (all UVM Biology)]
Amount: \$5,000
Award Period: 12 mos., 09/05 – 08/06
- 35. Title:** *Collaborative Efforts for Integrating Geochemical and Microbial Techniques in Environmental Engineering Applications*
Agency: NSF VT EPSCoR GRA Grant
Contribution: **PI**
Amount: \$4,923 (Graduate Research Assistantship for Zhiqiang Li)
Award Period: 4 mos., 09/05 – 01/06
- 36. Title:** *Using Artificial Neural Networks to Improve Data Inversion Methods*
Agency: NSF VT EPSCoR GRA Grant
Contribution: **PI**
Amount: \$24,750 (Graduate Research Assistantship for Jeff Doris)
Award Period: 12 mos., 01/04 – 12/05
- 37. Title:** *Integrating Data Mining, Geostatistics, and Optimization Techniques for the Long-term Monitoring of Nonstationary and Nonseparable Plume Statistics*
Agency: NSF VT EPSCoR GRA Grant
Contribution: **PI**
Amount: \$18,750 (Graduate Research Assistantship for Paula Mouser)
Award Period: 9 mos., 09/04 – 05/05
- 38. Title:** *Start-up Funding*
Agency: University of Vermont College of Engineering and Mathematical Sciences
Contribution:
Amount: \$13,000
Award Period: 12 mos., 09/02 – 008/03

Grants Pending:

- 1. Title:** *Inventory, Hazard Rating and Predictions of Landslides Affecting Transportation Infrastructure in Vermont*
Agency: Vermont Agency of Transportation: AOT (Proposal # CA0228)
Contribution: Co-PI, [PI: Mandar Dewoolkar, Co-PIs: Dryver Huston and Jeff Frolik]
Amount: \$223,097
Award Period: 36 mos., 09/12 – 08/15
- 2. Title:** Collaborative Research: Understanding Tuff Weathering and Deterioration Processes Affecting Preservation of the Rock-Cut Dwellings (Cavates) and Petroglyphs of Frijoles Canyon, Bandelier National Monument.
Agency: NSF (Proposal # 1241696)
Contribution: Co-PI, [PI: Dryver Huston, Co-PIs: Douglas Porter, Deborah Neher]
Amount: \$442,464
Award Period: 36 mos., 09/12 – 08/15
- 3. Title:** *Next generation agent transport and fate experiments and simulations*
Agency: Department of Defense (Thrust Area 3: Science for Protection)
Contribution: **Co-PI** with [PI: Mandar Dewoolkar, Co-PI: Darren Hitt (Mechanical Engr.)]
Amount: \$1,400,000
Award Period: 36 mos., 03/13 – 02/15

STUDENT RESEARCH SUPERVISION***Graduate Students:******Ph.D. Students (current)***

1. **Ian Anderson**, (expected graduation 2017), Ph.D. in Civil and Environmental Engineering, Dissertation: *To Be Determined*. Co-advised with M. Dewoolkar.
2. **John Hanley**, (expected graduation 2016), Ph.D. in Civil and Environmental Engineering, Dissertation: *To Be Determined*.
3. **Kristen Underwood**, (expected graduation 2015), Ph.D. in Civil and Environmental Engineering, Dissertation: *To Be Determined*. Co-advised with M. Dewoolkar.
4. **Scott Hamshaw**, (expected graduation 2015), 3-year NSF Graduate Research Fellowship recipient, Ph.D. in Civil and Environmental Engineering, Dissertation: *To Be Determined*.
5. **Nikolaos Fytilis**, (expected graduation 2013), Ph.D. in Civil and Environmental Engineering, Dissertation: *To Be Determined*.

Ph.D. Students (graduated)

6. **Bree Mathon**, (graduated winter 2011), Ph.D. in Civil and Environmental Engineering, Dissertation: *Assessing Uncertainty in Modeling Physical Processes Associated with Groundwater and Watershed Problems using Fuzzy Mathematics*. Co-advised with G.F. Pinder.
7. **Andrea Pearce**, (graduated winter 2010), Ph.D. in Civil and Environmental Engineering, Dissertation: *Combining Computational and Human Neural Networks: using Modified Self-Organizing Map to Explore Surface and Subsurface Hydrochemical and Biological Datasets*.
8. **Lance E. Besaw**, (graduated fall 2009), Ph.D. in Civil and Environmental Engineering, Dissertation: *Advances in Artificial Neural Networks in Surface and Subsurface Hydrological Environmental Engineering Applications*.
9. **Maeve McBride**, (graduated summer 2007), Ph.D. in Civil and Environmental Engineering, Dissertation: *Riparian Reforestation and Channel Morphology: Key Driving Mechanisms in Small Streams*. Co-advised with W.C. Hession.
10. **Paula J. Mouser**, (graduated spring 2006), Ph.D. in Civil and Environmental Engineering, Dissertation: *Improving Detection and Long-term Monitoring Strategies for Landfill Leachate Contaminated Groundwater with Molecular-Based Microbiological Data using Geostatistics and Artificial Neural Networks*.

M.S. Students (current)

11. **David Grover** (expected graduation summer 2012), Accelerated M.S. program in Civil and Environmental Engineering, Thesis Topic: *Prediction of Fluid Transport in Porous Building Materials using Artificial Neural Network*. Co-advised with M. Dewoolkar.

M.S. Students (graduated)

12. **Joseph Krupa**, (graduated spring 2013), M.S. in Civil and Environmental Engineering, Thesis Topic: *Plug-In Hybrid Vehicle Consumer Survey*. Co-advised with M.J. Eppstein.
13. **Alison Pechenick**, (graduated spring 2013), M.S. in Civil and Environmental Engineering, Dissertation: *A Multi-scale approach to assess the hydrological connectivity of Road and Stream Networks*.
14. **Kirk DuBois Jones**, (graduated fall 2012), Non-Thesis M.S. in Civil and Environmental Engineering, Report Topic: *Determining the Effects of Adsorption Bed Media on Water Quality: Measuring the effects of crushed coral sand, activated carbon, biochar, and steel slag mitigating the impacts of dairy farm runoff on Lake Champlain*.
15. **Keith Pelletier**, (graduated fall 2011) M.S. in School of Natural Resources, Thesis: *Use of Remote Sensing to Derive Geomorphic Features Indicative of Stream Stability*. Co-advised with L. Morrissey.
16. **Cabot Savidge**, (graduated fall 2011) M.S. in School of Engineering, Thesis: *Characterization of Porous Building Materials for Agent Transport Prediction using Artificial Neural Networks*. Co-advised with M.M. Dewoolkar.
17. **Ryan Butryn**, (graduated fall 2010), M.S. in the Rubenstein School of Environment and Natural Resources, Thesis Topic: *Summer Stream Temperature as an Indicator of Coldwater Fish Distribution*. Co-advised with D. Parrish.
18. **Martin Lee**, (graduated spring 2009), M.S. in Civil and Environmental Engineering, Thesis: *Pilot-Scale Constructed Wetlands Combined with Phosphorus Removing Slag Filters for Treating Dairy Wastewater*.
19. **Zhiqiang Li**, (graduated spring 2007), M.S. in Civil and Environmental Engineering, Thesis: *Applications using the Ordinary and Extended Kalman Filters to Characterize Groundwater Contaminant Sources*.
20. **Jessica S. Clark**, (graduated spring 2006), M.S. in Civil and Environmental Engineering, Thesis: *Modeling of Small Streams to Assess Velocity Distribution Influence and Geomorphic Condition on Habitat Indices*.

21. **Lance E. Besaw**, (graduated spring 2006), M.S. in Civil and Environmental Engineering, Thesis: *Conditional Simulations using Artificial Neural Networks*.
22. **Jeffrey J. Doris**, (graduated fall 2005), M.S. in Civil and Environmental Engineering, Thesis: *Application of Counterpropagation Networks (ANNs) to Problems in Civil Engineering*.
23. **Charles D. Mark**, (graduated fall 2004), M.S. in Civil and Environmental Engineering, Thesis: *Predicting Experienced Travel Time for Freeway and Arterial Systems: An Artificial Neural Network Approach*. Co-advised with A. Sadek.
24. **Patrick Sullivan**, (graduated fall 2000), M.S. in Civil and Environmental Engineering, Thesis: *Hierarchical Artificial Neural Networks for Regionalized Co-Kriging*. Advised while on an unpaid leave of absence from UVM.

M.S. Thesis and/or Ph. D. Dissertation Committee member (does not include advisees or co-advisees):

I have served, or currently serve, on a **total of 68 graduate committees** during my ten-year tenure at UVM. This list ***does not include advisees or co-advisees***; bold font indicates committees for which I have contributed significantly (*e.g.* met on a weekly basis over several semesters to assist with statistical, geostistical, or computational analyses).

1. **Sara E. Gran, Committee Member (and Chair), M.S. Geology, *Displacement History of the Nahef East Fault Scarp, Northern Israel: A Cosmogenic ³⁶Cl Approach, March 2000.***
2. Holly Rae Taylor, Committee Member (and Chair), M.S. Botany, *Biodegradation of Benzene in Field Soil: A Phytoremediation Experiment using Medicago Sativa and Lotus Corniculatus*, May 2001.
3. William C. Simonson, Committee Member (and Chair), M.S. Geology, *Structural and Kinematic Evolution of the Middle Crust During the Late Cretaceous Extension in Western New Zealand*, August 2003.
4. **Kwaw S. Andam, Committee Member, M.S. Civil & Environmental Engineering, *Comparing Physical Habitat Conditions in Forested and Non-Forested Streams, October 2003.***
5. Torgeir Grothe Lien, Committee Member (and Chair), M.S. Computer Science, *Local Search Over Relational Specifications*, April 2003.
6. Timothy R. Harris, Committee Member (and Chair), M.S. Mechanical Engineering, *Geometric Effects on Separation Surfaces in Converging Microchannel Flows*, April 2003
7. Melissa McKay, Committee Member, Ph.D. Civil & Environmental Engineering, *Multiphase Bioremediation Modeling in Association with Temperature Effects caused by Passive Resistive Soil Heating*, Spring 2004.
8. Seli James Agbolosu-Amison, Committee Member, M.S. Civil & Environmental Engineering, *Validating Traffic Simulation Models to Inclement Weather Travel Conditions with Applications to Arterial Coordinated Signal Systems in Northern New England*, Summer 2004.
9. **Thomas Tucker, Committee Member (and Chair), M.S. Biology, *Co-evolution between Arthropods and Saprophytic Parasites, Spring 2004.***
10. Mathew T. McGarry, Committee Member (and Chair), Ph.D. Mechanical Engineering, *Numerical Simulations of Arterial and Venous Bleeding in Terrestrial and Microgravity Environments*, Summer 2004.
11. Bonsu Mensah Osei, Committee Member (and Chair), Ph.D. Mathematical Sciences, *Modeling Aspects of Biological Invasions*, November 2004.
12. Edward Kwasi Boamah, Committee Member (and Chair), Ph.D. Mathematical Sciences, *Modeling the Dynamic Exchange of Solutes in a Prototype Hemodialyzer Construct*, Spring 2005.
13. **Joanna M. Reuter, Committee Member (and Chair), M.S. Geology, *Erosion Rates and Patterns Inferred from Cosmogenic ¹⁰BE in The Susquehanna River Basin, Spring 2005.***
14. **Christina Cianfrani, Committee Member, Ph.D. Civil & Environmental Engineering, *Linking Watershed Landscape, Stream Geomorphology and Aquatic Ecosystem Health, Spring 2005.***
15. Katherine Manaras, Committee Member (and Chair), M.S. Natural Resources, *Forest Structure and Ecosystem Function at Multiple Spatial Scales: Structural Variability in Young to Mature Forests and Predicting Species Occurrence*, Spring 2005.
16. **Diana Hidalgo, Committee Member (and Chair), M.S. Mechanical Engineering, *Investigation of Continuous Strain Fields in the Intervertebral Disc, Summer 2005.***
17. Spencer Morse, Committee Member (and Chair), M.S. Civil & Environmental Engineering, *Using Case-Based Reasoning to Predict the Impact of Variable Message Sign Diversion*, Winter 2005.
18. Xinyu Wei, Committee Member, Ph.D. Civil & Environmental Engineering, *Long Term Monitoring Network Design and Verification using an Intermediate Scale Groundwater Facility*, Spring 2006.

19. Gregory Lorenson, Committee Member (and Chair), M.S. Geology, *Application of In Situ AU-amalgam Microelectrodes in Yellowstone National Park to Guide Microbial Sampling: An Investigation into Arsenite and Polysulfide Detection to Define Microbial Habitats*, Spring 2006.
20. Yu He, Committee Member (and Chair), M.S. Computer Science, *Frequent Pattern Mining with Wildcards*, Spring 2006.
21. Mark Smith, Committee Member, M.S. Civil & Environmental Engineering, *Calibrating Microscopic Traffic Simulation Models - Two Case Studies: A Large-scale, County-side Model, and a Modern Roundabout*, Fall 2006.
22. Barton Kirk, M.S. Natural Resources, *Ecological Economics of Suburban Stormwater Management: A Life Cycle Approach*, Fall 2006.
23. **Erica Gaddis-Brown, Committee Member (and Chair), Ph.D. Natural Resources, *Landscape Modeling and Spatial Optimization of Watershed Interventions to Reduce Phosphorus Load to Surface Waters using a Process-oriented and Participatory Research Approach: A Case in the St. Albans Bay Watershed, Vermont*, Fall 2006.**
24. **Emily Hackett, Committee Member, M.S. Civil & Environ. Engineering, *Temperature Effects on the Physico-Chemical Properties of a Contaminant in Low Permeable Porous Media*, Fall 2007.**
25. Evan Fitzgerald, Committee Member (and Chair), M.S. Natural Resources, *Linking Urbanization to Stream Geomorphology and Biotic Integrity in the Lake Champlain Basin, Vermont*, Spring 2007.
26. **Andrea J. Porter, Committee Member, Ph.D., Civil & Environmental Engineering, *Hybrid Environmental Engineering Informatics Decision Support Systems: A Case Study on Plant-Assisted Bioremediation Design*, Spring 2007.**
27. Colleen L. Sullivan, Committee Member (and Chair), M.S. Geology, *Using ¹⁰Be to Investigate the Long-term Behavior of the Blue Ridge Escarpment*, Southern Appalachian Mountains, Spring 2007.
28. Harry D. Oduro, Committee Member (and Chair), M.S. Geology, *The Formation, Oxidation and Characterization of FeS(aq) Molecular Clusters – Decoupling Iron Sulfide Mineral Surface Dissolution and Oxidation Reactions*, Spring 2007.
29. Dani Newcomb, Committee Member (and Chair), M.S. Natural Resources, *Links between Geomorphic Condition, Water Quality, and Nutrient Loading in Hungerford Brook, Vermont*, Summer 2007.
30. Zoe Dokou, Committee Member, Ph.D. Civil & Environmental Engineering, *Optimal Search Strategy for the Definition of a DNAPL Source*, Fall 2007.
31. James Ross, Committee Member, Ph.D. Civil & Environmental Engineering, *Approximate Reasoning in Hydrological Modeling*, Spring 2008.
32. Jean Innamorati, Committee Member (and Chair), M.S. Historic Preservation, *The History of Burlington's Public Water Supply System from 1865 to 1915*, Summer 2008.
33. Julie A. Rumrill, Committee Member (and Chair), M.S. Geology, *Analysis of Spatial and Temporal Variations in Longitudinal Strain Rates near Swiss Camp, Greenland*, Fall 2008.
34. **William Hackett, Committee Member (and Chair), M.S. Geology, *Changing Land Use, Climate, and Hydrology in the Winooski River Basin, Vermont*, Spring 2009.**
35. Mia Akaogi, Committee Member (and Chair), M.S. Natural Resources, *An Assessment of Groundwater Vulnerability in the Ossipee Watershed*, Spring 2009.
36. Robert Skiff, Committee Member (and Chair), M.Ed., College of Education and Social Services, *First year teaching in an Ecuadoria secondary school: remembrance of things past, present and collective*, Spring 2009.
37. Hua Chen, Committee Member, Ph.D. Civil & Environmental Engineering, *Investigation of Contaminant Transport in Tidally-Influenced Porous Media*, Spring 2010.
38. **Jaron Borg, Committee Member, M.S. Civil & Environ. Engineering, *Streambank Stability and Sediment Tracing in Vermont Waterways*, Fall 2010.**
39. Douglas K. Royalty, Committee Member (and Chair), M.S. Historic Preservation, *Blueprints for Progress: General Houses, Inc. And the Modern Prefabricated House, 1932-40*, Fall 2010
40. Eric Portenga, Committee Member (and Chair), M.S. Geology, Thesis Topic “*Using ¹⁰Be to Contain Erosion Rates of Bedrock Outcrops Globally and in the Central Appalachian Mountains*”, Spring 2011.
41. Anthony McInnis, Committee Member (and Chair), Ph.D. Natural Resources, *An Ecomimetic Approach to Testing Biodegradation: The Treatment and fate of the Alkanolamine 2-[(2-Aminoethyl)Amino]Ethanol*, Spring 2011.
42. Nicole Mason, Committee Member (and Chair), M.S. Community Development and Applied Economics, *Engineering and Community Development: Exploring a Synthesis of Disciplines in Pursuit of Sustainable International Development*, Spring 2011.

43. **Narine Manukyan, Committee Member, M.S. Computer Science, *Improved Methods for Cluster Identification and Visualization in High-Dimensional Data Using Self-Organizing Maps*, Spring 2011.**
44. Charles D. Troderick, Jr., Committee Member (and Chair), M.S. Geology, *In Situ and Meteoric ¹⁰Be Concentrations and Fluvial Sediment Collected from the Potomac River Basin*, Summer 2011.
45. **Rebecca Tharp, Committee Member, M.S. Natural Resources, *Ecological Drinking Water Treatment: Mentha Aquatica as Disinfectant*, Fall 2011.**
46. Jody Stryker, Committee Member, M.S. Civil & Environ. Engineering, *The Effects of Land Cover Change on Pool Persistence and Malaria Transmission in the Highlands of Ethiopia*, Fall 2011
47. **Nilanjan Lodh, Committee Member (and Chair), Ph.D. Biology, Dissertation Title *TBD*, Spring 2012.**
48. **Kerrie Melissa Garvey, Committee Member (and Chair), M.S. Natural Resources, *Quantifying Erosion and Deposition due to Stream Planform Change using high Spatial Resolution Digital Orthophotography and LIDAR Data*, Spring 2012.**
49. Shreya Mukherjee, Committee Member, M.S. Computer Science, *Differential Evolution of Constants in Genetic Programming Improves Efficacy and Bloat*, Spring 2012.
50. Qiong Liu, Committee Member, M.S. Civil & Environ. Engineering, *Spatial Exploration of Obesity and Walking in Northern New England*, Fall 2012.
51. Christine Gingras, Committee Member, M.S. Civil & Environ. Engineering, *The Effect of Topography on Malaria Vector Mosquito Pools and an Assessment of Synthetic Aperture Radar as a Means to Model these Pools*, Fall 2012.
52. Yi Ge, Committee Member, M.S. Civil & Environ. Engineering, Non-Thesis Report: *The Movement of Phosphorus at a farm in Franklin County, VT*, Fall 2012.
53. Karen Sentoff, Committee Member, M.S. Civil & Environ. Engineering, Thesis Title *Characterization of Gas-Phase Emissions from Comparable Conventional and Hybrid Gasoline Vehicles during Real-world Operation*, Fall 2012.
54. **David Lucero, Committee Member (and Chair), Ph.D. Biology, Dissertation, *Spatial Distribution of Chagas Disease Vectors in Latin America*, Spring 2013.**
55. Jaime Jiménez-Díaz, Committee Member, M.S. Civil & Environ. Engineering, Thesis Title, *Correlation between Innate Immunity and SES-MS Breathprints of Acute Lung Infections*, Spring 2013.
56. Kristi Herzer, Committee Member, M.S. Civil & Environ. Engineering, Thesis Title, *Survival of Antibiotic-challenged microbes in Shake Flask, Biofilm, and LowShear Bioreactor (HARV) Environments*, Expected Spring 2013.
57. Karim Chichakly, Committee Member, Ph.D. Computer Science, Dissertation, *Advanced Computational Methods for Designing Stormwater Management Practices*, Spring 2013.
58. Robert Skiff, Committee Member (and Chair), M.Ed., College of Education and Social Services, Dissertation Title *TBD*, Expected Spring 2013.
59. Matt Conger, Committee Member, M.S. Civil & Environ. Engineering, *Investigation of the Effects of Road Grade, facility Type and traffic Congestion on Fuel Consumption of a Series-Parallel Hybrid and Comparable Conventional Vehicle*, Expected Spring 2013.
60. Catherine Webster, Committee Member (and Chair), M.S. Geography, Thesis Title *TBD*, Expected Spring 2013.
61. Benjamin Dejong, Committee Member (and Chair), M.S. Geology, Thesis Title *TBD*, Expected Spring 2013.
62. Jeff Sprenger, Committee Member (and Chair), Ph.D. Computer Science, Dissertation Title *TBD*, Expected Spring 2013.
63. Sam Gorton, Committee Member (and Chair), Ph.D. Natural Resources, Dissertation Title *TBD*, Expected Spring 2013.
64. Luke Reusser, Committee Member (and Chair), Ph.D. Natural Resources, *Quantifying Human Impacts on Natural Rates of Erosion along Continental Margins*, Expected Fall 2014.
65. Peter Larson, Committee Member, M.S. Civil & Environ. Engineering, Thesis Title *TBD*, Expected Fall 2012.
66. Jamie Ferro, Committee member, M.S. Natural Resources, Thesis Title *TBD*, Expected Fall 2014.
67. Jacob Kelsey, Committee Member (and Chair), M.S. Natural Resources, Thesis Title *TBD*, Expected Fall 2014.
68. Brian Gomez, M.S. Civil & Environmental Engineering, Thesis Title *Evaluation of Design Assumptions for Structural Backfill of Abutments and Retaining Walls*, Expected Fall 2014.
69. Tyler Feralio, Ph.D., Civil & Environmental Engineering, Dissertation Title *TBD*, Expected Fall 2014.
70. **Narine Manukyan, Committee Member, Ph.D. Computer Science, Thesis Title *TDB*, Spring 2014.**
71. Kairn Kelley, Committee Member (and Chair), Speech Therapy, Dissertation Title *TBD*, Expected Spring 2014.

- 72. Philip Halteman, Committee Member, Ph.D. Natural Resources, Dissertation Title: *Developing a Framework for the Adaptive Management of Phosphorus Loading to Lake Champlain*, Expected Spring 2014.
- 73. Thomas Neilson, M.S. Geology, Thesis Title *TBD*, Expected Spring 2015.
- 74. Peter Isles, Ph.D. Natural Resources, Dissertation Title *TBD*, Expected Spring 2018.

Ph.D Qualifying Examination Committee Member for:

- 1. Parminder Padgett, Ph.D., Civil & Environmental Engineering, April 2, 1999
- 2. Christina Cianfrani, Ph.D., Civil & Environmental Engineering, April 30, 2003
- 3. Xinyu Wei, Ph.D., Civil & Environmental Engineering, February 16, 2004
- 4. Paula J. Mouser, Ph.D., Civil & Environmental Engineering, April 5, 2004
- 5. Erica Brown, Ph.D., Natural Resources, December 16, 2004
- 6. Maeve McBride, Ph.D., Civil & Environ. Engineering, February 28, 2005
- 7. Zoe Dokou, Ph.D., Civil & Environmental Engineering, April 16, 2005
- 8. James Ross, Ph.D., Civil & Environmental Engineering, April 16, 2005
- 9. Lance Besaw, Ph.D., Civil & Environmental Engineering, February 2, 2007
- 10. Lindsay George, Ph.D., Civil & Environmental Engineering, February 2, 2007
- 11. Lalita Oka, Ph.D., Civil & Environmental Engineering, February 2, 2007
- 12. Andrea Pearce, Ph.D., Civil & Environmental Engineering, March 20, 2008
- 13. Anthony McInnis, Ph.D., Natural Resources, November 7, 2008
- 14. Bree Mathon, Ph.D., Civil & Environmental Engineering, May 22, 2009
- 15. Karim Chichakly, Ph.D. Computer Science, June 12, 2009
- 16. Nilanjan Lodh, Ph.D., Biology, April 30, 2009 & January 5, 2010
- 17. Luke Reusser, Ph.D., Natural Resources, February, 12, 2010
- 18. Christina, Syrrakou, Ph.D., Civil & Environmental Engineering, May 2010
- 19. Nikolaos Fytillis, Ph.D., Civil & Environmental Engineering, September 2010
- 20. Jeff Spranger, Ph.D., Computer Science, October 2010
- 21. John Kasumba, Ph.D., Civil & Environmental Engineering, January 14, 2011
- 22. Tyler Feralio, Ph.D., Civil & Environmental Engineering, August 2011
- 23. Narine Manukyan, Ph.D., Computer Science, February 2012
- 24. David Lucero, Ph.D., Biology, February, 2012
- 25. Philip Halteman, Ph.D., Natural Resources, January, 19, 2013

M.S. Comprehensive Examination Committee Member for:

- 26. Holly Taylor, M.S., Department of Botany, February 8, 2001
- 27. Thomas Tucker, M.S., Biology, January 26, 2004
- 28. Diana Hildalgo, M.S., Mechanical Engineering, May 8, 2005
- 29. Evan Fitzgerald, M.S., Natural Resources, September 28, 2006
- 30. Dani Newcomb, M.S. Natural Resources, March 19, 2007
- 31. Keith Peletier, M.S. Natural Resources, January 5, 2008
- 32. Ryan Butryn, M.S. Natural Resources, May 5, 2008
- 33. Kerrie Melissa Garvey, M.S. Natural Resources, January 2011
- 34. Rebecca Tharp, M.S. Natural Resources, March 14, 2011
- 35. Catherine Webster, M.S. Geography, May 2013

UNDERGRADUATE RESEARCH & ADVISING

Undergraduate Advisees:

Number of undergraduate MAJORS advised	5 (Fall 2002 – Spring 2003) 12 (Fall 2003 – Spring 2004) 18 (Fall 2004 – Spring 2005) 26 (Fall 2005 – Spring 2006) 33 (Fall 2006 – Spring 2007) 38 (Fall 2007 – Spring 2008) 28 (Fall 2008 – Spring 2009) 33 (Fall 2009 – Spring 2010) 36 (Fall 2010 – Spring 2011) 29 (Fall 2011 – Spring 2012)
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	34 (Fall 2012 – Spring 2013)
Frequency of Advisee Contact	I meet with my advisees twice during the fall semester and once (during advising weeks) in the spring semester.
Outside Activities with Advisees	I see the majority of my advisees on a weekly basis, either in class or as their faculty advisor for student clubs, honor societies and/or outreach projects associated with ECHO. I have an open door policy, and my advisees email or drop in when they have questions. I meet with prospective students and their parents on a regular basis, and write letters (~20-25/yr) of recommendation for undergraduates applying for graduate schools, scholarship applications and REU programs.

Undergraduate Research Advising:

Over the past 10 years, I have worked with **70+ undergraduates** on research projects. Approximately **60** of these have been funded through two grants (the NSF Undergraduate Mentoring in Environmental Biology and the Barrett Foundation grant; see details below) for which I am the PI and Co-PI, respectively. An additional **10 students** have been mentored or supported through a variety of UVM undergraduate research opportunities including undergraduate honors theses, the UVM summer HELIX program and the URECA scholarships.

Program: NSF UMEB (Undergraduate Mentoring in Environmental Biology) grant

In 2005, Dr. Lori Stevens (Department of Biology) and I procured this grant to recruit students from underrepresented groups and promote interdisciplinary science education through mentoring, laboratory and field research experience. It included training in problem-oriented computer modeling, introductory statistics, population genetics, a semester colloquium devoted to developing peer-reviewed research proposals and summer field research projects. We recruited 10 minority high school seniors. Each of the students was paired with a faculty research mentor and received \$32,000 in scholarship funds through this program. Lori and I acted as co-advisors and worked closely with all 10 students (listed below) in developing peer-reviewed research proposals. The grant dovetails nicely with a number of the University's strategic goals, including providing students with rigorous and challenging experiential learning, recruiting students from under-represented groups, and developing cross-disciplinary and interdisciplinary research and scholarship.

Undergraduates (Fall 2005-2010):

- 1. Joshua Carrera**
- 2. Sara Harris**
- 3. Kizette Vanger**
- 4. Jonathan Mejia**
- 5. Sabrina Lopez**
- 6. Danielle Griffith**
- 7. Benjamin Nsiah**
- 8. Theodore Ortiz-Y-Pino**
- 9. Melissa Caliente**
- 10. Leonardo Badia**

Program: Barrett Foundation Grant (Fall 2004 to Present):

The grant provides summer research experiences to outstanding engineering undergraduates interested in environmental engineering and interdisciplinary issues. Students receive a \$6,500 summer scholarship and \$1,500 for research supplies. The program has supported 54 undergraduates over the past 7 years.

Undergraduates (Fall 2012 to Summer 2013):

- 11. Hanna Anderson**, Topic: *BSTEM Modeling in the Mad River Watershed*. (Primary Advisor: M. Dewoolkar)
- 12. Luke Detwiler** Topic: *Deep-Belief Neural Networks and Landmine Detection* (Primary Advisor: D. Rizzo)
- 13. Rebecca Domingue** Topic: *Tuff Weathering and Delineation of Cavates* (Primary Advisor: D. Porter)
- 14. James Laughlin** Topic: *Hydrologic Impact of the Vermont Interstate Highway System* (Primary Advisor: P. Bierman)
- 15. James Lent** Topic: *Comparing Stochastic and Reactive Cellular Approaches to Survival in Fluctuating Environments* (Primary Advisor: M. Dunlop)
- 16. Anna Nadler** Topic: *Tailpipe Emissions: Real World Data versus MOVES Modeling* (Primary Advisor: B. Holmen)
- 17. Alex Poniz** Topic: *The Structure-Function Relationship of Hyaluronan based Cell Scaffolds* (Primary Advisor: R. Oldinski)
- 18. Marisa Rorabaugh** Topic: *The Origin of Sediment in Streambeds through Isotopic Soil Analysis* (Primary Advisor: D.M. Rizzo)

Undergraduates (Fall 2011 to Summer 2012):

- 19. Kasey Cybulak's** research aims to analyze and evaluate the implementation of seismic base isolation systems with respect to historic structures. (Primary Advisor: P. Wijesinghe)
- 20. Sebastian Downs** is researching the effects of vegetative scale on stream channel morphology. (Primary Advisors: M. McBride)
- 21. Lindsay Taylor** research aims to understand the relationship of phosphorus movement from agricultural fields to nearby streams during storm events. (Primary Advisor: A. Bomblies)
- 22. Will Greenwood** is developing a recipe for bio-mediated soil solidification and up-scaling for field applications. (Primary Advisor: M. Dewoolkar)
- 23. Hannah Maloy's** research involves the use of precariously balanced rocks to assess seismic hazards, specifically in the Pajarito Fault System. (Primary Advisor: E. Hernandez)

Undergraduates (Fall 2010 to Summer 2011):

- 24. Bradford Berry** researched the effects of recycled concrete in pervious concrete. (Primary Advisor: M. Dewoolkar)
- 25. Laura Galihier** researched the liquid transport characteristics (i.e., macroscopic surface gas permeability, the air permeability, the hydraulic conductivity, and the wicking traits) of approximately 25 manmade and natural building materials. (Primary Advisors: M. Dewoolkar and D.M. Rizzo)
- 26. Kristina Miele** research aims to understand the differences in material characteristics between Bandelier Tuff that has developed a weathered coating from exposure and fresh tuff along the face of the Frijoles Canyon at Bandelier National Monument. (Primary Advisor: D. Porter)
- 27. Kyle Sala** developed a new generation of computation models to predict the effects of turbulent mixing on growth rate and local concentration of suspended micro-algae. (Primary Advisor: J. Marshall)
- 28. Joanie Stultz** studied the potential of Aquatic Mint in conjunction with bio-sand filtration for water disinfection. (Primary Advisors: R. Tharp and D.M. Rizzo)
- 29. Meghan Thompson** developed hydraulic flume studies to examine the effect of *engineered* log jams on the topography of a streambed and the effects of scouring. (Primary Advisor: M. McBride)

Undergraduates (Fall 2009 to Summer 2010):

- 30. Jessica Buckley** characterized Bandelier Tuff (e.g., by measuring permeability, porosity, quartz content and strength) to assist in developing preservation strategies for chambers, known as cavates, that ancestral Pueblo people carved out of the tuff between the 13th and 16th century. (Primary Advisor: D. Porter)
- 31. David Grover** predicted depth to groundwater using artificial neural networks and remote sensing data (Primary Advisor: D. M. Rizzo)
- 32. Michael Ingrahm** performed landscape analysis to understand erosion on unpaved roads (Primary Advisor: B. Wemple)
- 33. Jason McCune-Sanders** performed an anaerobic digester feasibility study for a community in Middlebury Vermont (Primary Advisor: D.M. Rizzo)
- 34. Tamara Stone** analyzed the effect of humidity on measuring the size distribution of ultrafine particles (Primary Advisors: B.A. Holmén and T. Barrett)
- 35. Stephanie Wyman** identified aquatic worm taxa using qPCR to determine the health and water quality of Montana streams (Primary Advisors: L. Stevens and D.M. Rizzo)
- 36. David Zhang** studied the impact of swimming speed on bacterial adhesion processes. (Primary Advisor: J. Hill)

Undergraduates (Fall 2008 to Summer 2009):

- 37. Deirdre Collins** created and implemented hands-on projects, using inquiry-based learning and systems thinking, for CE3, a civil and environmental engineering course. (Primary Advisor: N. J. Hayden)
- 38. Benjamin Heath** studied the effectiveness of a stormwater system designed by Hamlin Engineering during three Chittenden storm events to illustrate relationships between rainfall and runoff in VT. (Primary Advisor: D. M. Rizzo)
- 39. Karl Hinrichs** created a method for quick detection of the Legionella Volatile Metabolite (responsible for legionnaire disease) Fingerprint Using Electrospray Ionization – Mass Spectrometry. (Primary Advisor: J. Hill)
- 40. Johanna Mayerhofer** focused on the purification and characterization of an enzyme of "*Pseudomonas aeruginosa* PA14 called phytase, which degrades phytic acid and cleaves phytate, an organic form of phosphorus. (Primary Advisor: J. Hill)
- 41. Allison Murphy** helped develop molecular genetic probes to analyze the DNA of *Tubifex tubifex*, the intermediate host of a parasite responsible for whirling disease, which damages neurological function in trout and salmon. (Primary Advisors: L. Stevens and D.M. Rizzo)
- 42. Scott Quinn** and
- 43. Michael Kreigh** studied the effects of biodiesel fuel on gaseous and particulate emissions. Their research helped verify the reduction of particle emissions using various biodiesel fuel mixtures. (Primary Advisor: B.A. Holmén)

44. Laura Townsend studied a variety of materials such as concrete, brick, sandstone, etc. during cycles of freezing and thawing to gather data research on the impact of various fluids on building materials. (Primary Advisors: M. Dewoolkar and D.M. Rizzo)

Undergraduates (Fall 2007 to Summer 2008):

45. Andrew Cooper developed a multi-spectral imaging solution using NIR light to help discriminate between wet and dry leaf matter to better detect the duration of leaf surface wetness and the onset of fungal infection in agricultural crops. (Primary Advisor: G. Mirchandani)

46. Nathan Dagesse created and documented a recipe/formula for the optimal mixture of cob – a sustainable earth building material, made up of clay and sand from areas in northern Vermont. (Primary Advisor: M. Dewoolkar)

47. Joseph Krupa investigated links between local weather climate data and in-stream temperature metrics and their effect (measured as stress protein response) in cold-water fish populations. (Primary Advisor: D.M. Rizzo)

48. Joseph Marri measured the performance and consistency of biodiesel fuels. The intent was to develop performance and emissions models that compared the behaviors of biodiesel to petrodiesel over time and among successive batches. (Primary Advisor: R. Jenkins)

49. Caroline McManus worked to “Put the Brakes on Legionnaires Disease” by developing a lab technique using a mass spectrometer and electro-spray ionization. The method provides a fingerprint for the bacterium that will aid in detection and species identification. (Primary Advisor: J. Hill)

50. Nathan Robinson developed a regional computer model of the transportation energy market to assist in making policy decisions that potentially shift the market to alternative energy sources for transportation. (Primary Advisor: D.M. Rizzo)

51. Joshua Tyler studied the eutrophication of Lake Champlain. Specifically, he is looking at industrial agricultural practices that could improve the environmental quality of the lake. (Primary Advisor: J. Hill)

Undergraduates (Fall 2006 to Summer 2007):

52. Charles Farmer studied the impact of bacteria on the chemistry of the subsurface porous media to promote the precipitation of calcite, for both enhancing the stability of soils and for sequestering pollutants such as highly toxic or radioactive metals. (Primary Advisors: M. Dewoolkar & N.J. Hayden)

53. Peter Larson structurally analyzed the Shelburne Farms breeding barn using an accelerometer to assess structural weaknesses that could cause the barn to collapse under heavy snows. (Primary advisor: J.G. Beliveau)

54. Jeremy Matt used image processing filters and artificial neural networks to assess the contaminant movement through building materials and for the prediction of leaf wetness, a leading indicator of disease in crops. (Primary Advisor: D.M. Rizzo)

55. Karen Sentoff investigated the impact of increased water temperature on cold water fish species in Vermont using highly resolved spatial temperature data in two Vermont streams. (Primary Advisor: D.M. Rizzo)

56. Iliana M. Vazquez-Spickers studied the affects on air quality of tailpipe emissions from Light Duty Vehicles. (Primary Advisor: B. Holmén)

Undergraduates (Fall 2005 to Summer 2006):

57. Danielle Eastman investigated sulfur-utilizing microbes in the Frasassi cave system of Italy (Primary advisor: G. Druschel, Co-advisor: D.M. Rizzo)

58. Ryan Foster investigated multiple soil parameters and their effects on stream bank stability. (Primary advisor: M. Dewoolkar, Co-advisor: D.M. Rizzo)

59. Aaron Hartmann assessed microbial communities and concentrations of limiting nutrients (nitrogen and phosphorous) in Missisquoi Bay as a driving force of species composition in cyanobacterial algal blooms. (Primary advisor: G. Druschel, Co-advisor: D.M. Rizzo)

60. Chris Palombini developed a wireless sensor platform for environmental monitoring projects. (Primary advisor: J. Frolik, Co-advisor: D.M. Rizzo)

61. Nathan Shaffer performed experimental studies to classify the erodibility of soils in dams, embankments, and levees. (Primary advisor: M. Dewoolkar, Co-advisor: D.M. Rizzo)

Undergraduates (Fall 2004 to Summer 2005):

62. Alaina Dickason tested the usefulness of LIDAR, a new high-resolution laser mapping technique, for use in river research. (Primary Advisor: D.M. Rizzo, Co-advisor: S. Conklin)

63. Jennifer Gagnon used artificial neural networks to explore the relationship between the physical characteristics of streams and the associated biological conditions. (Primary Advisor: W.C. Hession, Co-advisor: D.M. Rizzo)

64. Brendan Kennedy used advanced environmental sensor technologies, image processing filters and multiple types of data to better understand and measure soil moisture. (Primary Advisor: D.M. Rizzo, Co-advisor: M. Dewoolkar)

65. Tracy Owen used a new, six-meter experimental flume in the civil and environmental engineering hydraulics laboratory to model the impacts of downed trees on stream channel size and shape. (Primary advisor: M. McBride, Co-advisor: D. M. Rizzo)

Program: UVM Honors Thesis Program; Undergraduates (Spring 2008 to present):

66. **Sebastian Downs** (School of Engineering) Advisor, Spring 2013; Title: *TBD*
67. **Daniel Kendall** (School of Engineering) Committee member, Spring 2013; Title: *TBD*
68. **Meghan Thompson** (School of Engineering) Co-advisor with Maeve McBride, Spring 2012
Title: *Variations on engineered log jam designs and their impact on channel morphology: A series of flume experiments*
69. **Kristina Miele** (School of Engineering) Committee member, Spring 2012
Title: *Detecting Partially Damaged Gusset Plate Connections through Vibration-based Detection Models*
70. **Laura Townsend** (School of Engineering) Co-advisor with Dr. Mandar Dewoolkar, Spring 2010
Title: *Effects of Weathering on the Water and Gas Permeabilities of Porous Building Substrates*
71. **Connor Hayden** (School of Engineering) Committee member, Spring 2009
72. **Lauren Gilligan**. (Biology) Committee Member Spring 2008

Program: NSF Undergraduate Math & Biology Program; Undergraduates (Spring 2007):

Sara Baldwin (Co-advisor with L. Stevens) Thesis Title: Developing a system to count microscopic parasites of trout. The parasite (*Triactinomyxon*, or “TAM”) will be identified and counted using image processing and artificial neural networks.

Program: Grant Los Alamos National Laboratory; Undergraduates (2006):

73. **Marcy Brownell** studied contaminant transport through building materials using wicking and contact angle experiments and analysis of images from X-ray tomography and fluorescent microscopy. (Co-advisor D.M. Rizzo with N.J. Hayden)

Program: CE 295 Independent Study project; Undergraduates (2006):

74. **Charles Farmer** designed and constructed a stormwater treatment facility for the Votey parking lot. (Co-advisor with N.J. Hadyden)

Program: UVM URECA grants; Undergraduates (Spring 2004 and 2005):

75. **Jennifer Gagnon** presented “*Assessing Linkages between Stream Geomorphic Condition and In-stream Habitat*” at UVM URECA Research Days. (Gagnon, J., C.W. Hession, D.M. Rizzo, and C. Cianfrani. May 2005)
76. **Lance Besaw** presented “*Quantifying Surface Wetness in Support of Disease Prediction using Multiple Types of Crop Data*” at UVM URECA Research Days. (Besaw, L., D.M. Rizzo, and S. Conklin. May 2004)

Program: Vermont Agency of Natural Resources (2002 – 2003):

77. **Lance Besaw** was supported by a small grant entitled “*Environmental Statistical Analysis of Data for a Fuel Oxygenate Study*” during his junior year. He performed statistical analysis of data from fuel and groundwater samples for a fuel oxygenate study and presented the findings in several oral/PowerPoint presentations to the Vermont ANR Hazardous Materials Specialist, Richard Spiese. This research led to a follow-on grant to support additional research during Lance’s senior year.

Program: Senior design project for Civil Engineering student at RPI; Undergraduates (2002):

78. **Beth Soboslai** created an interactive continuous-flow stirred-tank reactor (CFSTR) using Simulink. Simulink (Mathworks Inc, Natick, MA) is a block diagram visual modeling tool that enables models to be created in an icon-based user interface.

NATIONAL SERVICE

Invited Panelist “Future Needs for Long-Term Stewardship”, ASCE 2003 World Water & Environmental Resources Congress, Philadelphia, PA, June 2003.

“Future Needs for Long-Term Monitoring Subsurface Monitoring Design”, ASCE 2001 World Water & Environmental Resources Congress, Orlando, FL, May 21, 2001.

“Long-Term Monitoring Design Workshop”, Argonne National Laboratory, IL, March 5-6, 2001.

“Decision Making under Uncertainty: Energy and Environmental Models”, The Institute for Mathematics and Its Applications (IMA) Workshop, The University of Minnesota, July 1999.

Vice Chair ASCE Long-Term Monitoring Committee, ASCE Joint Conference on Water Resources Engineering and Water Resources Planning & Management, 2000-2005. The committee produced an ASCE book

publication entitled, *Long-Term Groundwater Monitoring: The State of the Art*.

**Organizing
Committee
Member**

Committee member, led by Prof. Doug Porter, for hosting a two-day international colloquium devoted to developing undergraduate and graduate curricula for the UVM School of Engineering in historic preservation engineering. The program focused on quantitative techniques and methodologies applied to the engineering evaluation and remediation of heritage structures, and to ensure that students acquire the competencies necessary to address the challenges of the market. The event was hosted by the National Center for Preservation Technology and the UVM School of Engineering. June 2009.

Program committee member, 2010 Forum on Philosophy, Engineering, and Technology (FPET). A new initiative to foster dialogue among engineers and philosophers. Colorado School of Mines in Golden, CO, 9-10 May 2010 Program organizers: Dave Goldberg, Diane Michelfelder, and Carl Mitcham.

Member

ASCE/EWRI Standards Committee: *Fitting of Hydraulic Conductivity with Statistical Spatial Estimation (KSTAT)* to provide standard guidelines and practice documents for geostatistical spatial estimation and spatial averaging of hydraulic conductivity. 2000-2009.

Ground Water Management Committee, ASCE Joint Conference on Water Resources Engineering and Water Resources Planning & Management, 2000-2009.

Task Committee on Computational Issues in Optimal Aquifer Remediation, ASCE Water Resources Planning and Management Division Conference. Participated in committee's work to identify and address issues in large-scale optimization of groundwater systems, with particular attention to remediation problems, Boston 1995.

Session Chair

Co-Chaired (with J. Frolik and P.G. Flikkema) Session entitled: "Overcoming the Challenges of Multi-X Collaborations" at the *AESS 2011 Annual Meeting and Conference "Confronting Complexity"*, Burlington, VT, June 23-26, 2011

Co-Chaired, American Geophysical Union Session: Hydroepidemiology – Understanding Connections between Hydrology and Human Health, San Francisco, CA, Fall 2010 and 2011

NSF EPSCoR Water Dynamics Workshop Theme 2: Water Research Tools, Burlington, VT, 2008

ASCE-World Water & Environmental Congress, Honolulu, HI, 2008

ASCE-World Water & Environmental Congress, Tampa, FL, 2007

ASCE-World Water & Environmental Congress, Omaha, NE, 2006

ASCE-World Water & Environmental Congress, Anchorage, Alaska, 2005

ASCE-World Water & Environmental Congress, Salt Lake City, UT, 2004

ASCE-World Water & Environmental Congress, Philadelphia, PA, 2003

ASCE-World Water & Environmental Congress, Orlando, FLA, 2001

ASCE-Joint Conference on Water Resources Engineering and Water Resources Planning & Management, Minneapolis, MN, 2000.

**Professional
Society
Membership**

American Geophysical Union

American Society of Civil Engineers (National and Local Chapters)

American Society for Engineering Education

Association of Environmental Engineering and Science Professors

Chi Epsilon (Faculty Advisor 2002-2009)

Society of Women Engineers (Faculty Advisor 2002-2007)

Peer Reviewer

EPA Peer Review of final draft report and associated deliverables for a nation-wide industrial waste management project. U.S. Environmental Protection Agency, OSWER, 1999 and 2002

EPA Project Review Panel for the Optimization of Contaminated Groundwater Extraction Systems, Arlington VA, 1998.

Journal	Advances in Water Resources
Reviewer	Advances in Engineering Education ASCE Journal of Hydraulic Engineering ASCE Journal of Irrigation and Drainage ASCE Journal of Water Resources Planning and Management Computers and Geosciences Environmental Engineering Science Environmental Modelling and Software European Journal of Operations Research Ground Water Hydrology and Earth System Sciences IEEE Transactions on Neural Networks Journal of Computational Physics Journal of Environmental Engineering Journal of Hydrology Mathematical Geology Trends in Ecology and Evolution Water Resources Research
Proposal and Panel Reviewer	National Science Foundation (member of four panel reviews over the past five years and mail reviewer for six grant proposals) EPA EPSCoR (Experimental Program to Stimulate Competitive Research) DOE Laboratory Technology Research Review (All UVM EPSCoR proposal reviews are listed as University service below)

UNIVERSITY SERVICE

- Member of the cross-college faculty work group charged with "envisioning environment at UVM." This involves: conducting an inventory of UVM's environmental education and research strengths; identifying our comparative advantage; assessing "best practices" nationally & internationally; and developing potential models for organizing, supporting and maximizing this at UVM (Fall 2012 – present).
- Member of graduate college Ad hoc committee to structure protocols for the administration of the institutional grants program (aka Seed grants) (Fall 2012 – present).
- Invited speaker for UVM Center for Teaching and Learning, Topic: Balancing Teaching and Research (Fall 2011).
- Member on the President's Commission on the Status of Women (PCSW) (Fall 2008 – Fall 2010)
- Member of the UVM Transdisciplinary Research Initiative (while on sabbatical, Fall 2009). The process involved developing a proposal for a UVM Transdisciplinary Research Initiative on Complex Systems.
- Member of the Search Committee for UVM Vice President of Research and Graduate Studies (Spring 2009)
- Member of the Search Committee for UVM Provost and Senior Vice President position (2010)
- Appointed member of the Brownfields Advisory Committee (Act of the General Assembly No. 67 (S. 90)): The committee serves in an advisory role to the VT State Agency of Natural Resources and the Agency of Commerce and Community Development. It was created to develop proposed statutory and programmatic recommendations that promote the redevelopment of contaminated properties. (2007-2008).
- Board of Directors member: UVM representative for the Vermont Environmental Consortium (VEC). (2004 – 2008).
- Participant in the Vermont Public Television's "Emerging Science" Features UVM Program 2: Water and the Landscape, May 14, 2008.
- Core faculty and invited speaker at the American Association for the Advancement of Science (AAAS) Vermont EPSCoR Biocomplexity conference. (2007).
- Invited speaker at WISP (Women In Science Program) dinners, (Fall 2005 and 2006).

- Member of Vermont NSF-EPSCoR Focus Panel and Strategic Planning Workshop, (2002, 2005, and 2006)
- Member of the UVM DEPSCoR pre-proposal review committee, (2005).
- Member of the Vermont EPSCoR SBIR Phase 0 proposal review committee (2001, 2003, 2005 and 2008).
- Member of the UVM Interdisciplinary Evolutionary Computing Workshop (2000-2004).
- Co-hosted and interdisciplinary workshop (with DOE EPSCoR, Botany, Biology, Civil & Environmental Engineering, and Computer Science) entitled “Prospectus for a Golden Age of Computational Innovation: How Competent, Efficient Genetic Algorithms Will Change Our Future” presented by David E. Goldberg, Professor and Director of the Illinois Genetic Algorithms Laboratory, (April, 7 2003).
- Member of the Graduate College since January 1, 1996.

COLLEGE SERVICE

- CEMS representative to Center for Teaching and Learning Advisory Group (The group advises on developing strategic plans focused on supporting university-wide strategic initiatives, academic technology planning, and promoting outcome-based student learning assessments) (Sept. 2011- present).
- CEMS representative to the Graduate College Executive Committee (Sept. 2011- present).
- Member of nine faculty search committees. Each involved reviewing CVs, conducting phone interviews, campus interviews and attending candidate presentations).
 1. Geotechnical Faculty position, CEE (2013)
 2. Interim Provost and Senior Vice President (2010)
 3. Professor and Director of the GUND Institute for Ecological Economics (2010)
 4. Vice President for Research and Dean of the Graduate College (2009)
 5. School of Engineering Director position, (2009)
 6. Sensors and Control Systems Faculty position, (2007)
 7. Mechanical Engineering Faculty position, (2006)
 8. Director of the College of Engineering and Mathematical Sciences (2005)
 9. Mechanical Engineering Junior Faculty position, (2005)
 10. Mechanical Engineering Senior Faculty position, (2005)
 11. Chairperson search committee: Department of Mathematics and Statistics (2004)
 12. Geotechnical Faculty position, CEE (2002)
- CEMS representative to Curricular Affairs Committee of the Faculty Senate (2006 - present). This committee also involves subcommittee participation to perform and write Academic Program Reviews (APR) for programs on campus. To date, I’ve participated in four APR subcommittees (and have chaired 3 of the 4).
- CEMS representative for the UVM Geospatial Technologies Minor (2006 – present).
- Led efforts in the development, design and approval of UVM’s BA degree in engineering. The degree, offered jointly by UVM's College of Engineering and Mathematical Sciences and the College of Arts and Sciences, helps bridge traditional engineering and the liberal arts.
- Complex Systems Center Curriculum Committee member (2006 - present).
- Organizer, committee member (1992 – 1995), and judge (1996 – 2010) for the Annual Design TASC (Technology And Science Connection) Competition. TASC is an annual contest that encourages high school students to apply their knowledge of physics and mathematics in a tangible way.
- Member of CEMS 2008 Aiken Planning Committee that brought the thematic focus of Integrated Solutions to Global Environmental Problems and Dr. Gro Brundtland to the University of Vermont, 2008.
- Member of the UVM Leading by Design Task Force (<http://www.uvm.edu/~sstnblty/>).
- Presented at the CEMS Board of Advisors Meetings (Apr. 2006 – on complex systems in the environment and Apr. 2005 – an update of CEMS activities).
- College of Engineering & Mathematical Sciences Officer – Parliamentarian (09/04 - 05/06).

- Invited Participant in the Vermont EPSCoR Workshop to commission new dance work that investigates the relationship between dance and complex systems. This was a UVM partnership with the Flynn Theater in Burlington VT, the New England Complex Systems Institute, the Neuroscience Institute in San Diego, and Bennington College.

SCHOOL OF ENGINEERING SERVICE

- CEE representative to Student Affairs Committee of College of Engineering & Mathematics, (September 2005 – December 2011).
- Presented and participated in daylong visit to foster collaborations with Lockheed Martin, Fall 2010.
- Faculty Advisor, Chi-Epsilon September 2005 – 2008.
- Conducted a service-learning project entitled, “Innovations in Environmental Engineering”. This is a team effort with UVM, IBM and the Lake Champlain's Science Center and Lake Aquarium (ECHO). The focus involves mentoring home-schooled children (11–14 yrs old) to solve real engineering problems of mobility, while using the fun/inspiration of biomimicry (e.g., innovations inspired by nature). Students used engineering design to invent innovative methods to move people, goods, *etc.* that improve associated constraints (*i.e.*, amount of congestion, pollution, safety hazards), or reduce the need for transportation altogether.
- Faculty Advisor, Society of Women Engineers (SWE). We hosted a variety of outreach projects including Habitat for Humanity, Gizmo girls, and Engineers week, (September 2002 - 2007). (Details provided under high school outreach below.)
- Member and regular participant in the Order of the Engineer Ceremony, (2002 - 2012).
- Provide annual review sessions for fluid mechanics and engineering economics portions of the FE (Fundamentals of Engineering Exam), (Spring 2002 - 2012).
- Regular participant in Admitted Student Visitation Days, (2002 - present).
- Member of SoE Ad hoc Teaching Laboratories Committee, 2007.
- Faculty member representing School of Engineering at Homecoming Parents Weekend, (2002 and 2003, 2004, 2005, 2007 and 2009).

Additional High School Outreach:

- Training the next generation of scientists: Modeling Infectious Disease and Water Quality of Montana Streams. L. Stevens (Dept. of Biology) and I leveraged the Barrett Foundation funding with our NSF Biodiversity and Infectious Disease grant to develop outreach that integrates multiple disciplines (engineering, ecology, biology) and education levels (spanning secondary to graduate). Students and faculty across three departments (engineering, biology, and field ecology) at two universities (University of Vermont, Montana State University) and one independent high school (Vermont Commons School, located in So. Burlington, VT) formed a collaboration to better link complex geochemical data, biological community structure and molecular genetics necessary to develop next-generation scientists. Research included field and laboratory data collection, parameterization and development of a systems dynamic model to better understand the non-linear relationships and feedback between the hosts and parasites of whirling disease in fish. (Four graduate students, 5 undergraduates, and 5 high school students have collaborated and been funded since Summer 2009.)
- Collaborated with the Vermont Commons School involving system dynamics modeling and a US/China student exchange. The latter project, called the Systems Science Learning Project, was implemented long before online education or system dynamics modeling was popular at the high school level. The goal was to develop a systems-based curriculum that leveraged Chinese pedagogical strengths in the math and sciences with the U.S. strengths in problem solving and creativity. We worked remotely with Chinese students and faculty for three years to develop a curriculum that armed students with the common language of system dynamics to help better understand the world around them and tackle complex problems. It culminated with collaborative student exchanges and both oral and poster presentations at a systems modeling conference at Worcester Polytechnic Institute in Cambridge, MA.
- Faculty sponsor for the Vermont Helix/EPSCoR Outreach to high school teachers and students. The program is designed to link high schools to institutions of higher education. I was responsible for a weeklong workshop entitled: Watershed Classification using Artificial Neural Networks to Process Data

Collected at the Stream Reach Scale. This was selected by South Royalton High and resulted in Allison Murphy, a Vermont Green and Gold Scholar, deciding on a career in engineering.

- Co-developed (and taught) a Multi-Disciplinary Research Project (IMRP) for the Vermont Commons School (local high school) which led to the school's Research & Service course (<http://vermontcommons.org/academics-programs/research-service/>).
- Co-advised (with Dr. Lori Stevens) the UVM Abenaki Summer Happening Program, an outreach program designed to target minority high school students and introduce them to cutting-edge laboratory science (forensic DNA analysis of the insects that transmit Chagas disease). (August 2005).
- Community mentor for Tobi Drori, for her Senior Project (Vermont Commons School graduation requirement). Her project focused on Biomimicry, for which she developed a workshop for first-year UVM engineering students.
- Regular member of the faculty team representing the College of Engineering and Mathematical Sciences and an invited Speaker for the UVM Governor's Institute of Vermont College of Engineering & Mathematics summer programs. "Discovering Engineering, Mathematics & Computer Science Summer Program", (1995 - 1997, and 2000 – present).
- Problem judge for the 2002-2005, 2007, 2009, 2010 and 2012 Odyssey of the Mind Long-Term Problem.
- Judge for the 2002-2003 Aiken Challenge After Oil: The Future of Personal Transportation, (Apr. 15, 2003).
- As faculty advisor for SWE (2002 – 2007), we sponsored several high school outreach activities:
 - Habitat for Humanity
 - Engineer's Week – SWE sponsors the annual "Edible Car Contest" during Engineers week. The number of participants ranges from 80 to 186 high school students per year (Fall 2002 - 2007).
 - Gizmo Girls –co-sponsored by the UVM College of Engineering & Mathematics, the Vermont Girls Scouts and a grant from Lockheed Martin offers middle school females the opportunity to link with UVM engineering student mentors and experience the fun and excitement of doing engineering projects and activities. UVM students act as mentors and meet on a bi-monthly basis with their team of high school students. Highlights include: Two teams were selected (via a local competition) to participate in the 2003 National Sally Ride Toy Competition; seven teams competed in the 2004 Utopia competition that involves construction of a miniature scale model of a town or "imaginary city" that has all the resources and amenities that a girl might desire.
 - Mind-Works workshop – hosted at Lake Champlain's Science Center and Lake Aquarium (ECHO), and in collaboration with SWE and IBM, this event introduced young students to robotics and programming languages while building solar and wind-powered devices, (Spring 2007).

COURSES TAUGHT AND AVERAGE OVERALL RATING OF THE INSTRUCTOR

My teaching load has averaged 4-5 classes per year during my ten-year duration at UVM. In engineering, 4 credit courses have three 50-minute lectures and three 2 ½ - hour labs per week; this spring the number of labs was reduced to 2 labs/week. Until my sabbatical, I taught all labs without the help of a TA. I've developed (or co-developed) 15 different courses; descriptions are provided below.

(Average Instructor Ratings: 1=Poor; 2=Unsatisfactory; 3=Satisfactory; 4=Good; 5=Excellent)

# of Courses Taught	Course (Level)	# of Students	Credit Hours	Average Rating
1. Fall 2002	CE 160 Hydraulics (Junior)	29	3	4.58
	CE 160 Hydraulics Lab (sections A & B)	14 and 15	1	–
2. Spring 2003	CE 11 Computer-Based Tools for Engineers (Sophomore)††	42	3	4.36
	CE 11 Computer Lab (sections A & B)	20 and 22	1	–
3.	CE125 Engineering Economics (Senior)	34	3	4.82
4.	CE 295 Special Topics – Spatial Statistics for Stream Evaluation	3	3	–
5. Fall 2003	CE 160 Hydraulics (Junior)	30	3	4.58
	CE 160 Hydraulics Lab (sections A & B)	16 and 14	1	–
6.	CE 369 Applied Geostatistics (Graduate)	15	3	5.00
7. Spring 2004	CE125 Engineering Economics (Senior)	51	3	4.54
8.	CE 395 Applied Artificial Neural Networks (Graduate)	5	3	5.00
9. Fall 2004	CE 160 Hydraulics (Junior)	36	3	4.58

	CE 160 Hydraulics Lab (sections A & B)	17 and 19	1	–
10.	CE 395 Advanced Computational Systems (Graduate)	13	3	4.99
11. Spring 2005	CE125 Engineering Economics (Senior)	42	3	4.56
12.	CE 295 Special Topics – Applied Computational Biomechanics	2	3	–
13.	CE 395 Engineering & Science Ethics (Graduate)	10	1	–
14. Fall 2005	CE 160 Hydraulics (Junior)	37	3	4.84
	CE 160 Hydraulics Lab (sections A & B)	15 and 22	1	–
15.	CE 369 Applied Geostatistics (Graduate)	12	3	4.91
16.	GEOL 371 Communicating What We Know About Science††	13	1-3	–
17. Spring 2006	CE125 Engineering Economics (Senior)	45	3	4.63
18.	CE 295-C Water Resources Engineering II (Senior)	14	3	4.63
19. Fall 2006	CE 160 Hydraulics (Junior)	35	3	4.89
	CE 160 Hydraulics Lab (sections A & B)	20 and 15	1	–
20.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
21. Spring 2007	CE125 Engineering Economics (Senior)	47	3	4.57
22.	CE 132 Environmental & Transportation Systems (Sophomore)††	44	3	–
23.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
24. Summer 2007	CE 295 / GEOL 295 / GEOL 297 / NR285 Watershed Field Camp††	12	3	–
25. Fall 2007	CE 160 Hydraulics (Junior)	39	3	4.89
	CE 160 Hydraulics Lab (sections A & B)	19 and 20	1	–
26.	CE 133 Decision Analysis in Environ. & Transportation Systems††	34	3	–
27.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
28.	CE 359 Applied Artificial Neural Networks (Graduate)	8	3	5.00
29. Spring 2008	CE 134 Environmental & Transportation Systems (Junior)	31	3	4.61
30.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
31. Fall 2008	CE 160 Hydraulics (Junior)	47	3	4.75
	CE 160 Hydraulics Lab (sections A & B)	22 and 25	1	–
32.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
33.	CE 369 Applied Geostatistics (Graduate)	12	3	5.00
34. Spring 2009	CE 134 Modeling Environmental & Transportation Systems (Junior)	43	3	4.14
35.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
36.	CE 295 / GEOL 295 / GEOL 297 / NR285 Watershed Field Camp††	14	4	–
37. Fall 2009	ON (split-year) SABBATICAL LEAVE	8	1-2	–
38.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
39. Spring 2010	CE 134 Modeling Environmental & Transportation Systems (Junior)	59	3	3.82
40.	BIOL 196 Math-Bio Program Activities†	8	1-2	–
41.	CE 359 Applied Artificial Neural Networks (Graduate)	10	3	5.00
42. Fall 2010	ON (split-year) SABBATICAL LEAVE			
43. Spring 2011	CE 134 Engineering Systems Modeling (Junior)	77	3	4.10
44.	CE 369 Applied Geostatistics (Graduate)	12	3	4.90
45. Summer 2011	CE 195 Intr. to System Dynamics Modeling (First Year)	6	3	4.91
46. Fall 2011	CE 160 Hydraulics (Junior)	71	3	4.80
	CE 160 Hydraulics Lab (sections A, B & C)	25, 25 and 21	1	–
47.	CE 134 Engineering Systems Modeling (Junior)	66	3	4.80
48. Spring 2012	CE 359 Applied Artificial Neural Networks (Graduate)	6	3	4.80
49. Summer 2012	CE 195 Intr. to System Dynamics Modeling (First Year)	4	1-3	–
50. Fall 2012	CE 160 Hydraulics (Junior)	47	3	–
	CE 160 Hydraulics Lab (sections A, B & C)	24 and 23	1	–
51.	CE 134 Engineering Systems Modeling (Junior)	50	3	–
52. Spring 2013	CE 295 Subsurface Site Characterization (Senior Design course)	19 seniors, 5 grad	3	In progress

† Given the intimate nature of this particular course, the small number of students (8-10 students) and the interpersonal relationships that developed over the students' four-year tenure at UVM, we did not administer traditional department course evaluations. Instead, we worked closely with an external party, who was paid to perform quarterly assessments/evaluations. This material is being published. It does not exist in a conventional evaluation format and is not included in this document.

†† Denotes interdisciplinary courses co-taught by two (or more) faculty. I have not reported the overall instructor rating or student evaluations for courses involving multiple instructors.

1. **CE 11 – Computer-based Tools for Civil Engineers††:** This is a sophomore-level, four-credit course, required of all civil engineering majors. In the spring 2003, I taught this course in collaboration with Dr. Hession to 42 students (38 undergraduates as well as 4 graduate students who sat in to learn MatLab®). The course provides an introduction to computer programming using MatLab®, the use and applications of GIS, and the Global Positioning System (GPS) in civil engineering. My teaching responsibilities included the computer programming (MatLab®) material. Applications of this high-level language with visualization tools enable students to solve a variety of engineering problems. I taught the first 7 weeks of the course including two (3 ½ hr) labs per week (no Teaching Assistant). Students' grades were based on a final exam, weekly quizzes, and six computer labs.

2. **CE 125 – Engineering Economic Analysis:** This is a three-credit course required by all senior-level civil engineering students. (A total of 213 students have taken the course over 5 semesters – 144 CEs, 35 MEs, 19EEs, and 21 EGMT.) The focus is on the comparison of engineering alternatives, economic evaluations (including the time value of money, rate of return and cost/benefit analysis, taxes and depreciation), project optimization, scheduling and budgeting. Nonlinear optimization methods, uncertainty analysis, and simulation are emphasized. Students are briefly introduced to a variety of tools that enable social issues (essentially penalties for not meeting constraints) to be considered in the site cost/objective functions. Grading is based on two 1-hr exams, weekly homework problems, in-class quizzes, one group project and a final exam.

3. **CE 132 – Environmental/Transportation Systems††:** This is a three-credit course designed for sophomore engineering students. CE 132 is the first course in a series of systems courses that evolved from our NSF curriculum reform grant and was taught in collaboration with the other Co-PIs (Hayden and Sadek). It provides an introduction to systems thinking and a systems approach to solving problems. Material includes ecological and transportation systems components, interactions, and relationships; feedback and emergent properties; systems modeling, management and economic evaluations. The course uses a case study and a custom-built system dynamics simulation to complement the course material. The “Turtle Islands Archipelago” simulation was designed in STELLA® as an ecosystem management exercise to emphasize group work, adaptive and strategic planning, writing and systems thinking. Grading is based on 2 exams, weekly homework assignments and quizzes, six journal entries and a comprehensive final.

4. **CE 133 – Decision Analysis in Environmental & Transportation Systems††:** This three-credit course, designed for junior-level engineering students, is the second in a series of systems courses developed as a result of our NSF curriculum reform grant. The focus is on decision analysis tools and their application to environmental and transportation systems. Specific topics include: planning analysis, capacity and signal analysis, incremental benefit-cost ratio and rate of return analysis, linear programming, multi-objective optimization, demand forecasting and LP models of network flow. Grading is based on two exams, weekly homework assignments, in-class quizzes and a comprehensive final.

5. **CE 134 – Engineering Systems Modeling:** This is the third in a series of systems courses to create an awareness of systems and ability to identify the interactions among people, economic forces and environmental responses. We unified three subjects that existed independently in our engineering curricula with a focus on how human systems of economy become enmeshed with environmental concerns. The learning objectives are to:
 1. apply systems thinking and a systems modeling approach to solving engineering problems,
 2. apply mass balance concepts to environmental and transportation problems,
 3. identify feedback loops and models that commonly appear in natural systems (e.g. exponential growth, logistic growth, overshoot) to better understand how the underlying mechanisms of a dynamic system work (determine how a system maintains stability or identifies mechanics by which stability is jeopardized under a range of assumptions, conditions, and applications),
 4. apply modeling skills (e.g., behavior-over-time graphs, stock/flow diagrams, and causal loops) to assist in developing a causal viewpoint and sustainable outlook for a variety of engineering applications,
 5. apply fundamental principles of engineering economics to engineering problems,
 6. predict future performance of an existing system for the purpose of evaluating the impact of transportation systems on the environment and ways to mitigate impact,
 My intent is that improving understanding of these system patterns (and often the unintended emergent, consequences) will help students consider engineering design issues more fully and resist the urge to come to quick conclusions. In short, develop long-term sustainable thinkers/planners. Grading is based on 2 exams, weekly homework assignments and quizzes, six journal entries and a comprehensive final.

6. **CE 160 – Hydraulics:** This is a junior-level four-credit course, required of all civil engineering majors. The course material covers the mechanics of incompressible fluids including: fluid statics and dynamics, dimensional analysis, dynamic similitude, flow in closed conduits and open channels, and elements of hydraulic machinery. I teach the lecture as well as the two laboratory sections. The labs include a 45-minute lecture and weekly (2½ hr) laboratory exercises of flow, hydraulic properties and machinery and hand in a total of eight formal lab reports. Grading is based on three exams, weekly homework problems, one computer project, eight lab reports, and a final exam, and a pipe network analysis program using MatLab® (or other language of their choice) to reinforce programming skills learned in CE11/CS16/CS 20.
7. **BIOL 196 – Math-Biology Program Activities††:** This was a 1-2 credit colloquium required of the *National Science Foundation (NSF) UMEB* grant entitled; “Diversity & Excellence in environmental biology” that Dr. Stevens (Department of Biology) and I procured in 2006. The colloquium met for 1 hr/wk each semester for the duration of the 5-year grant. It included recruitment of students from under-represented groups, the development of cross-disciplinary and interdisciplinary research and scholarship, training in problem-oriented computer modeling, introductory statistics, population genetics and a capstone spatial statistics course. The colloquium is devoted to developing peer-reviewed research proposals, followed by a summer field research project for which Dr. Stevens and I are the primary and/or secondary advisors.
8. **CE 295 – Special Topics – Spatial Statistics for Stream Data Evaluation and Applied Computational Biomechanics:** These 3 credit courses were designed for three and two graduate students, respectively, who needed specific computational skills to analyze data collected for their research to meet graduation deadlines. Material for the *Spatial Statistics for Stream Data Evaluation* course focused on a variety of multivariate statistics, gradient analysis (both direct and indirect analyses), and geostatistical techniques to predict variation patterns given spatially and temporally correlated Vermont stream data. The *Applied Computational Biomechanics* course focused on computational methods for calculating continuous strain fields from sparse data (intervertebral discs) obtained using roentgen-stereophotogrammetry.
9. **CE 295C – Water Resources Engineering II:** This course is an introduction to physical hydrology and temporarily replaced the normal course offerings of CE 260 – Hydrology and CE 261 – Open Channel Flow. Material covers key topics in each of these two courses and several topics in groundwater to emphasize the linkages between the three subject areas. This course is an engineering design elective and, therefore, involves the application of hydrologic principles in the design of civil engineering projects. Specific goals include: Understanding the basic principles of hydrology; Aptitude for collecting, analyzing, and describing hydrologic data; Broad awareness of hydrologic resources, techniques, models; Ability to apply hydrologic techniques to solve design problems. Grading is based on weekly homework and lab assignments, two in-class exams, a final design project (e.g., an alternative storm water treatment technique for the Votey parking lot) and a written report written in manuscript format. Graduate students pursue an independent final project.
10. **CE 295 – Subsurface Site Characterization††:** This is a graduate/senior design course co-taught by Dr. Dewoolkar and myself. It provides a comprehensive approach to subsurface site characterization for geotechnical and environmental designs and a systems approach for integrating the two. The course goals are to: (1) provide an understanding and appreciation of the importance of subsurface site characterization and associated parameter evaluation in geotechnical and environmental engineering; (2) provide students with an understanding and appreciation of the importance of design verification and construction monitoring in geotechnical and environmental engineering, and (3) provide a comprehensive understanding of laboratory and field testing methods as tools for geotechnical and environmental site characterization. Grading is based on weekly homework, two design projects, and an oral presentation.
11. **CE 295 / GEOL 295 / GEOL 297 / NR285 – Watershed Field Camp††:** This four-credit summer field course was a result of an NSF interdisciplinary education grant. I co-taught this 40-hrs/wk course with four other faculty (P. Beirman and G. Druschel from Geology; B. Wemple from Geography and M. Watzin from the Rubenstein School of Environment and Natural Resources). The Winooski River watershed, home to the field camp, stretches from the alpine peaks of the Appalachian Mountains to the urbanized, lowland margins of Lake Champlain, providing an ideal transect for training students in humid-temperate watershed systems. Students worked across a continuum of elevation and human impact beginning in paired high-altitude, mountain basins and working down tributaries and the main stem river to the lake. Each week, the students spent three days in the field, one day in the lab, and one day collating and analyzing data. Students learned specific data collection skills: landscape and geologic mapping using both traditional paper and state-of-the-art GPS tools; flow, water quality, physical property, and

geochemical data acquisition both in the field and in laboratory; and, ecological assessment. Grading is based on group participation, weekly reports and a final presentation.

- 12. CE 369 – Applied Geostatistics:** This is a three-credit graduate course taught alternate years. The objective is to develop a fundamental understanding of the theory of regionalized variables (*i.e.*, produce the “best” estimation of an unknown value at some location within an area). This course provides an introduction to geostatistics (techniques known as kriging – including simple, ordinary, co-, indicator, probability, and factorial kriging methods) including some special methods in multivariate analysis. The subject is discussed at several levels of mathematical complexity; however, emphasis is placed on applying the methods to actual data. Students are required to utilize one or more software packages and expected to be comfortable with at least one programming language. Grading is based on 6 homework assignments, 1 team site characterization project using data from a real site, 1 journal article review, and a final paper and presentation describing their individual research project. Students are encouraged to find their own data sets (although real data are provided if needed). The analysis of real data exposes students to the challenges and surprises associated with real complex problems.
- 13. CE 395 (now 359) – Applied Artificial Neural Networks:** This is a three-credit graduate course taught alternate years. This course introduces both artificial and biological neural networks to engineering graduate students. Students experiment with artificial neural networks (ANNs), by studying and implementing a few (eight) ANN paradigms. A broad range of applications and equations that govern each networks’ computation are provided. Students are expected to code (in a language of their choice) each of the algorithms. Grading is based on eight programming assignments, critical reviews of journal articles, a final project and presentation describing an individual research project.
- 14. CE 395 – Advanced Computational Methods:** The objectives of the course are to develop a fundamental understanding of computational numerical methods capable of solving problems that are common in engineering practice (*i.e.*, handling large systems of equations, nonlinearities, and complex geometries). The study of computational methods reinforces the understanding of mathematics, computers and commercial programs. Many problems cannot be solved using existing commercial software (and/or analytical solutions). As a result, the successful implementation of computational numerical methods enables students to solve otherwise intractable problems. Grading is based on 6 programming assignments (written in MatLab®), a final project and presentation related to their individual research interests, and a final exam.
- 15. CE 395 – Engineering & Science Ethics:** This is a one-credit graduate seminar (required of all students funded on NSF grants). The course uses the reading and discussion of journal articles and popular papers to stimulate discussion and further understanding of the ethical issues common in science and engineering practice. Each week, the group is responsible for reading 1-2 papers. Individual students alternate the responsibility for directing the group discussion and for preparing questions to stimulate discussion should it happen to wane.
- 16. GEOL 371 – Communicating What We Know About Science††:** This is a variable credit (1-3) graduate seminar originally developed by Dr. Paul Bierman (Geology Department). In the fall of 2005 and 2007, I had the pleasure of co-teaching this seminar. Student-initiated topics were selected as catalysts to examine how we write about science. The reading and discussion of journal articles and popular papers were used to further the understanding of current topics in geologic, climatic and ecological history, as well as to help us all deal with the difficulties of communicating science well. Each week, the group read two to three papers and spent the evening discussing the content of these papers and the author’s approach to collecting and presenting data and opinions. After the first four weeks, students rotate the responsibility for directing the class discussion of the papers.