Curriculum Vitae

Patricia J. Culligan
Professor, Civil Engineering & Engineering Mechanics
Associate Director, Institute for Data Sciences and Engineering
Co-Director, The Urban Design Lab of the Earth Institute
Columbia University, New York, NY 10027
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Education:

School	Degree	Date
Université d'Aix-Marseille III	Diplome de Langue, Litterature et Civilization (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

Career History:

Employer	Position	Beginning	Ending
Columbia University	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; 98 refereed articles; 39 other major publications (National Academy Reports; Professional Periodicals, etc.).

Theses Supervision: 5 Bachelors; 26 Masters; 17 Doctoral as Supervisor (4 in progress); 24 Doctoral as Reader.

Research Funding: Funding as Columbia University faculty member [2003 - 2015] $15,330,000 ($8,130,000 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:

Award/ Honor	Date
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 *Frontiers of Engineering Education*	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. Avanessians 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

Activity	Beginning	Ending
Chair, Board of Earth Sciences and Resources Committee on Geological and Geotechnical Engineering	April 2014	present
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, Board of Earth Sciences and Resources Committee on Geological and Geotechnical Engineering	March 2011	present
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):

Activity	Beginning	Ending
Member, Board of Governors, ASCE Geo-Institute	Sept 2011	Sep 2014
Organizing Committee, 17th International Sustainable Development Research Conference, Columbia University, May 8 – 10th, 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 – 12th, 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 (last decade only):

Panel	Date
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:

Responsibility	Beginning	Ending
University Wide		
Advisory Board, Center for Science and Society	Nov 2014	present
Member, School of Continuing Education Executive Committee	Aug 2013	present
Member, Review Committee for Provost's Diversity Grants	April 2013	June 2013
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		
Co-Director, Urban Design Lab	Sept. 2012	present
Member, Search Committee for Sustainability in the Build Environment Lecture in Discipline position, School of General Studies	March 2012	May 2012
Organizing Committee & Plenary Speaker, The Green Roof Science Symposium, Columbia University, April 17th 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		
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 *(2004 – present)*

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

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 Mechaincs 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-O*

[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: the example of New York City", in *Cities in the 21st Century,* Fondazione ENEL. Invited. (*In Press*)

[4] **Culligan, P.J.** and F. Pena-Mora, "Interdisciplinary in Engineering", in the *Oxford Handbook on Interdisciplinarity*, Oxford University Press, 2010, 147-160, Invited. *ISBN978-0-19-923691-6*

[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***

[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.

[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 Conica 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.

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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.

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Other

[4] **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.

[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

	Total	Completed	In Progress
Bachelor's	5	5	0
Master's	26	26	0
Doctoral			
As Supervisor	17	13	4
As Reader	25	25	0

Current research group: 2 research scientists (one part-time); 4 PhD students, 9 under-graduate research assistants

Doctoral Theses, Supervisor

[17] Shetty, N. "Real-time monitoring of green streets", PhD Expected May 2016.

[16] Hakimdavar, R. "Measurement and prediction of urban and rural hydrological processes", PhD Expected Aug 2015.

[15] Liu, P.C. "Modeling inorganic and microbial particle transport in porous media", PhD Expected Aug 2015.

[14] Elliott, R. "Integrating structural analyses and hydrological performance in new urban green infrastructures", PhD expected 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

[25] Fricker, K. J. "Magnesium Hydroxide Sorbents for Combined Carbon Dioxide Capture and Storage in Energy Conversion Systems, PhD Columbia University, August 2014.

[24] 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.

[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:

Course	Institution	Level	Year
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 - present
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 Geomechnics*	University of Western Australia	Undergraduate	1991

* Included a laboratory section

Freshman Advising Seminar:

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

Master of Engineering Projects:

Title	Institution	Year
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:

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

High School Summer Programs:

Title	Institution	Year
Sustainable Urbanization: New Designs for the future city	Columbia University, June 24 – July 12th	2013 - present

Professional Courses:

Title	Institution	Year
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:

Program	Institution	Year
Director, Sustainable Engineering Graduate Scholars Program	Columbia University	2012 - present
Director, IGERT Program: Solving Urbanization Challenges by Design	Columbia University	2009 - present
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