

Curriculum Vitae

Patricia J. Culligan

Robert A. W. and Christine A. Carlton Professor of Civil Engineering & Engineering Mechanics
Founding Associate Director, Institute for Data Sciences and Engineering
Co-Director, The Urban Design Lab of the Earth Institute
Columbia University, New York, NY 10027
Tel: 212 854 3154; Fax: 212 854 6267; E-mail: pjc2104@columbia.edu

Education:

<u>School</u>	<u>Degree</u>	<u>Date</u>
Université d'Aix-Marseille III	Diplome de Langue, Litterature et Civilisation (avec Mention)	1993
Cambridge University	Ph.D.	1989
Cambridge University	M.Phil.	1985
University of Leeds	B.Sc. Hons. (Civil Engineering)	1982

Principal Fields of Interest:

Water Resources; Porous media flow and transport; Geo-environmental engineering; Urban sustainability & Smart Cities

Career History:

<u>Employer</u>	<u>Position</u>	<u>Beginning</u>	<u>Ending</u>
Columbia University	Founding Associate Director, Data Science Institute (DSI)	July 2012	present
Columbia University	SEAS Vice-Dean for Academic Affairs	Jan 2010	July 2012
Columbia University	Full Professor	July 2005	present
Columbia University	Associate Professor	July 2003	June 2005
Massachusetts Institute of Technology	Associate Professor	July 1998	June 2003
Massachusetts Institute of Technology	Assistant Professor	July 1994	June 1998
City University, London	Honorary Visiting Research Fellow	Oct 1993	Jun 1994
University of Western Australia	University Postdoctoral Research Fellow	Dec 1989	Jul 1992
City University	Research Fellow	Mar 1989	Nov 1989
Cambridge University	Graduate Research Assistant	May 1984	Feb 1989
C.H. Dobbie & Partners	Graduate Engineer	Sept 1982	Apr 1984

Professional Registration: Chartered Engineer with the UK Engineering Council (Reg. No. 436148)

Publications: 6 books; 5 book chapters; 108 refereed articles; 44 other major publications (National Academy Reports; Professional Periodicals, etc.).

Theses Supervision: 5 Bachelors; 26 Masters; 19 Doctoral as Supervisor (3 in progress); 33 Doctoral as Reader (1 in progress).

Research Funding: Funding as Columbia University faculty member [2003 - 2016] \$20,277,000 (\$12,271,000 as PI).

Academic Leadership/ Management: Founding Associate Director, Columbia University's Data Science Institute; Vice-Dean of Academic Affairs for Columbia's School of Engineering & Applied Science (SEAS); Founder of SEAS Office of Faculty Development and Diversity; Co-Chair of Provost's Task Force on Women and Minorities in Science and Engineering; Founder of SEAS Education Center for Sustainable Engineering; Graduate of Harvard University's 2009 Management Development Program.

Awards and Honors Received:

<u>Award/ Honor</u>	<u>Date</u>
G.A. Leonard’s Lecturer, Purdue University	2017
Robert A. W. and Christine A. Carlton Endowed Chair	2016
Columbia University’s Great Teacher Award	2015
Norma Slepecky Memorial Lecturer, Syracuse University	2014
Women in Science and Engineering Award for Leadership in Sustainability, University of Wisconsin, Madison	2013
Elected to the Board of Governors, ASCE Geo-Institute	2011
Plenary Speaker, National Academies <i>Frontiers of Engineering Education</i>	2011
Plenary Speaker, American Society of Civil Engineers Annual Geo-Institute Conference	2008
ASCE Journal of Geotechnical and Geo-Environmental Engineering, Editorial Board Member of the Year	2007
Columbia University Presidential Award for Outstanding Teaching	2007
Plenary Speaker, Sixth International Conference on Physical Modeling in Geotechnics	2006
Columbia Engineering School A. & J. Avanesians Diversity Service Award	2006
Columbia Engineering School Distinguished Faculty Teaching Award	2006
Invited Participant, Women in Engineering Leadership Institute (WELI) 2005 Leadership Conference	2005
Idaho National Environment and Engineering Laboratory, Academic Center for Excellence (ACE) Faculty Fellowship	2001
Arthur C. Smith Award for contributions to undergraduate life at MIT	1999
National Science Foundation CAREER Award	1999
Edgerton Career Development Chair	1996
University of Western Australia Mosey Visiting Fellowship	1996
Jasper and Marion Whiting Foundation Travel Fellowship	1996
Queen’s University, Canada Visiting Scholarship	1995
British Council Academic Links Award for Research Collaboration	1994
University of Western Australia, Postdoctoral Research Fellowship	1989-1992
British Institution of Civil Engineers Prize for “outstanding undergraduate work”	1982

National Academies Service

<u>Activity</u>	<u>Beginning</u>	<u>Ending</u>
Review coordinator: “ <i>Waste Management and Disposition: Proceedings from a Workshop</i> ”	Mar 2017	April 2017
Invited Expert, GAO Meeting on the DOE’s Treatment of Hanford Low Activity Tank Waste (hosted by National Academies)	May 2016	
Chair, Board of Earth Sciences and Resources Committee on Geological and Geotechnical Engineering	April 2014	Jan 2016
Member, National Academies National Research Council Workshop Planning Committee on Best Practices for Risk Informed Remedy Selection, Closure and Post-Closure Control of Contaminated Sites	May 2013	July 2014

Member, National Academies National Research Council Committee on the Analysis of Cancer Risks in Populations Near Nuclear Facilities: Phase 1	Feb 2011	March 2012
Member, Nuclear and Radiation Studies Board	April 2008	Dec 2013
Member, National Academies National Research Council Committee on Development and Implementation of an EM Cleanup Technology Roadmap	Mar 2007	Mar 2009
Member, New York Academy of Sciences Steering Committee for Green Science and Engineering Systems Initiative	May 2006	Sept 2008
Member, National Academies National Research Council Committee on Management of Certain Radioactive Waste Streams Resulting from Reprocessing Tank Waste at DOE Sites (Congressionally Mandated Study)	Mar 2005	Mar 2006
Member, National Academies National Research Council Committee on Opportunities for Accelerating Characterization and Treatment of Wastes at DOE Nuclear Weapons Sites	Oct 2003	Jan 2005
Member, National Academies National Research Council Committee on Long-Term Institutional Management of DOE Waste Sites	July 2001	June 2003

Editorial Board Membership

Associate Editor, Vadoze Zone Journal	Feb 2008	Sept 2011
Associate Editor, AGU Water Resources Research	Jan 2007	Jan 2011
Editorial Board Member, International Journal of Physical Modelling in Geotechnics	April 2000	July 2010
Editorial Board Member, Electronic Journal of Geotechnical Engineering	May 1996	April 1999

Service to Professional Associations (all by invitation only):

<u>Activity</u>	<u>Beginning</u>	<u>Ending</u>
Organizing Committee, U.S. National Science Foundation's Sustainable Smart Cities International Workshop, Alexandria, Egypt, May 8-11 th , 2017	Jan 2017	Present
Organizing Committee, NSF Workshop on Geotechnical Fundamentals, Washington D.C., July 17- 19 th , 2017	Jun 2015	July 2017
Member, Board of Governors, ASCE Geo-Institute	Sept 2011	Sep 2014
Organizing Committee, 17 th International Sustainable Development Research Conference, Columbia University, May 8 – 10 th , 2011	Sept 2010	May 2011
Member, Nominations and Elections Committee, Geo-Institute of ASCE	Feb 2009	Feb 2010
Organizing Committee, ISSMGE International Conference on Physical Modelling in Geotechnics, Zurich, Switzerland, June 2010	Jan 2009	July 2010
Member, ASCE Huber Award Selection Committee	Jan 2009	present
Member, ASCE Paper Awards Committee	Jan 2008	Jan 2011
Chair, Geo-Institute of ASCE Awards Committee	Aug 2007	July 2010
Organizing Committee, ASCE GeoCongress 2008: The Challenge of Sustainability in the Geo-environment, New Orleans, Louisiana, March 9 – 12 th , 2008	Nov 2006	Feb 2008
Organizing Committee, ISSMGE International Conference on Physical Modelling in Geotechnics, HKUST, Hong Kong, 4 – 6 August, 2006	July 2004	August 2006
Co-Chair, ISSMGE 12th Panamerican Conference on Soil Mechanics & Geotechnical Engineering and 37th U.S. Rock Mechanics Symposium, Soil & Rock America 2003, Cambridge, USA, June 22 – 26, 2003	June 2000	June 2003

Member, Technical Committee on Centrifuge and Physical Model Testing (TC2), International Society for Soil Mechanics & Geotechnical Engineering	May 1999	July 2010
Member, International Advisory Board for Network of European Centrifuges for Environmental Geotechnics Research	July 1998	June 2000
Member, ASCE Geo-environmental Engineering Committee	July 1995	present
Organizing Committee, ISSMGE International Conference on Physical Modelling in Geotechnics, Newfoundland, Canada, 10 – 12 July, 2002	Sept 1998	July 2002

National Science Foundation Review Panels (Since joining Columbia only):

<u>Panel</u>	<u>Date</u>
Unsolicited Proposals: NSF Geomechanics and Geotechnical Systems	April 2017
Coastal SEES proposals	March 2014
PIRE pre-proposal reviews: NSF Wide	Jan 2012
Unsolicited Proposals: NSF CMMI Division	Jan 2011
IGERT Systems Proposals, NSF Directorate of Human Resources	June 2010
Innovation in Engineering Education Program, NSF Directorate of Human Resources	May 2008
ADVANCE PAID Proposals, NSF Directorate of Human Resources	March 2008
Unsolicited Proposals: NSF Geomechanics and Geotechnical Systems	June 2007
Canadian National Research Council: Site Visit for Industrial Chair, Guelph University	Feb 2007
CAREER Proposals: NSF Civil & Mechanical Systems Division	Sept 2004
NSF Major Research Instrumentation: Civil & Mechanical Systems Division	March 2004

Administrative Responsibilities Within Columbia University:

<u>Responsibility</u>	<u>Beginning</u>	<u>Ending</u>
<i>University Wide</i>		
Member, Committee on Global Thought	May 2017	present
Member, Selection Committee for Presidential Teaching Awards	Feb 2016	present
Advisory Board, Center for Science and Society	Nov 2014	present
Member, School of Continuing Education Executive Committee	Aug 2013	July 2016
Member, Review Committee for Provost's Diversity Grants	April 2013	present
Member, Committee on Admissions and Financial Aid (CAFA)	Sept 2012	July 2013
Associate Director, Institute for Data Sciences	July 2012	present
Co-Chair, Provost's Task Force on Faculty Development	Nov 2008	April 2009
Member, SEAS Dean's Search Committee	Sept 2008	March 2009
Co-Chair, Provost's Task Force on Women & Minorities in Science & Engineering	Sept 2007	Sept 2009
Selection Committee, Presidential Teaching Awards for Graduate Students	Dec 2006	May 2009
Search Committee, Vice-Provost of Diversity and Faculty Development	Dec 2006	May 2007
Member, Faculty Advisory Committee on Undergraduate Studies in Sustainable Development	Feb 2006	present
Member, Presidential Advisory Committee on Diversity Initiatives	Sept 2005	April 2009

The Earth Institute at Columbia University

Member, Nomination Committee for Associate Chair of Faculty	Sept. 2015	
Co-Director, Urban Design Lab	Sept. 2012	present
Organizing Committee & Plenary Speaker, The Green Roof Science Symposium, Columbia University, April 17 th 2012	Sept 2011	April 2012
Chair, Ad Hoc Committee on Lamont Professor Nominations	Oct 2010	Nov 2010
Earth Institute Faculty Member	June 2009	present
Member, Earth Institute Practice Committee	Jan 2009	June 2010
Member, Earth Institute Education Committee	Nov 2007	present
Member, Earth Institute “Earth Clinic” Steering Committee	Feb 2007	present
Selection Committee, Earth Institute Post-doctoral Fellows	Oct 2004	Sept 2008
Co-PI the Earth Institute’s ADVANCE Program	Sept 2005	Aug 2010

School of Engineering and Applied Science (SEAS)

Member, Task Force on MS and Executive Programs	Sept 2013	Jan 2014
Member, Search Committee for SEAS Director of Facilities	April 2012	July 2012
Chair, Search Committee for Department Chair of Biomedical Engineering	Nov 2010	May 2011
Vice-Dean of Academic Affairs	Jan 2010	July 2013
Director, Education Center for Sustainable Engineering	Jan 2008	June 2010
Faculty Advisor, Columbia University Engineers Without Borders	Jan 2005	July 2009
Co-Chair, SEAS Faculty Development & Diversity Initiatives Committee	Sept 2005	Dec 2009
Faculty Advisor; Women in Computer Science and Engineering (WICSE)	Sept 2005	Sept 2006

Department of Civil Engineering & Engineering Mechanics

Member, Faculty Search Committee	Oct 2015	May 2016
Chair, Faculty Search Committee	Oct 2013	May 2014
Graduate Admissions Committee	Sept 2009	present
Faculty Search Committee in Experimental Mechanics	Nov 2007	June 2008
Graduate Admissions Committee	Dec 2005	Sept 2007
Faculty Search Committee in Construction Management	March 2005	March 2006
ABET Committee	March 2005	Sept 2009
PhD Qualifying Committee	Oct 2003	present
Director, Water Resources and Environmental Engineering Concentration	Sept 2003	present

Recent Funded Projects (Since joining Columbia University in 2003)

- 2016 – 2019 Principal Investigator (Co-PIs McKeown, Meinrenken & Mehmani) Reducing plug-load electricity footprint of residential buildings through low-cost, non-intrusive sub-metering and personalized feedback technology, DOE Collaborative Agreement \$1,530,000.00.
- 2016 – 2017 Co-Principal Investigator (PI Fuchs) Stopping Trash Where it Starts, New York City Department of Environmental Protection, \$100,000.00
- 2016 – 2018 Principal Investigator Coastal SEES: Developing High Performance Green Infrastructure Systems to Sustain Coastal Cities, Supplement for *NSF Connected Communities Initiative*, \$139,846.00
- 2015 – 2019 Co-Director (Director, Ramaswami - U. Minnesota, Co-Director, Russell - Georgia Tech), SRN: Integrated Urban Infrastructure Solutions for Environmentally Sustainable, Healthy and Livable Cities, NSF Collaborative Agreement \$12,000,000.00 (CU portion \$2,500,000.00)
- 2015 – 2017 Principal Investigator, Quantifying and modeling the long-term performance of urban green roofs for stormwater in New York City, EPA \$43,996.00
- 2014 – 2016 Co-Principal Investigator (PI McKeown), Interface of the Natural Sciences and Data Sciences, Sloan Foundation and Gordon & Betty Moore Foundation, \$705,000.00
- 2013 – 2018 Principal Investigator (Co-PIs Becker, Gerrard, McGillis & Plunz), Coastal SEES: Developing High Performance Green Infrastructure Systems to Sustain Coastal Cities, NSF \$2,999, 838.00
- 2012 – 2017 Principal Investigator (Co-PI Simon), Sustainable Engineering Graduate Scholars Program, NSF \$594,990.00.
- 2010 – 2013 Principal Investigator (Co-PIs Gaffin; McGillis), Quantifying the Quantity and Quality of Runoff from Urban Green Roofs, *EPA*, \$100,000.00.
- 2010 – 2014 Principal Investigator, Saturated Particle Transport in Porous Media: An Investigation into the Influence of Flow Direction and Particle Size Distribution, *ARO*, \$236,149.00.
- 2010 – 2011 Co-Principal Investigator (PI Gaffin, co-PI McGillis), Direct Green Roof Storm Water Mitigation Measurement at Con Edison Green Roof Facility at 43-82 Vernon Boulevard, Queens, New York, *Con-Edison*, \$69,907.00.
- 2009 – 2011 Co-Principal Investigator (PI Blaustein, co-PIs Orff, Plunz & Sclar), The Accra Millennium Cities Initiative, *Private-Donor*, \$400,000.00.
- 2009 – 2013 Principal Investigator (co-PIs, Gaffin and McGillis): Quantifying the fundamental behavior of green roofs in an urban environment, *NSF* \$476,020.00.
- 2009 - 2016 Principal Investigator (co-PIs, Beauregard, Deodatis, Modi & Plunz): IGERT: Solving Urbanization Challenges by Design – A New PhD Program Between Architecture & Engineering, *NSF*, \$2,959,994.00.
- 2009 Principal Investigator, *Earth Institute Internship Support*, \$7,200.00.
- 2008 – 2010 Principal Investigator, (co-PIs, Keeley, Plunz, Vlachopoulos, Rosenweig, Gaffin, McGillis): Neighborhood Green Infrastructure: Planning for climate change adaptation in Harlem's 125th Street corridor, *Earth Institute Earth Clinic Seed Funding*, \$29,620.00.

- 2008 – 2009 Co-Principal Investigator (PI Taylor, co-PIs Plunz, Siegal of UT Austin): Coupling technology and organizational dynamics to induce energy efficient behavior, *Earth Institute Cross-Cutting Initiative Grant*, \$31,985.00.
- 2008 – 2009 Principal Investigator, *Earth Institute Course Field Travel Support*, \$4,800.00.
- 2007 – 2008 Principal Investigator, *Earth Institute Summer Internship Support*, \$6,200.00
- 2007 – 2010 Principal Investigator (co-PIs, Profs. Deodatis, Griffin, Lall, McGourty, Modi, Pfirman & Plunz) *Columbia University's Academic Quality Fund*, An Education Center for Sustainable Engineering. \$190,000.
- 2007 – 2011 Co-Principal Investigator (PI Dr. VanGeen, collaborators Profs Emch (UNC), Mailloux (Barnard) & McKay (Tennessee) *NIH EID- Collaborative Research: Does Arsenic Mitigation in Bangladesh Raise Exposure to Bacterial and Viral Pathogens?* \$1,500,000.
- 2006 – 2007 Principal Investigator, *The Earth Institute at Columbia University: Course Transportation Support: CIEE E3260: Engineering for Developing Communities trip to Ghana*, \$4,800.
- 2006 – 2007 Principal Investigator. *EPA P3 Program*, Development Plan of a Sustainable Water Management Plan for Sakyikrom, Ghana, Africa. \$10,000.
- 2004 – 2010 Co-Principal Investigator (PI Dr. Bell, Co-PIs Profs Cane, Mutter & Pfirman, Dr. Balstad) *NSF ADVANCE* at the Earth Institute, \$4,200,000.
- 2004 – 2009 Co-Principal Investigator (PI Prof. McGourty, Co-PIs Profs. Lall, Gong & Castaldi) *Reforming Undergraduate Education in Environmental Engineering: Urban Studios as Knowledge Delivery Systems and Vehicles for Service Learning*. *NSF*, \$999,494.
- 2004 – 2007 Principal Investigator (co-PIs, Profs. Garvin, Hawkinson, Lall, Macapia, McGourty, McGrath, McKee, Orff, Plunz & Themelis) *Columbia University's Academic Quality Fund*, *Toward New Urban Ecologies: Integrating Science, Engineering and Design Through Education*. \$212,140.
- 2004 – 2008 Principal Investigator (collaborator Dr. J. Germaine, MIT) *NSF*, *Air-Flow Mechanisms During Insitu Air-Sparging Operations*. \$255,000.

Publications of *Patricia J. Culligan-Hensley* (excluding under review)

(*Student & Post-Doc Authors Underlined*)

1. **Books**

- [2] Plunz, R.A and **P.J. Culligan**, “Eco-Gowanus: Urban Remediation by Design”, MSAUD New Urbanisms 8, Columbia GSAPP Architectural Press, 160 pages. *ISBN 978-1-883584-46-7*
- [1] **Culligan, P. J.**, H. H. Einstein and A. J. Whittle, “Soil and Rock America 2003”, Proceedings of the 12th Panamerican Conference on Soil Mechanics and Geotechnical Engineering and the 39th U.S. Rock Mechanics Symposium, June 22 – 26, 2003, Cambridge, MA, USA, Verlag Gluckauf, Essen, Vol 1 & Vol 2, 2861 pages. *ISBN 3-7739-5985-0*

2. **National Academy Press Books**

- [4] National Research Council. “Analysis of Cancer Risks in Populations Near Nuclear Facilities, Phase I”, The National Academies Press, Washington, D.C., 2012. *ISBN-10: 0-309-25571-6*
- [3] National Research Council. “Advice of the Department of Energy’s Cleanup Technology Roadmap: Gaps and Bridges”, The National Academies Press, Washington, D.C., 2009. *ISBN 0-309-13231-2*
- [2] National Research Council. “Tank Waste Retrieval, Processing and On-site Disposal at Three Department of Energy Sites”: The National Academies Press, Washington, D.C. 2006. *ISBN 0-309-10170-0*
- [1] National Research Council. “Improving the Characterization and Treatment of Radioactive Wastes for the Department of Energy’s Accelerated Site Cleanup Program”, The National Academies Press, Washington, D.C. 2005. *ISBN 0-309-09299-X*

3. **Book Chapters**

- [5] Plunz, R. and **Culligan, P.**, “Group-form and urban infrastructure resilience: New York City as an example”, *in Cities in the 21st Century*, Routledge, 192-204. Invited, *ISBN 978-1-138-11964-2*
- [4] **Culligan, P.J.** and F. Pena-Mora, “Interdisciplinary in Engineering”, *in the Oxford Handbook on Interdisciplinarity*, Oxford University Press, 2010, 147-160, Invited. *ISBN 978-0-19-923691-6*
- [3] Griffioen, J. W., **P. J. Culligan**, D. A. Barry, and K. Banno, “Centrifuge scaling of unstable infiltration,” *in Recent Research Developments in Soil Science*, Research Signpost, Trivandrum, India. 1997, 29-41. Invited. *ISBN 81-271-0046-3*
- [2] Parlange, J.-Y., T. S. Steenhuis, R. Haverkamp, D. A. Barry, **P. J. Culligan-Hensley**, W. L. Hogarth, and M. B. Parlange, “Soil properties and water movement,” *in Vadose Zone Hydrology: Cutting across disciplines*, Oxford University Press, 1996, 99-129. Invited. *ISBN 0-19-510990-2*
- [1] **Culligan-Hensley, P. J.**, and C. Savvidou, “Environmental geomechanics and transport processes,” *in Geotechnical Centrifuge Technology*, R. N. Taylor (ed.), Chapman and Hall, London, 196-263, 1995. Invited. *ISBN 0-7514-0032-7*

4. **Refereed Articles in Journals**

- [71] Carson, T. B., M. Keeley, D. Marasco, W. R. McGillis, **P. Culligan**, Assessing methods for predicting green roof rainfall capture: A comparison between full-scale observations and four hydrologic models, *Urban Water Journal*, 14 (6), 589-603.
- [70] Farnham, D.J., R. A Gibson, D. Y. Hsueh, W. R. McGillis, **P. J. Culligan**, N. Zain, R. Buchanan, Citizen science based water quality monitoring: Constructing a large database to characterize the impacts of combined sewer overflow in New York City, *Science of The Total Environment*, Volume 580, 15 February 2017, Pages 168–177.

- [69] Elliott R.M., R. A. Gibson, T. B. Carson, D. E. Marasco, **P. J. Culligan**, W.R. McGillis, Green Roof Seasonal Variation: Hydrologic Behavior of Thick and Thin Extensive Systems in New York City, *Environmental Research Letters*, 11(7), 074020, 2016.
- [68] Hakimdavar, R., **P. J. Culligan**, A. Guido, W.R. McGillis, The Soil Water Apportioning Method (SWAM): An approach for long-term, low-cost monitoring of green roof hydrologic performance, *Ecological Engineering*, 93, 2017-220, 2016.
- [67] Ramaswami, A. A. G. Russell, **P. J. Culligan**, K. R. Sharma, E. Kumar, Meta-principles for developing smart, sustainable, and healthy cities, *Science*, Vol 352, Issue 6288, pp 940-943, 2016.
- [66] Whittinghill, L.J., D. Hsueh, **P. Culligan**, R. Plunz, Stormwater performance of a full scale rooftop farm: Runoff water quality, *Ecological Engineering*, 91, 195-206, 2016.
- [65] Liu, P.C., B. J. Mailloux, A. Wagner, J. Magyar, **P.J. Culligan**, Can varying velocity conditions be one possible explanation for difference between laboratory and field observations of bacterial transport in porous media? *Advances in Water Resources*, 88, 97-108, 2016.
- [64] D. E. Marasco, **P. J. Culligan**, W. R. McGillis, Evaluation of common evapotranspiration models based on measurements from two extensive green roofs in New York City, *Ecological Engineering*, 84, 451-462, 2015
- [63] McGillis, W. R., D. Hsueh, Y. Zheng, M. Markowitz F. Fevrin, W. Noel, J. E. Thys, J. Paine, Z. A. Wang, K. Hoering R. Hakimdavar, **P. J. Culligan**, Carbon Transport in Rivers of Southern Haiti, *Journal of Applied Geochemistry*, DOI: 10.1016/j.apgeochem.2015.09.004, 2015.
- [62] Zhang, B., C. Dong, Q. Zhou, X. Chen, **P. J. Culligan**, Q. Zhao, T. Xu, S Hui. Experimental Study on Laminar Flame Speed of Natural Gas/Carbon Monoxide/Air Mixtures, *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, 37(6), 576-582, 2015.
- [61] Hakimdavar, R., **Culligan, P. J.**, Finazzi, M., Barontini, S., Ranzi, R. Scale dynamics of extensive green roofs: Quantifying the effect of drainage area and rainfall characteristics on observed and modeled green roof hydrologic performance, *Ecological Engineering*, 73, 494-508, 2014.
- [60] Toker, N. K., J. T. Germaine, **P. J. Culligan**, Effective Stress and Shear Strength of Moist Uniform Spheres, *Vadose Zone Journal*, Vol. 13 (5), doi:10.2136/vzj2013.07.0129, 2014.
- [59] Marasco, D.E., B. N Hunter, **P. Culligan**, S.R. Gaffin and W. R. McGillis, Quantifying Evapotranspiration from Urban Green Roofs: A Comparison of Chamber Measurements with Commonly Used Predictive Methods, *Environmental Science & Technology*, Volume: 48, Issue: 17 Pages: 10273-10281, 2014.
- [58] Ackerman, K., M. Conard, **P. Culligan**, R. Plunz, M.P. Sutto and L. Whittinghill, Sustainable Food Systems for Future Cities: The Potential of Urban Agriculture, *The Economic and Social Review*, Vol. 43 (2), pp 189-206, 2014.
- [57] Xu X., **P. J Culligan**, J. E Taylor, Energy Saving Alignment Strategy: Achieving energy efficiency in urban buildings by matching occupant temperature preferences with a building's indoor thermal environment, *Applied Energy*, Vol 123, pp 209-219, 2014.
- [56] Jain, R.K., K. M Smith, **P. J Culligan**, J. E. Taylor, Forecasting energy consumption of multi-family residential buildings using support vector regression: Investigating the impact of temporal and spatial monitoring granularity on performance accuracy, *Applied Energy*, Vol 123, pp 168-178, 2014.
- [55] Dong, C. Q Zhou, X Chen, **PJ Culligan**, Q Zhao, T Xu, S Hui, On the Laminar Flame Speed of Hydrogen, Carbon Monoxide, and Natural Gas Mixtures with Air: Insights for a Dual-fuel Polygeneration System, *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, Vol 36(4), pp 393-401, 2014.

- [54] Knappett, P.S., J. Du, P. Liu, V. Horvath, B. J. Mailloux, J. Feighery, A. van Geen and **P. J. Culligan**, Importance of reversible attachment in predicting E. Coli transport in saturated aquifers from column experiments, *Advances in Water Resources*, Vol 63, p 120-130, 2014.
- [53] Carson T. B., D E Marasco, **P J Culligan**, and W R McGillis: Hydrological performance of extensive green roofs in New York City: observations and multi-year modeling of three, full-scale systems, *Environmental Research Letters*, 8, 024036 doi:10.1088/1748-9326/8/2/024036, 2013.
- [52] Jain, R., R. Gulbinas, J. Taylor, and **P. Culligan**, Can social influence drive energy savings? Detecting the impact of social influence on the energy consumption behavior of networked users exposed to normative eco-feedback, *Energy and Buildings*, Vol 66, pp 119-127, 2013.
- [51] Jain, R.K., J. E. Taylor, **P.J. Culligan**, Investigating the Impact Eco-Feedback Information Representation has on Building Occupant Energy Consumption Behavior and Savings, *Energy and Buildings*, Volume 64, pp 408-414, 2013.
- [50] Feighery J., B. J. Mailloux, A.S. Ferguson, K. M. Ahmed, A. van Geen, **P. J. Culligan**, Transport of *E. coli* in Aquifer Sediments of Bangladesh: Implications for Widespread Microbial Contamination of Groundwater, *Water Resources Research*, Vol 49(7), pp 3897-3911, 2013.
- [49] Knappett, P.S., K. L. D. McKay, A. Layton, D. E. Williams, Md J Alam, B. J. Mailloux, A. S. Ferguson, **P. J. Culligan**, M. L. Serre, M. Emch, K. M. Ahmed, G. S. Sayler, A. van Geen, Unsealed tubewells lead to increased fecal contamination of drinking water, *Journal of Water and Health*, Vol 10, Issue 4, p 565 – 577, 2012.
- [48] Xiaoqi, X., J. E. Taylor, A. L. Pisello, **P. J. Culligan**, The impact of place-based affiliation networks on energy conservation: An holistic model that integrates the influence of buildings, residents and the neighborhood context, *Energy and Buildings*, Volume 55, Pages 637–646, 2012.
- [47] Ferguson A. S., A. C. Layton, B. J. Mailloux, **P. J. Culligan**, D. E. Williams, A. E. Smartt, G. S. Sayler, J. Feighery, L. McKay, P. S.K. Knappett, E. Alexandrova, T. Arbit, M. Emch, V. Escamilla, K. M. Ahmed, Md. J. Alam, P. K. Streatfield, M. Yunus, A. van Geen, Comparison of Fecal Indicators with Pathogenic Bacteria and Rotavirus in Groundwater, *Science of the Total Environment*, 431, pp 314-322, 2012.
- [46] Knappett, P.S. K., L. D. McKay, A. Layton, D. E. Williams, Md. J. Alam, Md. R. Huq, J. Mey, J. E. Feighery, **P. J. Culligan**, B. J. Mailloux, J. Zhuang, V. Escamilla, M. Emch, E. Perfect, G. S. Sayler, K. M. Ahmed, and A. van Geen, Implications of Fecal Bacteria Input from Latrine-Polluted Ponds for Wells in Sandy Aquifers, *Environmental Science & Technology*, Volume: 46, Issue: 3 Pages: 1361-1370, 2012.
- [45] Ferguson, A.S., B. J. Mailloux, K.M. Ahmed, A. van Geen, L.D. McKay and **P. J. Culligan**, Hand Pumps as Reservoirs for Microbial Contamination of Well Water, *Journal of Water and Health*, Volume: 9 Issue: 4 Pages: 708-717, 2012.
- [44] Wu, Jianyong, A. van Geen, K.M., Ahmed, Y. Alam, Y. Jahangir, **P. J. Culligan**, V. Escamilla, J. Feighery, A. S. Ferguson, P. Knappett, B. J. Mailloux, L. D. McKay, M. L. Serre, P. K. Streatfield, Y. Mohammad, M. Emch, : Increase in Diarrheal Disease Associated with Arsenic Mitigation in Bangladesh , *PLOS ONE*, Volume: 6, Issue: 12 , Article Number: e29593, 2011.
- [43] van Geen, A., K.M. Ahmed, Y. Akita, Md. J. Alam, **P. J. Culligan**, M. Emch, V. Escamilla, J. Feighery, A. S. Ferguson, P. Knappett, A. C. Layton, B. J. Mailloux, L. D. McKay, J. L. Mey, M. L. Serre, P. K. Streatfield, J. Wu and M. Yunus, Fecal Contamination of Shallow Tubewells in Bangladesh Inversely Related to Arsenic, *Environmental Science and Technology*, Volume: 45 Issue: 4 Pages: 1199-1205, 2011.
- [42] Zhao, J., **P. J. Culligan**, Y. Qiao, Q. Zhou, Y. Li, M. Tak, T. Park and X. Chen, Electrolyte solution transport in electropolar nanotubes, *Journal of Physics: Condensed Matter*, 22, 315301 (12pp), 2010.

- [41] Boyle, C., G. Mudd, J. R. Mihelcic, P. Anastas, T. Collins, **P. J. Culligan**, M. Edwards, J. Gabe, P. Gallagher, S. Handy, J-J. Kao, S. Krumdieck, L. D. Lyles, I. Mason, R. McDowall, A. Pearce, C. Riedy, J. Russell, J. Schnoor, R. Venables, J. B. Zimmerman, V. Fuchs, S. Miller, S. Page, K. Reeder-Emery, Delivering Sustainable Infrastructure that Supports the Urban Built Environment, *Environmental Science and Technology*, 44, 4836-4840 (Cover Article), 2010.
- [40] Basha, H. A. and **P. J. Culligan**, Modeling particle transport in downward and upward flows, *Water Resources Research*, 46, W07518, 17pp., doi:10.1029/2009WR008133, 2010.
- [39] Zhao, J., Y. Qiao, **P. J. Culligan** and X. Chen, Confined Liquid Flow in Nanotube: A Numerical Study and Implications for Energy Absorption, *Journal of Theoretical and Computational Nanoscience*, invited paper, cover article, Vol 7, No 2, 379-387, 2010.
- [38] Zhao, J. L. Liu, **P. J. Culligan** and X. Chen, Thermal Effect on the Dynamic Infiltration of Water into Single-walled Carbon Nanotubes. *Physical Review E*, 80: 061206, 2009.
- [37] Zhao, J., **P. J. Culligan**, J. Germaine and X. Chen, Experimental study on energy dissipation of electrolyte in nanopores, *Langmuir*, 25: 12687 – 12696, 2009.
- [36] Liu, L., J. Zhao, **P. J. Culligan**, Y. Qiao and X. Chen, Thermally Responsive Fluid Behaviors in Hydrophobic Nanopores. *Langmuir*, 25: 11862-11868, 2009.
- [35] Ling, L., J. Zhao, C-Y. Yin, **P. J. Culligan**, and X. Chen, Mechanisms of Water Infiltration into Conical Hydrophobic Nanopores. *Physical Chemistry Chemical Physics*, Vol 11, 6520-6524, 2009.
- [34] Schulte, K. E., S. L. Heng, **P.J. Culligan** and J. T. Germaine, Toward Validation of an Intrinsic Sorptivity for Liquid Infiltration into Initially Dry Soil, *Vadoze Zone Journal*, Vol 8, No 2, 462-469, 2009.
- [33] Chen, X., G. Cao, A. Han, V. K. Punyamurtula, L. Liu, **P. J. Culligan**, T. Kim, and Y. Qiao, Nanoscale Fluid Transport: Size and Rate Effects. *Nano Letters*, 8: 2988-2992. 2008.
- [32] Garnier, J. , C. Gaudini, S.M. Springman, **P.J. Culligan**, D. Goodings, D. Konig, B. Kutter, R. Phillips, M.F. Randolph, and L. Thoreli , Catalogue of Scaling Laws and Similitude Questions in Geotechnical Centrifuge Modelling *Int. J. of Physical Modelling in Geotech.* Vol.7(3), 1-24, 2007.
- [31] Yoon, J. S., J.T. Germaine and **P.J. Culligan**, “Visualization of Particle Behavior Within a Porous Medium: Mechanisms for Particle Filtration and Retardation During Downward Transport, *Water Resources Research*. Vol 42, W06417, 2006.
- [30] **Culligan, P. J.**, V. Ivanova and J. T. Germaine, “Sorptivity and Horizontal Liquid Infiltration into Dry Soil”, *Advances in Water Resources*, 28, 1010-1020. 2005.
- [29] Oates, P. M., C. Castenson, C. F. Harvey, M. Polz, and **P. J. Culligan**, “Shedding light on reactive microbial transport in saturated porous media: Demonstration of a visualization method and conceptual transport model”, *Journal of Contaminant Hydrology*, 77, No. 4, 233-244, 2005.
- [28] Toker, N. K., J. T. Germaine, K. J. Sjoblom and **P. J. Culligan**, “A new technique for rapid measurement of continuous SMC curves” *Geotechnique* 54, No.3, 179-186, 2004.
- [27] Toker, N. K., J. T. Germaine, and **P. J. Culligan**, “Comment on cavitation during desaturation of porous media under tension”, *Water Resources Research*; 39(11), 1305, 2003.
- [26] Levy, L.C., **P.J. Culligan** and J.T Germaine, “Modeling of DNAPL behavior in vertical fractures”, *International Journal of Physical Modelling in Geotechnics*”, 3(1), 1-19, Invited. 2003.
- [25] Levy, L.C., **P.J. Culligan** and J.T Germaine, “The Use of the Geotechnical Centrifuge as a Tool to Model DNAPL Migration in Fractures”, *Water Resources Research* 38(8), 34-1-34-12, 2002.
- [24] **Culligan, P. J.**, K. Banno, D.A. Barry and J-Y Parlange, “Preferential flow of a light non-aqueous phase liquid in dry sand”, *ASCE Journal of Geotechnical and Geoenvironmental Engineering* 128(4), 327-337, 2002.

- [23] **Culligan, P.J., J. V. Sinfield**, W. E. Mass, and D.G. Cory, "Use of NMR relaxation times to differentiate between mobile and immobile pore fractions in a wetland soil", *Water Resources Research*, 37(3), 837-842, 2001.
- [22] **Levy, L.C.**, W. R. McGillis, J. T. Germaine, **P.J. Culligan**, "Spinning drop tensiometry using a square section sample tube", *Journal of Colloid and Interface Science*, 234, 442-444, 2000.
- [21] **Marulanda, C., P.J. Culligan** and J.T. Germaine, "Centrifuge Modeling of Air Sparging - A Study of Air Flow Through Saturated Porous Media", *Journal of Hazardous Materials*, 72, 179-215, 2000.
- [20] **Culligan, P.J.**, D.A. Barry, J-Y Parlange, T.S. Steenhuis and R. Haverkamp, "Infiltration with Controlled Air Escape: Determining Soil Hydraulic Properties from Air Pressure Measurements", *Water Resources Research*, 36(3), 781-785, 2000.
- [19] **Culligan, P. J.**, and D. A. Barry, "Similitude requirements for modelling NAPL movement with a geotechnical centrifuge", *Proc. Instn Civ. Engrs Geotech. Engng*, **131**, July, 152 – 162, Invited, 1998.
- [18] Savvidou, C., and **P. J. Culligan-Hensley**, "Waste and pollution management," *Proc. Instn Civ. Engrs Geotech. Engng*, **131**, July, 180 – 186, Invited, 1998.
- [17] Barry, D. A., C. T. Miller, **P. J. Culligan**, and **K. Bajracharya**, "Analysis of split operator methods for nonlinear and multispecies groundwater chemical transport models," *Mathematics and Computers in Simulation*, 43, 331-341. 1997.
- [16] **Culligan, P. J.**, D. A. Barry, and J.-Y. Parlange, "Scaling unstable infiltration in the vadose zone," *Canadian Geotechnical Journal*, 34(3), 466-470, 1997.
- [15] **Culligan, P. J.**, C. Savvidou and D. A. Barry, "Centrifuge modelling of contaminant transport," *Electronic Journal of Geotechnical Engineering*, **1** [On-Line]. Available: <http://geotech.civen.okstate.edu/ejge/index.htm>, **1**, Invited, 1996.
- [14] **Bajracharya, K.**, D. A. Barry, and **P. J. Culligan**, "Discussion on 'Geo-Environmental Assessment of a Micaceous Soil for its Potential Use as an Engineered Clay Barrier' by A. M. O. Mohamed, R. N. Yong, B. K. Tan, A. Farkas and L. W. Curtis," *Geotechnical Testing Journal*, **19**(4): 452-453, 1996.
- [13] Barry, D. A., C. T. Miller, and **P. J. Culligan-Hensley**, "Temporal discretisation errors in split-operator approaches to solving chemical reaction/groundwater transport models," *Journal of Contaminant Hydrology*, **22**(1-2), 1-17, 1996.
- [12] Barry, D. A., S. J. Barry, and **P. J. Culligan-Hensley**, "Algorithm 743: WAPR: A FORTRAN routine for calculating real values of the W function," *Association of Computing Machinery Transactions on Mathematical Software*, **21**(2), 172-181, 1995.
- [11] Barry, D. A., **P. J. Culligan-Hensley**, and S. J. Barry, "Real values of the W function," *Association of Computing Machinery Transactions on Mathematical Software*, **21**(2), 161-171, 1995.
- [10] **Li, L.**, D. A. Barry, **P. J. Culligan-Hensley**, and **K. Bajracharya**, "Mass transfer in soils with local stratification of hydraulic conductivity," *Water Resources Research*, **30**(11), 2891-2900, 1994.
- [9] Barry, D. A., **P. J. Hensley**, and D. A. Lockington, "Comment on 'Effect of Sand Lenses on Groundwater Flow and Contaminant Migration' by K. W. E. San and R. K. Rowe," *International Journal for Numerical and Analytical Methods in Geomechanics*, **18**(4), 279-282, 1994.
- [8] **Hensley, P. J.**, and C. Savvidou, "Modelling coupled heat and contaminant transport in groundwater," *International Journal for Numerical and Analytical Methods in Geomechanics*, **17**(7), 493-527, Invited, 1993.

- [7] Barry, D. A., J.-Y. Parlange, and **P. J. Hensley**, “Calculation of kinetic rate constants from steady state soil profile concentration measurements,” *International Journal for Numerical and Analytical Methods in Geomechanics*, **17**(4), 243-254, Invited, 1993.
- [6] Anderson, S. J., **P. J. Hensley**, and D. Smirk, “An investigation into the characteristics of blended bauxite refining residue,” *Geotechnical Engineering*, **22**(2), 171-197, 1992.
- [5] **Hensley, P. J.**, and D. A. Barry, “On describing fluid flow in porous media,” *Geotechnical Engineering*, **22**(2), 131-143, 1992.
- [4] **Hensley, P. J.**, and C. Savvidou, “Modelling pollutant transport in soils,” *Australian Geomechanics*, **22**, 7 -16, 1992.
- [3] **Hensley, P. J.**, and A. N. Schofield, “Accelerated physical modelling of hazardous waste transport,” *Geotechnique*, **41**(3), 447-466, 1991.
- [2] Fahey, M., I. Finnie, **P. J. Hensley**, R. J. Jewell, M. F. Randolph, D. P. Stewart, K. J. L. Stone, S. H. Toh, and C. S. Windsor, “Geotechnical centrifuge modelling at the University of Western Australia,” *Australian Geomechanics*, **19**, 33-49, 1990.
- [1] **Hensley, P. J.**, and A. N. Schofield, “An approximate solution to contaminant transport by parabolic isochrones,” *Geotechnique*, **40**(2), 285-292, 1990.

5. *Refereed Articles in Conferences and Specialty Publications*

- [37] Shetty, N., **P. J. Culligan**, B. Mailloux, W. R. McGillis, H. Y. Do., “Bioretention Infrastructure to Manage Nutrient Runoff from Coastal Cities”, Geo-Chicago 2016: Sustainability, Energy and the Geo-Environment, Chicago, Illinois, August 14th – 18th, 2016.
- [36] **Culligan, P.**, Carson, T., Gaffin, S., Gibson, R., Hakimdivar, R., Hsueh, D., Hunter, N., Marasco, D., McGillis, W., “Evaluation of Green Roof Water Quality and Quantity Performance in an Urban Climate, Office of Research and Development, *Environmental Protection Agency*, EPA/600/R-14/180, 79 pages, September 2014.
- [35] Jain, R., Smith, K., **Culligan, P.** and Taylor, J. Exploring Energy Consumption Forecasting for Multi-Family Residential Buildings Using Support Vector Regression, In *Proceedings of the 8th Conference on Sustainable Development of Energy, Water and Environment Systems*, ISSN 1847-7178, Dubrovnik, Croatia, September 22-27, 2013.
- [34] Jain, R., Taylor, J., and **Culligan, P.**, Examining the Impact Information Representation in Eco-Feedback Systems has on Building Occupant Energy Consumption Behavior, In *Proceedings of the Annual Conference of the Canadian Society for Civil Engineering*, Montreal Canada, May 29 to June 1, 2013 / 29 mai au 1 juin 2013.
- [33] Carson, T.B., R. Hakimdivar, K.J. Sjoblom, and **P.J. Culligan**. Viability of recycled and waste materials as Green Roof substrates. In: *Geotechnical Special Publication No.226*, State of the Art and Practice in Geotechnical Engineering, ASCE Press, Reston, pp. 3644-3653, Proceedings of GeoCongress 2012, Oakland CA, March, 2012.
- [32] Pfirman, S., C. Block, R.E. Bell, L. Roberson, **P. J. Culligan**, “Perspective: Transitioning from Pet to Peer, *Science Career Development*, January 29, 2010, 2010_01_29/carecredit.a1000011, 2010.
- [31] **Culligan, P. J.**, “Two-Phase Transport in Porous Media: What Questions Still Remain?, Geosustainability and Geohazard Mitigation, *Geotechnical Special Publication No.178 - The Challenge of Sustainability in the Geoenvironment*, ASCE Press, Reston, Virginia, pp. 646-663, Invited Paper, Proceedings of GeoCongress 2008, New Orleans LA, March 2008.
- [30] O’Keefe, G., K. E. Schulte, **P. J. Culligan**, F. Montalto and W. R. McGillis, “Design of an Instrumented Model Green Roof Experiment”, *Geotechnical Special Publication No.178 - The Challenge of Sustainability in the Geoenvironment*. ASCE Press, Reston, Virginia, pp. 1105-1112, Proceedings of GeoCongress 2008, New Orleans LA, March 2008.

- [29] Pei, J., J. T. Germaine and **P. J. Culligan**, “An Experimental Method for Visualizing Coupled Particle and Fluid Transport within a Porous Medium”, *Geotechnical Special Publication No.178 - The Challenge of Sustainability in the Geoenvironment*, ASCE Press, Reston, Virginia, pp. 830-837, 2008, Proceedings of GeoCongress 2008, New Orleans LA, February 2008.
- [28] Schulte, K. E., S. L. Heng, **P. J. Culligan** and J. T. Germaine , “Intrinsic Sorptivity for Soils with Difference Average Grain Size Diameters”, *Geotechnical Special Publication No.178 - The Challenge of Sustainability in the Geoenvironment*, ASCE Press, Reston, Virginia, pp. 822-829, Proceedings of GeoCongress 2008, New Orleans LA, February 2008.
- [27] Pfirman, R.E Bell, **P. J. Culligan**, P. Balsam and J. D. Laird, “Maximizing Productivity and Recognition: Part 3: Developing a research plan, *Science Career Development*, October 10, 2008, 10.1126/science.caredit.a0800148, 2008.
- [26] Pfirman, S., P. Balsam, R.E Bell, **P. J. Culligan** J. D. Laird, “Maximizing Productivity and Recognition: Part 2: Collaboration and Networking. *Science Career Development*, 1 February 2008, DOI: 10.1126/science.caredit.a0800016, 2008.
- [25] Pfirman, S., P. Balsam, R.E Bell, J. D. Laird, **P. J. Culligan**, “Maximizing Productivity and Recognition: Part 1: Publication, Citation and Impact. *Science Career Development*, 2 November 2007, DOI: 10.1126/science.caredit.a0700155, 2007.
- [24] Schulte, K. E. **P. J. Culligan** and J. T. Germaine , “Intrinsic Sorptivity and Water Infiltration into Dry Soil at Different Degrees of Saturation”, *Geotechnical Special Publication no. 163 – New Peaks in Geotechnics*, ASCE Press, Reston, Virginia, pp. 1-11, 2007, Proceedings of GeoCongress 2007, Denver, CO, February 2007.
- [23] **Culligan, P.J.** and K. Soga, “Non-Aqueous Phase Liquid Behavior in the Subsurface: Source Zone Characterization, Transport and Remediation”, 6th International Conference on Physical Modeling in Geotechnics, HKUST, Hong Kong, 4 – 6 August, 2006. Invited Keynote Paper, Taylor and Francis, Vol. 1, 29-45, 2006.
- [22] Montalto, F.M and **P. J. Culligan**, “Brooklyn Proper Owner Opinions and the Urban Water Cycle”, 2006 Philadelphia Annual GSA Meeting, Paper no 116-5, 22–25 October 2006.
- [21] **Culligan, P. J.**, Y. Zhu and J. T. Germaine, “Numerical simulation of in situ air-sparging”, *Geotechnical Special Publication No. 130- 142 - Geofontiers*, ASCE Press, Reston, Virginia, 10 pages, CD-ROM Proceedings of GeoCongress 2005, Austin, TX, January 2005.
- [20] Mullen, W. G., A. Ashmawy, **P. J. Culligan**, A. De, M. Mauldon, F. Townsend, and A. Welker, “Undergraduate Geotechnical Education 2004”, *Geotechnical Special Publication No. 130- 142 - Geofontiers*, ASCE Press, Reston, Virginia, 8 pages, CD-ROM Proceedings of GeoCongress 2005, Austin, TX, January 2005.
- [19] **Culligan, P.J.** “The Integration of Service Learning and Scholarship”, 3rd Annual Conference of The Environmental Consortium of Hudson Valley Colleges and Universities, Civic Engagement and Service Learning for the Environment: The Challenge for Higher Education”, Rensselaer Polytechnic Institute on November 4th & 5th. 2005.
- [18] Magrin, D., **P.J. Culligan** and J.T. Germaine, “Interfacial tension measurement of a DNAPL using the capillary rise method”, 12th Panamerican Conference Soil Mechanics and Geotechnical Engineering and the 39th US Rock Mechanics Symposium, Soil Rock America 2003, Cambridge, USA 23-26 June, 2003,1561-1568, 2003.
- [17] Yoon, J. S., **P.J. Culligan** and J.T. Germaine, “A visualization technique to investigate the behavior of colloid particles moving in a porous medium”, 12th Panamerican Conference Soil Mechanics and Geotechnical Engineering and the 39th US Rock Mechanics Symposium, Soil Rock America 2003, Cambridge, USA 23-26 June, 2003, 1553-1560, 2003.

- [16] Marulanda, C., **P.J. Culligan** and J.T. Germaine, “Study of air-flow through saturated porous media and applications to insitu air sparging”, Int. Symp. On Physical Modelling and Testing in Environmental Geotechnics, La Boule, France, 15-17 May 2000, 165-172, 2000.
- [15] Levy, L.C., K.A. Adams, **P.J. Culligan** and J.T. Germaine, “DNAPL transport in fracture using the centrifuge: Modelling and physical data”, Int. Symp. On Physical Modelling and Testing in Environmental Geotechnics, La Boule, France, 15-17 May 2000, 309-316, 2000.
- [14] Marulanda, C., **P. J. Culligan** & J. T. Germaine, “A study of air flow in air-sparging applications”, Centrifuge ‘98, Kimura, Kusakabe & Tekemura (eds), Balkema, 577 – 582, 1998.
- [13] Levy, L., **P. J. Culligan** & J. T. Germaine, “ Investigation into DNAPL transport in fractures using capillary tubes”, Centrifuge ‘98, Kimura, Kusakabe & Tekemura (eds), Balkema, 607 – 612, 1998.
- [12] Savvidou, C., **P. J. Culligan**, and D. A. Barry, “Centrifuge modelling of environmental problems”, *Proceedings of the International Symposium on Recent Developments in Soil and Pavement Mechanics*, M. Almeida (ed.), Rio de Janeiro, Brazil, 25-27 June 1997. Balkema, Rotterdam, pp. 161-173, Invited Keynote Lecture, 1997.
- [11] Ratnam, S., **P. J. Culligan-Hensley**, and J. T. Germaine, “Modeling the behavior of LNAPLS under hydraulic flushing,” *Non-Aqueous phase Liquids (NAPLs) in the Subsurface Environment: Assessment and Remediation*, ASCE 1996 National Convention, Washington D.C., 10-14 November 1996, pp. 595-606. 1996.
- [10] Ratnam, S., **P. J. Culligan-Hensley**, and J. T. Germaine, “LNAPL entrapment under hydraulic flushing,” *Proceedings of the Second International Congress on Environmental Geotechnics: IS-Osaka ‘96*, Japan, 5-8 November 1996.
- [9] Anderson, S. J., D. A. Barry and **P. J. Culligan-Hensley**, “Experimental evaluation of a brine transport model,” *Proceedings of the Secound International Congress on Environmental Geotechnics: IS-Osaka ‘96*, Japan, 5-8 November 1996.
- [8] Barry, D. A., C. T. Miller, **P. J. Culligan**, and K. Bajracharya, “Split operator methods for reactive chemical transport in groundwater,” *Proceedings of the International Conference on Modelling and Simulation 1995: MODSIM95*, University of Newcastle, Newcastle, New South Wales, 27-30 November, Modelling and Simulation Society of Australia, **3**, 53-57, Invited, 1995.
- [7] **Culligan-Hensley, P. J.**, and C. Savvidou, “How can geotechnical engineers contribute to environmental engineering research?,” *Proceedings of: The Earth, Engineers, and Education: A Symposium in Honor of Robert V. Whitman*, Session 3, Cambridge, Massachusetts, pp. 128-143, 7-8 October, Invited, 1994.
- [6] **Hensley, P. J.**, and M. F. Randolph, “Modelling contaminant dispersion in saturated sand,” *XIII International Conference on Soil Mechanics and Foundation Engineering*, New Delhi, **4**, 1557-1560, 1994.
- [5] Jewell, C., **P. J. Hensley**, D. A. Barry, and I. Acworth, “Site investigation and monitoring techniques for contaminated sites and potential waste disposal sites,” *in Geotechnical Management of Waste and Contamination*, R. Fell, T. Philips, and C. Gerrard (eds.), A. A Balkema, Rotterdam, pp. 3-37, Invited, 1993.
- [4] Li, L., D. A. Barry, **P. J. Hensley**, and K. Bajracharya, “Nonreactive chemical transport in structures soil: The potential for centrifuge modelling,” *in Geotechnical Management of Waste and Contamination*, R. Fell, T. Philips, and C. Gerrard (eds.), A. A Balkema, Rotterdam, pp. 425-431, 1993.
- [3] **Hensley, P. J.**, and C. Savvidou, “Centrifuge modelling of environmental geomechanics,” *International Conference on The Environmental and Geotechnics: From Decontamination to Protection of the Sub-Soil*, Paris, April 1993.

- [2] Stone, K. J. L., **P. J. Hensley**, and R. N. Taylor, "A centrifuge study of rectangular box culverts," *in Proceedings of the International Conference Centrifuge 1991*, Boulder, Colorado, 13-14 June, H. Y. Ko, and F. G. McLean (eds.), A. A. Balkema, Rotterdam, pp. 107-112, 1991.
- [1] **Hensley, P. J.**, "Geotechnical centrifuge modelling of hazardous waste migration," *in Land Disposal of Hazardous Waste: Engineering and Environmental Issues*, J. R. Gronow, A. N. Schofield, and R. K. Rain (eds.), Ellis Horwood Ltd., Chichester, pp. 139-151, Invited, 1988.

6. *Other Major Publications*

National Academy Reports

- [4] National Research Council. "Technical and Strategic Advice for the Department of Energy, Office of Environmental Management's Development of a Cleanup Technology Roadmap – Interim Report: 16 pages, 2008.
- [3] National Research Council. "Tank Wastes Planned for Onsite Disposal at the Three Department of Energy Sites: The Savannah River Site", National Academy Press. Washington, DC: 72 pages. 69 pages. 2005.
- [2] National Research Council. "Long Term Stewardship of DOE Legacy Waste Sites – A Status Report", National Academy Press. Washington, DC: 68 pages. 2003.
- [1] National Research Council. "Remedial Action at the Moab Site -- Now and for the Long Term. Committee on Long-Term Institutional Management of DOE Legacy Waste Sites: Phase 2", National Academy Press. Washington, DC: 46 pages. 2002

Professional Periodicals

- [9] Burns, S. E., **P. J. Culligan**, N. Lu, J. C. Santamarina, and A. Wayllace. NSF Workshop on Geotechnical Fundamentals, ASCE *Geo Strata* Magazine, March/ April 2017.
- [8] **Culligan, P. J.**, Green Roofs and Urban Stormwater Management, ASCE *Geo Strata* Magazine, March/ April 2011.
- [7] **Culligan, P. J.**, Urban Climate Change at the Crossroads: Efficiency + Decentralization = Urban Water Sustainability? *Domus 930 Intersections Climate Change*, Bossi, Plunz & Sutto (eds.), Editoriale Domus, Milan, Italy, November 2009.
- [6] Montalto, F., and **P. J. Culligan**, "The Next Step in Green?", New York Academy of Sciences, *Update*, Special issue July/August 2006.
- [5] **Culligan, P.J.**, G. Mullen, B. Sukumaran, K. Stutter and A. Welker, "Geotechnical Engineering Education: The Present and the Future", *Geo Strata* Magazine, 17 – 20, January/February 2006.
- [4] Marulanda, C., **P.J. Culligan** and J.T. Germaine, "Air-flow patterns and the efficiency of in situ Air Sparging as a technology for the cleanup of contaminated groundwater", I&EC paper number 77, *C&E News*, July 22, 2002.
- [3] Ratnam, S., **P. J. Culligan-Hensley**, and J. T. Germaine, "Geotechnical centrifuge modelling of LNAPL entrapment in sand samples under hydraulic flushing," *Geotechnical News*, **14**(3), 22-26, 1996.
- [2] **Culligan-Hensley, P. J.**, C. Savvidou, and D. A. Barry, "Centrifuge modelling of transport processes in soil - Part II," *Geotechnical News*, **13**(3), 35-39, 1995.
- [1] **Culligan-Hensley, P. J.**, C. Savvidou, and D. A. Barry, "Centrifuge modelling of transport processes in soil - Part I," *Geotechnical News*, **13**(2), 30-31, 1995.

Published Abstracts and National Science Foundation Workshop Papers

- [24] **Culligan, P. J.**, A. Ramaswami, A. Russell and R. A. Plunz, Adaption to Climate Change Impacts in Urban Environments: Use of distributed infrastructure as a case study in New York City, *NSF Sustainable Smart Cities International Workshop*, Alexandria, Egypt, May 8-11th, 2017, 5 pages.
- [23] Russell, A., A. Ramaswami, **P. J. Culligan**, T. Odman, Y. Hu, L. Henneman and R. Lal, Making Cities Healthier, Infrastructure and Air Quality, *NSF Sustainable Smart Cities International Workshop*, Alexandria, Egypt, May 8-11th, 2017, 6 pages.
- [22] Elliott, R.M., N. H. Shetty and **P. J. Culligan**, Translating Street Tree Census Data into Stormwater Management Strategy: A Study of Efficacy and Economics of Street Tree Guards in New York City, *NSF Sustainable Smart Cities International Workshop*, Alexandria, Egypt, May 8-11th, 2017, 5 pages.
- [21] **Culligan, P.J.** and A.J. Whittle. Some Personal Perspectives on Geotechnical Research Needs to Address Global Challenges, *NSF Workshop on Geotechnical Fundamentals*, Washington D.C., July 17- 19th, 2017, 12 pages.
- [20] Hakimdavar, R., **P. J. Culligan**, A. Guido, Understanding green roof spatial dynamics: results from a scale based hydrologic study and introduction of a low-cost method for wide-range monitoring, *EGU General Assembly 2014*, held 27 April - 2 May, 2014 in Vienna, Austria, id.14840, 2014.
- [19] Finazzi, M. R. Hakimdavar, S. Barontini, R. Ranzi, P. J. Culligan, Spatial scale effects on hydrologic modeling of extensive green roofs in New York City, *EGU General Assembly 2013*, held 07-12 April, 2013 in Vienna, Austria, p.13047, 2013.
- [18] McGillis, W.R., G Jacobson, **P Culligan**, S Gaffin, T Carson, D Marasco, D Hsueh, C Rella, Surface emissions of heat, water and GHGs from a NYC greenroof, *EGU General Assembly 2012*, held 22-27 April, 2012 in Vienna, Austria, p.12895, 2012.
- [17] **Culligan, P. J.**, T. Carson, J. K. Peterson, M. Odlin and W. R. McGillis, Quantifying Stormwater Runoff from Green Roofs in an Urban Environment, NSF CMMI Research and Innovation Conference 2011, *Engineering for Sustainability and Prosperity*, Jan 4 – 7, 2001. Atlanta, GA.
- [16] Knappett, P. S., L. D., McKay, A. Layton, M. M. Hasan, D. Williams, M. L. Serre, K. M. Ahmed, **P. J. Culligan**, L. Band, B. J. Mailloux, A. Ferguson, J. Feighery, V. Escamilla, M. Emch, Y. Akita, , E. Perfect, R. W. Gentry, A. van Geen, Transport of fecal-derived microorganisms from latrine ponds to aquifers in Bangladesh, *EOS Trans. AGU*, Fall Meet. Suppl., Abstract H42B-01, 2009.
- [15] Knappett, P. S., L. D., McKay, A. Layton, M. M. Hasan, D. Williams, M. L. Serre, K. M. Ahmed, **P. J. Culligan**, L. Band, B. J. Mailloux, Investigating Fecal Contamination Pathways to An Unconfined Sandy Aquifer in Bangladesh, *Geological Society of America Abstracts with Programs*, Vol. 40, No. 6, p. 458, 2008.
- [14] Akita, Y., J. Leber, P. S. K. Knappett, J. Feighery, L. E. Band, M. E. Emch, B. J. Mailloux, **P. J. Culligan**, A. C. Layton, L. D. McKay, A. van Geen, M. L. Serre, Spatial Analysis of the Distribution of Bacterial Pathogen Indicators Across Shallow Aquifers in Bangladesh, *Epidemiology*: Volume 19 - Issue 6 - p S205, 2008.
- [13] Joon, J. S., **P. J. Culligan**, J. T. Germaine, “New Insights into Non-Brownian Particle Behavior in Porous Media”, *EOS Trans. AGU*, Fall Meet. Suppl., Abstract H21D-1044, 2004.
- [12] **Culligan, P. J.**, Ivanov, V. M., and J. T. Germaine, “Horizontal Fluid Infiltration: A new measurement device and some observations”, *EOS Trans. AGU* Fall Meet. Suppl., Abstract H22J 05, 2003.
- [11] Yoon, J. S., **P. J. Culligan**, J. T. Germaine, “Understanding subsurface colloid behavior”, *EOS Trans. AGU*, Fall Meet. Suppl., Abstract H22A-0904, 2003

- [10] Marulanda, C., **P.J. Culligan** and J.T. Germaine, “A study of air-flow through saturated porous media and applications to insitu air sparging”, *EOS Transactions AGU*, **83**(19), H42B, 2002.
- [9] Levy, L. C., **P. J. Culligan**, and J. T. Germaine, “Modeling the migration of DNAPL in fractures”, in *Proceedings: International Symposium on Geotechnical Centrifuge Modelling and Networking, December 8-9, 2001, Hong Kong University of Science and Technology*, edited by C. W. W. Ng, pp. 52-56, Univ. of California, Davis, 2001.
- [8] **Culligan, P. J.**, L. C. Levy, K.A. Adams, and J.T. Germaine, “DNAPL transport and remediation in fractured rock”, *GSA Annual Meeting*, Abstracts, Vol. 32, No. 7, 2000.
- [7] Levy, L. C., **P. J. Culligan**, J. T. Germaine, “Investigation into DNAPL Transport in Fractures Using Centrifuge Modeling”, *EOS Transactions AGU*, **79**(45), H72A, 1998.
- [6] Levy, L. C., **P.J. Culligan**, J. T. Germaine, “Investigation into the Effectiveness of DNAPL Remediation Strategies in Fractured Rock”, *GSA Annual Meeting*, Abstracts, Vol. 29, No. 6, 1997.
- [5] Banno, K., **P. J. Culligan**, and D. A. Barry, “Centrifuge modelling of LNAPL behaviour in porous media,” *EOS Transactions AGU*, **77**(46), H31B, 1996.
- [4] Ratnam, S., **P. J. Culligan-Hensley**, and D. A. Barry, “Centrifugal techniques for investigating nonwetting phase entrapment during immiscible fluid transport in porous media,” *EOS Transactions AGU*, **76**(46), F189, 1995.
- [3] Griffioen, W., **P. J. Culligan**, D. A. Barry, and J.-Y. Parlange, “Unstable infiltration and the two-region transport model,” *EOS Transactions AGU*, **76**(46), F179, 1995.
- [2] **Culligan-Hensley, P. J.**, D. A. Barry, and J.-Y. Parlange, “The potential for modelling wetting front instability using a geotechnical centrifuge,” (extended abstract) *Vadose Zone Hydrology: Cutting Across Disciplines*, Kearney Foundation of Soil Science International Conference Proceedings, pp. 27-30, University of California, Davis, Invited, September 1995.
- [1] **Culligan-Hensley, P. J.**, C. Savvidou, and D. A. Barry, “Geotechnical centrifuge modelling: An innovative technique for investigating subsurface transport processes,” *EOS Transactions AGU*, **75**(44), 291, 1994.

Educational Publications

- [4] **Culligan, P.J.** “The Integration of Service Learning and Scholarship”, 3rd Annual Conference of The Environmental Consortium of Hudson Valley Colleges and Universities, Civic Engagement and Service Learning for the Environment: The Challenge for Higher Education”, Rensselaer Polytechnic Institute on November 4th & 5th. 2005.
- [3] Castella, F, **P. J. Culligan** and H.M. Nepf, “Groundwater Pollution: Curriculum guide”, Educational Package produced for the Center for Environmental Health Sciences, MIT, 66 pages, August 2002.
- [2] Aref, L., **P.J. Culligan**, H.M. Nepf, “1999 Classroom Activities for Human Health, Pollution and the Environment”, Massachusetts Corporation for Educational Telecommunications, 32 pages. 1999.
- [1] Aref, L., **P.J. Culligan**, H.M. Nepf, “1998 Classroom Activities for Human Health, Pollution and the Environment”, Massachusetts Corporation for Educational Telecommunications, 128 pages. 1997.

Other

- [3] **Culligan, P. J.**, “Use of Centrifuge Testing in Geoenvironmental Engineering”, Proceedings of Advanced Concept ARO 2001 Centrifuge Workshop, Vicksburg, MS, Jan 31st-February 1st 2001, 45 pages.
- [2] **Culligan, P. J.** “Peer Review of Hazardous Waste Identification Rule Risk Assessment, Final Report Task Number 320”, EPA Contract 68-W5-0057, December 1998, pp12.

- [1] Harvey, C., and **P.J. Culligan**, “Final Report to Wrentham Research Group on Contaminant and Remediation Issues at Plainville Landfill”, published by Sea-Change, June 1998. pp 10.

Theses Supervised by *Patricia J. Culligan*

Summary

	<u>Total</u>	<u>Completed</u>	<u>In Progress</u>
Bachelor's	5	5	0
Master's	27	27	0
<u>Doctoral</u>			
As Supervisor	19	16	3
As Reader	33	32	1

Current research group: 1 research scientist, 3 PhD students, 3 post-doctoral scholars, 4 M.S. research assistants

Doctoral Theses, Supervisor

- [19] Rauschkolb, N. "Analysis of energy consumption patterns in multi-family residential buildings", Co-advised with Prof. Vijay Modi, Columbia University, pre-qualifying exam.
- [18] Wang, S. "Modeling the impact of green infrastructure at the neighborhood scale", pre-qualifying exam.
- [17] Shetty, N. "Real-time monitoring of green streets", PhD Expected Aug 2017.
- [16] Liu, P.C. "Experimental and Numerical Investigations into Fundamental Mechanisms Controlling Particle Transport in Saturated Porous Media", PhD Thesis, Columbia University, Aug 2016.
- [15] Hakimdavar, R. "Quantifying the Hydrological Impact of Re-greening Across Various Spatial Scales", PhD Thesis, Columbia University, Feb 2016.
- [14] Elliott, R. "Vegetated Infrastructure for Urban Stormwater Management: Advances in Understanding, Modeling and Design", PhD Thesis, Columbia University, Aug 2015.
- [13] Carson, T. "Evaluating Green Roof Stormwater Management in New York City: Observations, Modeling and Design of Full-Scale Systems", PhD Thesis, Columbia University, May 2014.
- [12] Marasco, D. "Alternative Metrics of Green Roof Hydrologic Performance: Evapotranspiration and Peak Flow Reduction". PhD Thesis, Columbia University, May 2014.
- [11] Jain, R. "Building Eco-Informatics: Examining the Dynamics of Eco-Feedback Design and Peer Networks to Achieve Sustainable Reductions in Energy Consumption" Co-advised Prof. J. Taylor Virginia Tech, PhD Thesis, Columbia University, August 2013.
- [10] Xu, X. "Leveraging Human-environment Systems in Residential Buildings for Aggregate Energy Efficiency and Sustainability", (Co-advised Prof. J. Taylor VirginiaTech, PhD Thesis, Columbia University, July 2013.
- [9] Feighery, J. "A Combined Field and Laboratory Investigation into the Transport of Bacterial Indicator Microorganisms Through a Shallow Drinking Water Aquifer in Bangladesh", PhD Thesis, Columbia University, August 2013.
- [8] Zhao, J. "Nano-Porous Energy Absorption System (NEAS) and Nanofluidics", PhD Thesis, Columbia University, September 2010.
- [7] Schulte, K. E. "Processes for liquid infiltration in dry soil", PhD Thesis, Columbia University, May 2008.
- [6] Toker N. K. "Modeling the relation between suction, effective stress and shear strength in partially saturated granular media". PhD Thesis, MIT, May 2007.

- [5] Zhu, Y. "Experimental and numerical modeling of air-flow mechanisms in porous media". PhD Thesis, Columbia University, August 2006.
- [4] Sik Yoon, J., " Discrete Particle Behavior in Porous Media: Direct Observations of Physical Mechanisms Influencing Particle Behavior". PhD Thesis, MIT, January 2005.
- [3] Levy, L., "Experimental and theoretical modeling of DNAPL transport in vertical fractured media" PhD Thesis, MIT, January 2003.
- [2] Marulanda, C., "A study of air flow through saturated porous media and its applications to in-situ air sparging." PhD Thesis, MIT, August 2001.
- [1] Aref, L., "Flow and transport mechanisms in wetland soils." PhD Thesis, MIT, May 1999.

Doctoral Theses, Reader

- [33] Torres, M., Reduction of Uncertainty in Post-Event Loss Estimates through Partial Observation Data, PhD Thesis, Columbia University, May 2017.
- [32] Hess, A.J. "Rain Garden Evapotranspiration Accounting", PhD Thesis, Villanova University, March 2017.
- [31] Waite, M. "Analysis of Energy Infrastructure Serving a Dense Urban Area: Opportunities and Challenges for Wind Power, Building Systems and Distributed Generation, PhD Thesis, Columbia University, August 2016.
- [30] Spyridaki, A. "Response Variability of Statically Determinate Beam Structures Following Non-Linear Constitutive Laws and Analytical Identification of Progress Collapse Modes of Steel Frames, PhD Thesis, Columbia University, May 2016.
- [29] Sideri, J. "Distributed Damage Effect on Progressive Collapse of Structures and Variability Response Functions in 2D Elasticity Stochastic Problems", PhD Thesis, Columbia University, May 2016.
- [28] Brotto, A.C. "Production Pathways and Emissions of Nitrogenous Greenhouse Gas from Engineered Biological Nitrogen Transformation Processes Through Systems Biology", PhD Thesis, Columbia University, May 2016.
- [27] Lopeman, M. "Extreme Storm Surge Hazard Estimation and Windstorm Vulnerability Assessment for Quantitative Risk Analysis, PhD Columbia University, May 2015.
- [26] Fricker, K. J. "Magnesium Hydroxide Sorbents for Combined Carbon Dioxide Capture and Storage in Energy Conversion Systems, PhD Columbia University, August 2014.
- [25] Song, X. " The Application Of Insurance As A Risk Management Tool For Alternative Dispute Resolution (ADR) Implementation In Construction Disputes, PhD Columbia University August 2013.
- [24] Tang, A. "Leveraging Policy for Renewable Energy Development in Industrialized Countries and Emerging Markets, PhD Columbia University May 2013.
- [23] Chen, J. "Simulating Network Structure, Layering Multi-layer Network Systems and Developing Network Block Configuration Models to Understand and Improve Energy Conservation in Residential Buildings", PhD Columbia University May 2013.
- [22] Lu, H., "Structural and functional microbial ecology and denitrifying bacteria using different organic carbon sources", PhD Thesis, Columbia University, September 2011.
- [21] Park, H., "Microbial ecology, activity and abundance of aerobic and anaerobic ammonium oxidizing bacteria in engineering drinking water and wastewater systems", PhD Thesis, Columbia University, September 2010.

- [20] Yin, J., “Mechanical self-assembly: Science and applications”, PhD Thesis, Columbia University, September 2010.
- [19] Ahn, J. H., “Nitrous oxide emissions from wastewater treatment processes: Molecular biology through National Inventory Development”, PhD Thesis, Columbia University, August 2010.
- [18] Liu, L., “Nanofluidics and applications in energy conservation”, PhD Thesis, Columbia University, August 2010.
- [17] Aziz, Z., “Hydrology and arsenic distribution in shallow aquifers of Bangladesh”, PhD Thesis, Columbia University, August 2010.
- [16] Albro, M., “Solute transport in porous deformable media: Active uptake in dynamically loaded tissue and molecular partitioning in the cellular cytoplasm”, PhD Thesis, Columbia University, December 2009.
- [15] Lewis, T. W., “Theoretical effects of consolidation on solute transport in soil barriers”, PhD Thesis, The University of Newcastle, Australia, February 2009.
- [14] Wang, J-P., “Large scale shaking table tests of reinforced retaining walls with geocell facing”, PhD Thesis, Columbia University, July 2007.
- [13] Moraczewski, T., “NMR imaging of expansion flows of suspensions”, PhD Thesis, Columbia University, April 2007.
- [12] Wu, M.H. “Centrifuge modeling of two-dimensional slope failure”, PhD Thesis, Columbia University, July 2006.
- [11] Bryant, L. “Centrifuge modeling of pipe piles subjected to lateral impact loads”, PhD Thesis, Columbia University, July 2006.
- [10] Kim, Y. S. “Simulation of filtration for suspension transport in porous media”, PhD Thesis, MIT, January 2005.
- [9] Hellweger, F. L., “Arsenic transformation by phytoplankten: The effect of phosphorous luxury uptake, PhD. Thesis, Columbia University, 2004.
- [8] Zinn, B. “Mass transfer and dispersion processes in connected conductivity structures: Simulation, visualization, delineation and application”, PhD. Thesis, MIT, 2003.
- [7] Peters, G. P. "Contaminant transport through rigid and deforming porous media", Ph.D. Thesis, School of Engineering, the University of Newcastle, Australia, 2001.
- [6] Caputo, D. “Characterizing actinide transport and speciation using nuclear magnetic resonance tracer techniques”. PhD. Thesis, MIT, 2000.
- [5] Sjoblom, K., “Development of MIT Tensiometer”. PhD. Thesis, MIT, 2000.
- [4] Sinfield, J., “Optical laser for contaminant detection in soils.” PhD. Thesis, MIT, 1999.
- [3] Ivanova, V., “3D geometric-mechanical model of rock fracture systems.” PhD. Thesis MIT, 1998.
- [2] Knight, M. A., “Centrifuge modelling of multiphase flow in the vadose zone”, PhD. Thesis, Queen’s University, Canada, 1995.
- [1] Helliwell, E. E., “Modelling transport processes in soil due to hydraulic density and electrical gradients”, PhD. Thesis, University of Cambridge, UK, 1994.

Master’s Theses

- [26] Finazzi, M., “Spatial Scale Effects on Hydrologic Modeling of Extensive Green Roofs in New York City”, MS Thesis University of Brescia (Italy), September 2012 (co-advisor).
- [25] Peterson, K., “Observations of the hydrological performance of green roofs”. SM Thesis, Columbia University, January 2010.

- [24] O’Keeffe, G., “Observations of water balance in a model green roof”. SM Thesis, Columbia University, May 2007. Sponsor W.R. McGillis.
- [23] Poanessa, M., "A model for predicting air-flow during insitu air-sparging", SM Thesis, MIT, August 2003.
- [22] LeFrancois, S. O. “Ground penetrating radar characterization of wood piles and the water table in Back Bay, Boston”, SM Thesis, MIT, May 2003.
- [21] Gostic, R., “An NMR investigation into the influence of wettability on entrapment mechanisms during two phase flow”, SM Thesis, MIT, January 2002.
- [20] Toker, N. K., “Improvements and reliability of the MIT tensiometers and studies on soil moisture characterisation curves”, SM Thesis, MIT, January 2002.
- [19] Fidalgo, B. “Evaluation and improvement of a modified permeameter to characterize dual-porosity media”, SM Thesis, MIT, January 2002.
- [18] Ivanov, V., “Measurements and Interpretation of Wetting Front Infiltration in Soil,” SM Thesis, MIT, May 2001.
- [17] Alexander, D. “Evaluation of present and emerging MSW landfill technology”, SM Thesis, MIT, January 2001.
- [16] Adams, C. “DNAPL transport and remediation in smooth-walled vertical fractures,” SM Thesis, MIT, August 2000.
- [15] Casterton, C. “An Investigation of bioluminescent microbial transport in porous media,” SM Thesis, MIT, May 2000.
- [14] Woodoworth, R. “Air-sparging operations at Plainville Landfill, MA.”, M.Eng. Thesis, MIT, May 1999.
- [13] Chen, E. “Plainville Landfill Operation & Remediation.”, M.Eng. Thesis, May 1999.
- [12] Hwang, G. M., “Mico-LIBS: A novel chemical analysis tool,” SM Thesis, MIT, January 1998.
- [11] Horng, R. T., “An investigation into the application of Magnetic Resonance Imagery (MRI) for the dynamic mapping of immiscible fluid transport in porous media,” SM Thesis, MIT August 1997.
- [10] Mukhopadhyay, S. R., “Development of a data search engine for surface water pathway criteria list,” M.Eng. Thesis, MIT, May 1997.
- [9] Kuo, K. N., “Web-based database-enabled executive information system for Preliminary Site Assessment under CERCLA,” M.Eng. Thesis, MIT, May 1997.
- [8] Lukasiak, A. D., “Graphical interface for existing PA scoresheet,” M.Eng. Thesis, MIT, May 1997.
- [7] Guzman, J., “An interactive data base of Preliminary Assessments for cross-site comparison outline,” M.Eng. Thesis, MIT, May 1997.
- [6] Leon, R. M., “Post-closure management of a hazardous waste landfill at the Massachusetts Military Reservation Main Base Landfill,” M.Eng. Thesis, MIT, May 1997.
- [5] Banno, K., “Geotechnical centrifuge modelling of immiscible fingering in porous media,” SM Thesis, MIT, August 1996.
- [4] Elias, K., “Source containment at the Massachusetts Military Reservation Main Base Landfill: Design of a hazardous waste landfill cover system,” M.Eng. Thesis, MIT, May 1996.
- [3] Jones, K., “An analysis of air sparging/soil vapor extraction systems emphasizing volatilization kinetics in JP-4 jet fuel,” M.Eng. Thesis, MIT, May 1996.
- [2] Ramsay, W. B., “A modified triaxial permeameter for physical characterisation of parameters affecting contaminant transport through wetland deposits,” SM Thesis, MIT, May 1996.

- [1] Ratnam, S., “Geotechnical centrifuge modelling of the behaviour of LNAPLs under hydraulic flushing,” SM Thesis, MIT, May 1996.

Bachelor’s Theses

- [5] Bowen, A., “Design of a Bicycle Route for CLIMB, NYC”, Department of Earth and Environmental Engineering, Columbia University, May 2007.
- [4] Holguin, A., “Spinning Drop Tensiometry for measuring DNAPL interfacial tension”, Department of Mechanical Engineering, MIT 1999.
- [3] Campbell, R., “A study of macroscopic dispersion processes in porous media,” University of Western Australia, November 1991.
- [2] Peterson, S., “Subsurface migration and breakdown of a non-aqueous phase organic liquid,” University of Western Australia, November 1991.
- [1] Anderson, S. J., “Chemical properties of amended bauxite residue,” University of Western Australia, November 1991.

Teaching Experience of *Patricia J. Culligan*

Courses Taught:

<u>Course</u>	<u>Institution</u>	<u>Level</u>	<u>Year</u>
Freshman Design: Civil Engineering	Columbia University	Undergraduate	2012
Hydrosystems Engineering (joint with EAEE)	Columbia University	Undergraduate	2012
Advanced Issues in Development Planning (joint with GSAPP)	Columbia University	Graduate	2010
Fluid Mechanics*	Columbia University	Undergraduate	2003 - 2008
Urban Ecology Studio (joint with GSAPP)	Columbia University	Graduate/ Undergraduate	2004 – present
Engineering for Developing Communities	Columbia University	Undergraduate	2005 - 2015
Soil Mechanics*	Columbia University	Undergraduate	2006
Groundwater Contaminant Transport and Remediation	Columbia University	Graduate	2004
Waste Containment Design and Practice	Columbia University	Graduate	2005
Environmental Geotechnics: Sub-module on contaminant transport & remediation	Harvard University	Graduate	2001
Introduction to Civil Engineering Materials*	Massachusetts Institute of Technology	Undergraduate	1999-2003
Waste Containment & Site Remediation Technology	Massachusetts Institute of Technology	Graduate	1996- 2000
Introduction to Geotechnical Engineering	Massachusetts Institute of Technology	Undergraduate	1996-1997
Introduction to Geomechanics*	University of Western Australia	Undergraduate	1991

* Included a laboratory section

Freshman Advising Seminar:

<u>Title</u>	<u>Institution</u>	<u>Year</u>
Human Health Pollution & the Environment	Massachusetts Institute of Technology	2000
The European Union	Massachusetts Institute of Technology	1999

Master of Engineering Projects:

<u>Title</u>	<u>Institution</u>	<u>Year</u>
Investigation of the Groundwater Impacts from the Plainville Landfill	Massachusetts Institute of Technology	2000
A Web-Based System for Preliminary Investigation at Hazardous Waste Sites	Massachusetts Institute of Technology	1999

Graduate Summer Schools:

<u>Title</u>	<u>Institution</u>	<u>Year</u>
Geophysical Porous Media: Multi-scale science from nano to global scale: Sponsored by NSF CMG program	Purdue University, July 17 – 26 th	2006

High School Summer Programs:

<u>Title</u>	<u>Institution</u>	<u>Year</u>
Sustainable Urbanization: New Designs for the future city	Columbia University	2013 - present

Professional Courses:

<u>Title</u>	<u>Institution</u>	<u>Year</u>
Pollutant Transport in Natural Water Systems	Graduate School of Education, Harvard University	2002-2003
Land-Based Waste Disposal	University of Western Australia	1990

Program Management:

<u>Program</u>	<u>Institution</u>	<u>Year</u>
Director, Sustainable Engineering Graduate Scholars Program	Columbia University	2012 - present
Director, IGERT Program: Solving Urbanization Challenges by Design	Columbia University	2009 - 2016
Director, Education Center for Sustainable Engineering	Columbia University	2008 - 2010
Director, Water Resource and Environmental Engineering Concentration; Department of Civil Engineering & Engineering Mechanics	Columbia University	2003 - present
Supervisor, Undergraduate Research Opportunities Program in Civil & Environmental Engineering	Massachusetts Institute of Technology	2000 - 2003
Supervisor, Cambridge University and MIT Undergraduate Student Exchange Program in Civil & Environmental Engineering	Massachusetts Institute of Technology	2000 - 2003
Faculty Advisor, Chi-Epsilon Honor Society	Massachusetts Institute of Technology	2000