

## Mary J.S. Roth, Ph.D., P.E.

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### EDUCATION

Ph.D., Civil Engineering, University of Maine, 1992  
M.S., Civil Engineering, Cornell University, 1986  
B.S. *Summa Cum Laude*, Civil Engineering, Lafayette College, 1983

### EXPERIENCE

#### Lafayette College, Easton, PA

Simon Cameron Long Professor	2006-present
Faculty Resident Director: Lafayette in Bonn, Germany	spring 2022
Head: Department of Civil and Environmental Engineering	2003-06, 2016-21
Associate Provost for Academic Operations	2008-14
Interim Associate Provost and Director of Engineering	2007-08
American Council on Education Fellow	2006-07
Professor	2005-06
Associate Professor	1999-2005
Assistant Professor	1992-99
Instructor	1991-92

#### Association of American Colleges and Universities, Washington, D.C.,

Project Kaleidoscope: Mentor, co-leader, and leader, STEM Leadership Institutes	2012, 2014-16, 2018
Senior Fellow	2011-12

#### Franklin & Marshall College, Lancaster, PA

American Council on Education Fellow	2006
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#### Norwegian Geotechnical Institute, Oslo, Norway

Fulbright Research Fellow	2000-01
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#### Woodward-Clyde Consultants, Wayne, NJ & Gaithersburg, MD

Senior Staff Engineer	1986-89
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### ADMINISTRATIVE INTERESTS/EXPERTISE

*Integrated and interdisciplinary/multidisciplinary learning to prepare students for a complex and changing world. Mentoring and leadership development to support early- and mid-career faculty. Useful, efficient, and sustainable assessment to improve student learning.*

#### ***Administrative experience leading campus initiatives (selected):***

Accreditation:

- 2008-09 ABET accreditation reports
- 2009 Middle States decennial report
- 2014 Middle States periodic review report

Arts/Humanities: Mellon Foundation proposal for arts integration (\$800,000 – awarded)

Assessment: Development and implementation of academic division assessment plan

Diversity: Teagle Foundation proposal and grant oversight for infusing diversity in the curriculum and residential life (\$300,000 consortium funding – awarded)  
Facilities: New and renovated facilities for programs in theater and film and media studies, new facilities for Center for Global Education, preliminary programming for new interdisciplinary science facility  
Faculty Development: Development and implementation of year-long faculty orientation program; development and implementation of new orientation program for department heads and program chairs  
Interdisciplinary Programs: Facilitated development of film and media studies major and health and life sciences minor; initiated external reviews of interdisciplinary programs  
Natural Sciences: Howard Hughes Medical Institute proposal (successful submission of pre-proposal and full proposal)  
Strategic Planning: Developed implementation plan for Lafayette College's 2007 strategic plan

***Administrative responsibilities (selected):***

Coordinated external evaluations for academic programs  
Coordinated interdisciplinary programs  
Coordinated hiring of adjunct and visiting faculty (over 50 visiting faculty hires)  
Managed and adjusted operating and endowed budgets in the academic division (over \$15 million)  
Served as College's representative on Lehigh Valley Association of Independent Colleges (LVAIC) consortium's chief academic officers committee  
Served as provost's liaison with development for fundraising for academic needs  
Served as provost's liaison with facilities and information technology divisions for major capital projects within academic division  
Supervised administrative staff

**RESEARCH INTERESTS/EXPERTISE**

*Reliability analysis of geotechnical structures; use of earth resistivity testing in site investigations; use of bacteria to stabilize loose sands; use of bacteria to reduce soil permeability; use of bacteria to increase soil strength.*

**HONORS AND AWARDS**

Marquis Distinguished Teaching Award (Lafayette College), 2017  
Cy Fleck Administrator of the Year, 2014  
Special Service Award, Tau Beta Pi, 2011  
American Council on Education Fellow, 2006-07  
Marquis Distinguished Teaching Award (Lafayette College), 2002  
Fulbright Research Scholarship, Norway, 2000-01  
Engineer of the Year (NSPE, Lehigh Valley Chapter), 2000  
James P. Crawford Award (Teaching Award - Lafayette College), 1999  
Engineer of the Year (ASCE, Lehigh Valley Chapter), 1999  
GE Graduate Fellowship, 1983-84  
Tau Beta Pi  
Phi Beta Kappa

## **COURSES TAUGHT**

Cities: An introduction to the civil engineering systems that make cities work  
Civil Engineering Design II  
Civil Engineering Design III  
Data: the good, the bad, the misleading  
Engineering Professionalism and Ethics  
Environmental Site Assessment  
Envisioning a Sustainable World  
Introduction to Engineering: Design, Risk, and Judgment  
Introduction to Engineering: Life Cycle Assessment  
First Year Seminar: Understanding Design  
Foundation Engineering  
Geotechnical Engineering  
Professional Issues for Civil Engineers  
Retaining Walls, Slopes, and Earthen Dams  
Risk Assessment  
Statics  
Surveying and Engineering Measurements

## **PROFESSIONAL REGISTRATION AND MEMBERSHIPS**

Professional Engineer (Maine, Pennsylvania)  
American Society of Civil Engineers (ASCE)  
American Society for Engineering Education (ASEE)  
United States Universities Council on Geotechnical Education and Research  
(USUCGER)

## **CERTIFICATIONS AND COURSES TAKEN**

Nature Journaling and Field Sketching. The Cornell Lab of Ornithology, 2020.  
ABET Program Evaluator (ASCE approval in 2019)  
Learning How to Learn: Powerful mental tools to help you master tough subjects.  
Coursera, 2017  
From Ideas to Action: Bring Ideas to Life Through Ideation and Prototyping. IDEO,  
2016.  
Becoming an Assessment Facilitator Workshop. MSCHE, 2011.  
Middle States Workshop for Team Chairs and Evaluators. MSCHE, 2009.

## **SERVICE ACTIVITIES**

### **Lafayette College**

#### College Service (selected):

Engineering/International Studies Joint Degree Advisory Committee (2016-20, 2021-22)  
Friends of Skillman Library Executive Council (2016-2020)  
Appeals and Grievance Committee (2004-06, 2016-2019; chair of committee in 2005-06  
and 2017-18)  
Academic Research Committee (2015-2018)

Ad Hoc Committee to Review the Role of the President in Promotion, Tenure, and Review Committee Decisions and Related Processes (2016-17)  
 HHMI Inclusive Excellence Proposal Steering Committee Co-Chair (2016)  
 Institutional Representative for HHMI Pre-proposal Initiative (2015)  
 Search Committee for Vice President for Finance and Administration (2014)  
 Steering Committee for Periodic Review Report for Middle States Accreditation, Chair (2012-14)  
 Design Committee for Oeschle Global Education Center (2011-14)  
 Design Committee for New and Renovated Facilities for Theater and Film and Media Studies (2011-14)  
 Administrative Enrollment Planning Committee (2008-04)  
 Advisory Committee on Assessment (2010-14)  
 Curriculum and Educational Policy Committee – *ex officio* (2007-08) and Provost's representative on Curriculum sub-committee (2008-14)  
 Faculty Compensation Committee – *ex officio* (2008-14)  
 Information Technology Governance Committee (2012-14)  
 Lehigh Valley Association of Independent College Chief Academic Officer Committee (2008-14)  
 Student Appeals Committee (2008-14)  
 Student Learning Assessment Advisory Committee (2009-14)  
 Budget Advisory Committee (2009-13)  
 Film and Media Studies Advisory Committee (2008-10)  
 Faculty Ad Hoc Committee on Life Sciences (2008-10)  
 Campus Master Planning Administrative Committee (2008-09)  
 Decennial Report Steering Committee for Middle States Accreditation, Co-Chair (2007-09)  
 Community-Based Learning and Research Provost Advisory Committee (2007-09)  
 Faculty Academic Policy Committee (2003-06)  
 Chair of Health Care Subcommittee (2005-06)  
 Health Care Subcommittee (2003-06)  
 Graduate Studies and Fellowship Advisory Committee (2002-05)  
 Promotion, Tenure, and Review Committee (1999-2000, 2001-03)  
 Faculty Ad Hoc Committee to Review Composition of Appointments, Promotions, and Tenure Committee (1994-95)

Departmental Service (selected):

ABET 2020 self-study (primary author)  
 Chaired search committees (multiple searches 2003-06, 2016-20)  
 Served as faculty advisor to more than 150 students  
 Served as honors advisor to seven students  
 Faculty advisor for student chapter of ASCE (1996-2000)

**Professional Service (selected)**

ABET Program Evaluator (2019-20, 2020-21, 2021-22)  
 Program Committee, ASCE Civil Engineering Education Summit (2018-19)

National Judge for American Council of Engineering Companies (ACEC) Engineering Excellence Awards (2016, 2017, 2018, 2019 – Chief Judge)

Leader or Co-Leader, AAC&U/PKAL STEM Leadership Institute (2014, 2015, 2016)

Mentor, AAC&U/PKAL STEM Leadership Institute (2012, 2018)

United States Universities Council on Geotechnical Education and Research (USUCGER), Nominating Committee (2017)

Associate Editor Journal of Engineering and Environmental Geophysics (2003 to 2016)

Blue Ribbon Committee Ad Hoc Reviewer, National Science Foundation (2016)

Committee of Visitors, National Science Foundation review of the Division of Civil, Mechanical and Manufacturing Innovation (2015)

Blue Ribbon Committee, National Science Foundation (2014-15)

Consultant, Rutgers-Newark HHMI Proposal Development (2013)

Association of American Colleges and Universities Senior Fellow, (2011-12)

Advisory Council, Department of Civil and Environmental Engineering, University of Delaware (2007-11)

Facilities Committee Member, National Canal Museum (2007-11)

Middle States Commission on Higher Education Evaluation Team (2010)

National Cooperative Highway Research Program panel member for NCHRP Project 20-07, Task 259, development of “Guide to Asset Management of Earth Retaining Structures” (2008-09)

Committee of Visitors, National Science Foundation review of the Division of Civil, Mechanical and Manufacturing Innovation (2009)

Logistics Coordinator, Expanding Your Horizons Conference, organized by the National Canal Museum (2006)

Board Member, Engineering and Environmental Geophysics Society (2005-06)

Organizer of Geo-Challenge 2005 at Geo-Frontiers, Austin, TX

External reviewer for geotechnical program at Virginia Military Institute (2004)

Geo-Institute Risk Assessment and Management Committee (1992-2008)

Conference Organizing Committee for ASCE Geotechnical Engineering Division Specialty Conference entitled *Uncertainty in the Geologic Environment: From Theory to Practice* (1996)

Co-Editor, Committee on Earth Retaining Structure Committee Report, “Guidelines of Engineering Practice for Braced and Tied-Back Excavations,” Geotechnical Special Publication No. 74, Geo-Institute of ASCE (1997)

Reviewer for ASCE Journal of Geotechnical and Geoenvironmental Engineering

Reviewer for ASEE conference abstracts and papers

Reviewer for Engineering Geology

Reviewer for Geotechnique

External evaluator for National Science Foundation unsolicited proposals

#### **PEDAGOGICAL GRANTS**

Team-Teaching Multi-Disciplinary Courses Grant, Lafayette College (2017)

Meta Mindset grant, Lafayette College (2017, \$1500; 2018, \$1500)

Teaching with Technology Grant, Lafayette College (2016-17, \$5497)

STEAM Curriculum Grant, Lafayette College (2015; \$1480)

## SCHOLARSHIP

### Funded Research Projects

- “RUI: Reducing Permeability in Sands Using Biofilm-Forming Bacteria and Quorum Sensing Inhibitors to Create Uniform Growth,” National Science Foundation Research Grant No. CMMI-1632963, \$242,073, 8/15/2016-7/31/2021.
- “Achieving Diversity Goals: A Program to Advance Leadership in Engineering and Computer Science,” National Science Foundation S-STEM Grant No. DUE-0966165. \$586,500, 8/1/10 – 7/31/16.
- “MRI: Acquisition of State-of-the-Art Soil Structure Interaction Facility,” National Science Foundation, Major Research Instrumentation Grant No. CMMI-0820640, \$222,487, 9/1/08 – 8/31/12.
- “Exploratory Research in Microbial Remediation of Liquefiable Soils,” National Science Foundation Small Grant for Exploratory Research Grant No. CMS-0408832, \$56,123, 2/1/04-5/31/06.
- "MRI/RUI Proposal for Instrumentation of Environmental Research Laboratories," National Science Foundation, Major Research Instrumentation Grant No. CMS-0215809, \$366,364, 8/1/02-7/31/03.
- “Collaborative Research: Evaluation of 2D vs 3D Multielectrode Resistivity for the Characterization of Shallow Karst,” National Science Foundation Research Grant No. CMS-0201015, \$76,749, 6/1/02 – 5/31/05.
- “Evaluation of Potential of Earth Resistivity in Norway,” Fulbright Scholar Program Research Grant, NOK 146,000, 9/1/00-3/1/01.
- “Evaluation of Potential of Earth Resistivity in Norway,” National Science Foundation Research Grant No. INT 0071702, \$14,000, 8/1/00 – 7/1/01.
- “Evaluation of Reliability of Earth Resistivity Method in Thinly Mantled Karst,” National Science Foundation Research Grant No. CMS-9734899, \$76,375, 6/1/98 – 5/31/00.
- “Risk Assessment of Foundations in Karst Terrain,” National Science Foundation Research Grant No. CMS-9612675, \$18,000, 9/1/96 – 2/28/98.

### Books

- Elrod, S. and Roth M.J.S. (2012). Leadership for Interdisciplinary Learning: A Practical Guide to Mobilizing, Implementing, and Sustaining Campus Efforts, AAC&U, Washington D.C., 47p.
- Shackelford, C.D., Nelson, P.P., and Roth, M.J.S., editors (1996). Uncertainty in the Geologic Environment: From Theory to Practice, ASCE, NY, NY, 1453 p.

### Journal Publications (Student co-authors noted with an \*)

- Roth, M.J.S., Caslake, L.F., DeJong, J., Greer, J., Nelson, D., and Parales, R. (2022). “Stimulated microbial growth for permeability reductions in granular soils.” Proceedings of the Institution of Civil Engineers – Ground Improvement, <https://doi.org/10.1680/jgrim21.00011>
- Roth, M.J.S. (2016). “A Faculty Internship: Reconnecting with the Profession,” Geo-Strata. Vol. 20, No. 1, 62-65.

- Roth, M.J.S., and Elrod, S. (2015). "Framing Leadership for Sustainable Interdisciplinary Programs," Peer Review: Emerging Trends and Key Debates in Undergraduate Education, Vol. 17, No. 2, 8-12.
- Banagan, B. \*, Wertheim, B. \*, Roth, M.J.S., and Caslake, L (2010). "Microbial Strengthening of Loose Sand," Letters in Applied Microbiology, 51, 138-142.
- Schuster, M.J., Juang, C. H., Roth, M.J.S., and Rosowsky, D. V. (2008). "Reliability Analysis of Building Serviceability Problems Caused by Excavation," Geotechnique, Vol. 58, No. 9, 743-749.
- Nyquist, J.E., Mintz, H.E., and Roth, M.J.S. (2008). "Mise- à-la-masse and smoke tests for mapping vadose zone karst," The Leading Edge, Vol. 27, 1510-1515.
- Xia, J., Nyquist, J.E., Xu, Y., Roth, M.J.S., and Miller, R.D. (2007). "Feasibility of Detecting Near-surface Feature with Rayleigh-wave Diffraction," Journal of Applied Geophysics, Vol. 62, 244-253.
- Elton, D., Shannon, D., Luke, B., Townsend, F., and Roth, M. J. S. (2006). "Adding Excitement to Soils: A Geotechnical Student Design Competition," International Journal of Engineering Education, Vol. 22, No. 6, 1325-1336.
- Nyquist, J.E., and Roth, M.J.S. (2005). "Improved 3D Pole-Dipole Resistivity Surveys Using Radial Measurement Pairs," Geophysical Research Letters, Vol. 32, L21416.
- Nyquist, J., and Roth, M.J.S. (2005). "Puzzling over karst," Fasttimes, Feb., p. 27.
- Roth, M.J.S., and Nyquist, J.E. (2003). "Evaluation of multi-electrode earth resistivity testing in karst," ASTM Geotechnical Testing Journal, Vol. 26, 167-178.
- Roth, M.J.S., Mackey, J.R. \*, Mackey, C. \*, and Nyquist, J.E. (2002). "A case study of the reliability of multi-electrode earth resistivity testing for geotechnical investigations in karst terrains," Engineering Geology, 65, 225-232.
- Roth, M.J.S. (2001). "Sabbatical Abroad," Geo-Strata, October 2001, 18-22.
- Roth, M.J.S. (2001). "Suzanne Lacasse: Engineer, Researcher, and Managing Director, Norwegian Geotechnical Institute," Geo-Strata, April 2001, 30-31.
- Roth, M.J.S., and Roth, L.H. (2000). "Academic-Industry Partnerships: How can we do more?" Geo-Strata, April 2000, 26-29.
- Nyquist, J.E., Roth, M.J.S., and Petruccione, J.L. (1999). "Characterization of shallow karst terrain using multi-frequency electromagnetic induction: two examples from Eastern Pennsylvania," 69<sup>th</sup> Annual International Meeting of the Society for Exploration Geophysics, Expanded Abstracts, published by SEG on CD-ROM, 4 pp.
- Mackey, J.R. \*, Roth, M.J.S., and Nyquist, J.E. (1999). "Case study: Site characterization methods in karst," in Geo-Engineering for Underground Facilities, Geotechnical Special Publication No. 90, G. Fernandez and R. Bauer, eds., ASCE, Reston, VA, 695-705.
- Thomas, B. \* and Roth, M.J.S. (1999). "Evaluation of site characterization methods for sinkholes in Pennsylvania and New Jersey," Engineering Geology, Vol 52, 147-152.
- Shaffer, D. L. \*, Roth, M. J. S., and Ruggles, R. (1996). "Development of a GIS for environmental assessment incorporating known potential environmental hazards and remote sensing", Remote Sensing and GIS for Site Characterization: Applications and Standards, ASTM STP 1279, V.H. Singhroy, D.D. Nebert, and A.I. Johnson, Eds., American Society for Testing and Materials, pp. 101-106.

- Tunnell, D. M. \*, Dennis, R. M., and Roth, M. J. S. (1996). "Soil-washing evaluation program for Palmerton zinc site", Journal of Environmental Science & Health, A31(6), pp. 1459-1468.
- Roth, M. J. S. (1992). Discussion of "Partial and total factors of safety in anchored sheet pile design" by A. J. Valsangkar and A. B. Schriver, Canadian Geotechnical Journal, 29(5). p. 879.
- Spry (Roth), M. J., Kulhawy, F. H., and Grigoriu, M. D. (1988). "Reliability-Based Foundation Design for Transmission Line Structures, Volume 1: Geotechnical Site Characterization Strategy", Report E1-5507, Volume 1, Electric Power Research Institute, Palo Alto, California.
- Grigoriu, M. D., Kulhawy, F. H., Spry (Roth), M. J., and Filippas, O. B. (1987). "Probabilistic site strategy for transmission lines", Foundations for Transmission Line Towers, Geotechnical Special Publication No. 8, ASCE, New York, pp. 1-14.

**Conference Proceedings, Posters, Project Reports<sup>1</sup>** (Student co-authors noted with an \*)

- Roth, M.J.S., Caslake, L.F., and McGuire, M.P. (2022). "Biocementation for All, Anywhere: A New Experiment for Introductory Soil Mechanics Courses." Geo-Congress 2022, Annual Conference of ASCE's Geo-Institute, Minneapolis, MN.
- Malladi, H., and Roth, M.J.S. (2021). "Implementing Life Cycle Assessment in Introduction to Engineering in Different Modalities." Proceedings, American Society of Engineering Education Annual Conference.
- Roth, M.J.S., and Malladi, H. (2020). "Incorporating Life Cycle Assessment in an Introduction to Engineering Course." Proceedings, American Society of Engineering Education Annual Conference.
- Roth, M.J.S., and Caslake, L.F. (2019). "Reducing Soil Permeability Using In-Situ Biofilm-Forming Bacteria: Overcoming Testing Apparatus Challenges." Proceedings, Geo-Congress 2019: Soil Improvement, Philadelphia, PA, 187-195.
- Roth, M.J.S., and Caslake, L.F. (2018). "Establishment of a biofilm in a soil column is correlated to reduced permeability." Poster presentation, 8<sup>th</sup> ASM Conference on Biofilms, Washington, D.C.
- Sanford Bernhardt, K.L., and Roth, M.J.S. (2018). "Using Concept Maps to Assess Student Learning in a Multi-Section Introduction to Engineering Course." Proceedings, American Society of Engineering Education Annual Conference, Salt Lake City, UT.
- Roth, M.J.S., and Caslake, L.F. (2018). "A New Approach to Collaboration: A Partnership between an NSF-funded Engineering Research Center and a Liberal Arts College." Proceedings, American Society of Engineering Education Annual Conference, Salt Lake City, UT.
- Roth, M.J.S. (2016). "Introduction to Geotechnical Engineering Using a Project-Based Module in a First-Year Engineering Course." Proceedings, American Society of Engineering Education Annual Conference, New Orleans, LA.
- Roth, M.J.S., and Sanford Bernhardt, K.L. (2016). "Using Concept Maps for Assessment and Improvement of a Multi-Section Introduction to Engineering Course."

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<sup>1</sup> Publications in this list underwent varying levels of review; however, the review processes for these publications were generally not as rigorous as reviews done for journal publications.



- Proceedings, American Society of Engineering Education Annual Conference, New Orleans, LA.
- Saini, J.K. \*, Galperin, M. \*, Roth, M.J.S. and L.F. Caslake. (2015). "Inhibition of quorum sensing affects biofilm formation by *Pseudomonas fluorescens* MIC102L in sandy soil." Poster presentation, General Meeting of the American Society for Microbiology, New Orleans, LA.
- Schlegel, W. M., Stewart, M.T., Ridgway, J.W., Roth, M.J.S., and Elrod, S. (2012). "Building and Sustaining Interdisciplinary STEM: What Works from the Keck/PKAL Facilitating Interdisciplinary Learning in Science and Mathematics Project," Poster Presentation, Experimental Biology 2012, San Diego.
- Suleiman, M.T., Kurtz, S., Raich, A., Roth, M.J.S., and Helm, J. (2011). "Soil-Structure Interaction Focusing on Single Laterally Loaded Piles," 2011 CMMI NSF Conference.
- Suleiman, M.T., Raich, A., Polson, T.W., Kingston, W.J., and Roth, M.J.S. (2010). "Measured Soil-Pile Interaction Pressures for Small-Diameter Laterally Loaded Pile in Loose Sand," Proceedings, GeoFlorida 2010: Advances in Analysis, Modeling & Design, West Palm Beach, Florida.
- Suleiman, M.T., Kurtz, S., Raich, A., and Roth, M.J.S. (2009). "Soil-Structure Interaction Facility," Proceedings, 2009 NSF Engineering Research and Innovation Conference, Honolulu, Hawaii.
- Nelson, P., Hunt, T., Traver, C., Eibeck, P., Toro-Ramos, Z., Schrader, C., Roth, M., and Durham, D., (2009). "Women Engineers in Advanced Academic Positions," Proceedings, American Society of Engineering Education Annual Meeting, Austin, Texas.
- Schuster, M.J., Juang, C.H., Roth, M.J.S., Hsiao, C.L., and Kung, T.C. (2007). "Serviceability Limit State for Probabilistic Characterization of Excavation-induced Building Damage," Proceedings of Geo-Denver 2007, Annual Conference of ASCE's Geo-Institute, Denver, CO.
- Schuster, M.J., Juang, C.H., Hsiao, E.C.L., Roth, M.J.S., and Kung, G.T.C. (2006). "Reliability analysis of excavation-induced building damage," Taipei International Symposium on New Generation Design Codes for Geotechnical Engineering Practice," Taipei, Taiwan.
- Meighan, H., J.E.Nyquist, and M.J.S. Roth (2006) "Mise-à-la-masse, resistivity tomography and smoke tests combined to map karst, Easton, PA," Geological Society of America Abstracts, Philadelphia, October.
- Xia, J., J. E. Nyquist, Y. Xu, R. Miller and M.J.S. Roth (2006) "Rayleigh-wave diffractions due to near-surface features," Geological Society of America Abstracts, Philadelphia, October.
- Nyquist, J. E., J. Peake, M. J. S. Roth (2006). "Comparison of a computer-optimized array and dipole-dipole DC resistivity soundings for karst characterization," Proceedings of the 2<sup>nd</sup> International Conference on Environmental and Engineering Geophysics (ICEEG), Wuhan, China, 6 pp. (*Invited Paper*)
- Xia, J., Nyquist, J.E., Xu, Y., and Roth, M.J.S. (2006). "Feasibility of Detecting Voids with Rayleigh-Wave Diffraction," Proceedings, Symposium on the Application of Geophysics to Environmental and Engineering Problems, Seattle, WA.

- Manney, R. \*, Roth, M.J.S., and Nyquist, J.E. (2005). "Exploring Directional Differences in Resistivity Results in Karst." Proceedings, Symposium on the Application of Geophysics to Environmental and Engineering Problems, Atlanta, Georgia, 1117 - 1124.
- Nyquist, J.E., Roth, M.J.S., Henning, S. \*, Manney, R. \*, and Peake, J. (2005). "Smoke without Mirrors: A New Tool for the Geophysical Characterization of Shallow Karst Cavities," Proceedings, Symposium on the Application of Geophysics to Environmental and Engineering Problems, Atlanta, Georgia, 337-343.
- Caslake, L., and Roth, M.J.S. (2005). "Increasing Sand Strength through the Addition of Bacteria," Poster presentation at the 105th General Meeting of the American Society for Microbiology, Atlanta GA, June 2005.
- Caslake, L., and Roth, M.J.S. (2005). "Increasing Sand Strength with Bacteria," Poster presentation, 21<sup>st</sup> Annual International Conference on Soils, Sediments, and Water, University of Massachusetts at Amherst, October 2005.
- Welker, A. L., Roth, M.J.S., and Finley, C.A. (2005). "Prototype Geotechnical Engineering Modules," Proceedings, Geo-Frontiers 2005, Austin, TX, GeoInstitute of the American Society of Civil Engineers.
- Sanford Bernhardt, K.L., and Roth, M.J.S. (2004). "Undergraduate Research: The Lafayette Experience," Proceedings, American Society of Engineering Education Annual Meeting.
- Roth, M.J.S., Nyquist, J.E., Faroni, A. \*, Henning, S. \*, Manney, R. \*, and Peake, J. (2004). "Measuring Cave Dimensions Remotely Using Laser Pointers and a Downhole Camera," Proceedings, Symposium on the Application of Geophysics to Environmental and Engineering Problems, Colorado Springs, Colorado.
- Hiltunen, D. R., and Roth, M.J.S. (2003). "Investigation of Bridge Foundation Sites in Karst Terrane via Multi-Electrode Electrical Resistivity," Proceedings, Geophysics 2003, Orlando, Florida.
- Hiltunen, D.R., Cramer, B.J., Dunn, P.W., Englert, C.M., Gardner, J.M., Harrison, H.D., Kuzenski, J.D., Mathias, A.D., Roth, M.J.S., Voorhees, A.J., and Walker, C.L. (2003). Geotechnical Site Investigation for Bridge Foundations: University-Based Research, Education and Technology Transfer Program Agreement No. 359704, Work Order 82, Final Report. Pennsylvania Transportation Institute, University Park, PA.
- Nyquist, J.E., and Roth, M.J.S. (2003). "Application of a Downhole Search and Rescue Camera to Karst Cavity Exploration," Proceedings, Symposium on the Application of Geophysics to Environmental and Engineering Problems, San Antonio, Texas.
- Sanford Bernhardt, K.L., and Roth, M.J.S. (2002). "Active Ethics: Philosophy, Cases, and Writing," Proceedings, Frontiers in Engineering Education Conference, Boston, MA.
- Roth, M.J.S. (2002). "Earth Resistivity Testing: Two Case Studies from Norway," Proceedings, Symposium on the Application of Geophysics to Environmental and Engineering Problems, Las Vegas, Nevada.
- Sanford Bernhardt, K.L., Roth, M.J.S., Brandes, D., and Kney, A.D. (2002). "Engineering Ethics: Teaching Moral Theories to Engineers," Proceedings, American Society of Engineering Education Annual Meeting, session 3261.

- Roth, M.J.S. (2002). "Recruiting and Retaining Faculty and Students: The Role of Faculty Liaison," Proceedings, American Society of Engineering Education Annual Meeting, session 2515.
- Roth, M.J.S., Nyquist, J.E., and Guzas, B. \* (2000). "Locating subsurface voids in karst: a comparison of multi-electrode earth resistivity testing and gravity testing," Proceedings, 13<sup>th</sup> Symposium on the Application of Geophysics to Environmental and Engineering Problems, M.H. Powers, A.-B. Ibrahim, and L. Cramer, eds., Arlington, Virginia, 359-365.
- Maule, J., Nyquist, J.E., and Roth, M.J.S. (2000). "A comparison of 2-D and 3-D resistivity soundings in shallow karst terrain, Easton, PA," Proceedings, 13<sup>th</sup> Symposium on the Application of Geophysics to Environmental and Engineering Problems, M.H. Powers, A.-B. Ibrahim, and L. Cramer, eds., Arlington, Virginia, 969-977.
- Roth, M.J.S., Mackey, J.R. \*, and Nyquist, J.E. (1999). "A case study of the use of multi-electrode earth resistivity in thinly mantled karst," Proceedings, 12<sup>th</sup> Symposium on the Application of Geophysics to Environmental and Engineering Problems, 293-302.
- Roth, M.J.S., Mackey, J.R. \*, Mackey, C. \*, and Nyquist, J.E. (1999). "A case study of the reliability of multi-electrode earth resistivity testing for geotechnical investigations in karst terrains," Hydrogeology and Engineering Geology of Sinkholes and Karst – 1999, ed. B.F. Beck, A.J. Pettit, and J.G. Herring, A.A. Balkema, Rotterdam, 247-252.
- Roth, M.J.S., Ruggles, R., Berrier, N. \*, Doyle, S. \*, and Fish, D. \* (1998). "Using metadata sources to assess risk in areas prone to sinkhole formation," Proceedings of the First International Conference on Geospatial Information in Agriculture and Forestry, Volume II, 359-366.
- Chen, L. \*, and Roth, M.J.S. (1997). "Sinkhole case study: Athletic fields, Lafayette College, Easton, Pennsylvania", in The Engineering Geology and Hydrogeology of Karst Terranes, B. Beck and B. Stephenson, eds., Balkema, Rotterdam, pp. 37-40.
- Thomas, B. \*, and Roth, M.J.S. (1997). "Site characterization for sinkholes in Pennsylvania and New Jersey", in The Engineering Geology and Hydrogeology of Karst Terranes, B. Beck and B. Stephenson, eds., Balkema, Rotterdam, pp.281-286.
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- Roth, M. J. S., and Rosenbauer, R. (1993). "Conducting a needs assessment for a women in engineering program", Proceedings, 1993 WEPAN National Conference, Washington, DC., pp. 35-40.
- Roth, M. J. S. (1993). "Teaching environmental site assessment methods at the college level", Proceedings, Seventh National Outdoor Action Conference, Las Vegas, Nevada, pp. 669-676.

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- Roth, M. J. S., Dagher, H. J., and Sandford, T. C. (1992). "Application of design point method to a time-dependent system-reliability analysis problem", Proceedings, Second Canadian Conference on Computing in Civil Engineering, Ottawa, Canada, pp. 448-459.
- Roth, M. J. S., Dagher, H. J., and Sandford, T. C. (1991). "Reliability analysis of waterfront retaining structures", Proceedings, Sixth International Conference on Applications of Statistics and Probability in Civil Engineering, Mexico City, Mexico, pp. 840-848.
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#### **Invited Presentations (expenses paid)**

- “Integrating Education and Research at a Primarily Undergraduate Institution: Leveraging Collaborations,” Geotechnical Engineering Faculty Teaching Strategies & Resources Workshop, sponsored by the National Science Foundation and the United States Universities Council on Geotechnical Education and Research, Minneapolis, MN, February 2020.
- “Teacher Preparation and Curriculum Design,” Presentation for Sharing Solutions: Advancing Girls in STEM, Agnes Irwin School, Rosemont, PA, March 2015.
- “Interdisciplinary Teaching Practices: Opportunities & Challenges,” American Psychological Association Conference Interdisciplinary & Interprofessional Teaching, Research and Practice, Washington, DC, September 2011.
- “Leadership Strategies for Facilitating Interdisciplinary Learning in Undergraduate STEM.” Presentation for 2010 Keck/PKAL National Colloquium: Transformative Change in STEM Education: Leadership for Advancing Undergraduate Interdisciplinary Learning, Washington, DC, October 2010.
- “Geophysical Research to Improve Geotechnical Investigations.” Presentation for National Science Foundation Workshop for Women and Minority Engineering

Educators, sponsored by the Civil and Mechanical Systems Division, Arlington, VA, September 2003.

“Field Testing of Frozen Soils – D.C. Electrical Resistivity.” Presentation for The University Courses on Svalbard (UNIS), Longyearbyen, Svalbard, March 2001.

### **Institutes or Workshops** (as leader or co-leader)

Understanding Design: A Course to Introduce First-Year Students to the Language of Design, 9<sup>th</sup> Symposium on Engineering and Liberal Education, Union College, Schenectady, NY, June 2016.

AAC&U and Project Kaleidoscope’s Summer Leadership Institute for STEM Faculty, Baca Campus of Colorado College, Crestone, CO, 2014, 2015, Claggett Center, Adamstown, MD 2016.

Development and Use of a Logic Model as a Tool for the Preparation of a HHMI Grant Proposal, Rutgers University-Newark, July 2013.

Leadership for Interdisciplinary STEM Teaching and Learning, AAC&U Next Generation STEM Learning: Investigate, Innovate, Inspire, Kansas City, MS, November 2012.

A Leadership Guide for Planning, Implementing, and Institutionalizing Interdisciplinary Programs, AAC&U 98<sup>th</sup> Annual Meeting, Washington, DC, January 2012.

### **Presentations**

“Incorporating Life Cycle Assessment in an Introduction to Engineering Course.” American Society of Engineering Education Annual Conference, June 2020.

“Primarily Undergraduate Institutions.” Center for Bio-mediated and Bio-inspired Geotechnics Annual Meeting, Tempe, AZ, October 2019.

“The Decades in Review.” ASCE Education Summit, May 2019.

“Scientist Roundtable.” Pocono Environmental Education Center, April 2019.

“Reducing Soil Permeability Using In-Situ Biofilm-Forming Bacteria: Overcoming Testing Apparatus Challenges.” Geo-Congress 2019, Philadelphia, PA, March 2019.

“Update: CBBG and Lafayette College Biofilm Collaboration.” Center for Bio-mediated and Bio-inspired Geotechnics Annual Meeting, Tempe, AZ, November 2018.

“A New Approach to Collaboration: A Partnership between an NSF-funded Engineering Research Center and a Liberal Arts College.” American Society of Engineering Education Annual Conference, Salt Lake City, UT, June 2018.

“A Classification System for Integrative Engineering Education.” American Society of Engineering Education Annual Conference, Columbus, OH, June 2017.

“Reducing Permeability in Sands.” Center for Bio-mediated and Bio-inspired Geotechnics Mid-Year Meeting, Davis, CA, April 2017.

“Introduction to Geotechnical Engineering Using a Project-Based Module in a First-Year Engineering Course.” American Society of Engineering Education Annual Conference, New Orleans, LA, June 2016.

“Using Concept Maps for Assessment and Improvement of a Multi-Section Introduction to Engineering Course.” American Society of Engineering Education Annual Conference, New Orleans, LA, June 2016.

“Apple TV as an Instructional Device,” LVAIC Digital Tools Conference, Easton, PA, May 2016.

- “Collaborative Models for Global Education,” Society for College and University Planning 49<sup>th</sup> Annual, International Conference, Pittsburgh, PA, July 2014.
- “Collaborative Models for Global Education,” Society for College and University Planning 2014 Mid-Atlantic Regional Conference, Philadelphia, PA, March 2014.
- “Aligning Leadership Efforts to Facilitate Interdisciplinary Learning: Innovation to Institutionalization,” AAC&U Next Generation STEM Learning: Investigate, Innovate, Inspire, Kansas City, MS, November 2012.
- “Attaining Academic Leadership Positions,” ASEE Annual Conference, San Antonio, TX, June 2012.
- “Building and Sustaining Interdisciplinary Campus Programs: ‘What Works’ Case Studies from the Keck/PKAL Facilitating Interdisciplinary Learning in Science and Mathematics Project,” AAC&U 98<sup>th</sup> Annual Meeting, Washington, DC, January 2012.
- “Resistivity Testing: An Overview using Case Studies with a Focus on Karst Applications,” Bucknell University, February 2007.
- “When Geophysics and Engineering Collide,” GeoCongress 2006, Atlanta, GA, March 2006.
- “Using Bacteria to Stabilize Loose Sands: a biological approach to reducing the chance of liquefaction failure during earthquakes,” Temple University, November 2005.
- “Sinkholes: A primer,” Forks Township Action Committee, March 2005.
- “Sinkholes: Is there a better way?” Forks Kiwanis Club, February 2005.
- “Earth Resistivity Testing as a Geotechnical Investigation Tool,” Villanova University Civil Engineering Graduate Seminar, January 2005.
- “Multi-electrode Resistivity Testing: A powerful new tool in the geotechnical toolbox?” Drexel University Civil Engineering Graduate Seminar, February 2004.
- “Recruiting and Retaining Faculty and Students: The Role of Faculty Liaison,” American Society of Engineering Education Annual Meeting, June 2002.
- “Engineering Ethics: Teaching Moral Theories to Engineers,” American Society of Engineering Education Annual Meeting, June 2002.
- “Geotechnical Engineering in Norway,” Northeast Regional Meeting of the Society of Women Engineers, Bethlehem, Pennsylvania, April 2002.
- “Earth Resistivity Testing: Two Case Studies from Norway.” Symposium on the Application of Geophysics to Environmental and Engineering Problems, Las Vegas, Nevada, February 2002.
- “Earth Resistivity Testing: Lessons Learned in Norway,” Norwegian Geotechnical Institute, Oslo, October 2001.
- “Resistivity Testing.” Norwegian Geological Survey, Trondheim, May 2001.
- “Resistivity Testing.” Norwegian University of Science and Technology, Trondheim, February 2001.
- “Earth Resistivity Testing – An Overview.” Norwegian Geotechnical Institute, Oslo, September 2000.
- “Teaching engineering at undergraduate institutions.” Princeton University, 2000.
- “Multi-Electrode Earth Resistivity Testing for Geotechnical Investigations in Karst.” Lehigh University, 2000.
- “Teaching engineering at undergraduate institutions.” Penn State University, 1999.

- “Case study: Site characterization methods in karst.” Third National Conference of the Geo-Institute. Champaign, Illinois, 1999.
- “A case study of the reliability of multi-electrode earth resistivity testing for geotechnical investigations in karst terrains.” Seventh Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst. Harrisburg, Pennsylvania, 1999.
- “A case study of the use of multi-electrode earth resistivity in thinly mantled karst.” Poster, Annual Meeting of the Environmental and Engineering Geophysical Society. Oakland, California, 1999.
- “Multi-Electrode Earth Resistivity Testing for Geotechnical Investigations in Karst.” Lehigh Valley Section of ASCE, 1999.
- “Risk assessment, sinkholes, and earth resistivity testing.” Temple University Geology Graduate Student Seminar. Philadelphia, Pennsylvania, 1998.
- “Sinkhole case study: Athletic fields, Lafayette College, Easton, Pennsylvania.” Poster, Sixth Multidisciplinary Conference on Sinkholes and the Environmental Impacts of Karst, Springfield, Missouri, 1997.
- “Site characterization for sinkholes in Pennsylvania and New Jersey.” Poster, Sixth Multidisciplinary Conference on Sinkholes and the Environmental Impacts of Karst. Springfield, Missouri, 1997.
- “The assessment of risk for structures built in karst areas; or, should you buy sinkhole insurance?” ARC research forum. Lafayette College, Easton, Pennsylvania, 1997.
- “A comparison of pile design methods using model factors.” Tenth Conference on Engineering Mechanics. Boulder, Colorado, 1995.
- “Application of a geographic information system to evaluate environmental hazards.” First Congress of Computing in Civil Engineering, Washington, D.C., 1994.
- “Teaching environmental site assessment at the college level.” Lehigh Valley section of ASCE. Allentown, Pennsylvania, 1993.
- “Conducting a needs assessment for a women in engineering program.” WEPAN National Conference, Washington, D.C., 1993.
- “Application of design point method to a time-dependent system-reliability analysis problem.” Second Canadian Conference on Computing in Civil Engineering, Ottawa, Canada, 1992.
- “Incorporating Corrosion in Reliability-Based Design of Anchored Bulkheads.” Sixth Conference on Probabilistic Mechanics and Structural and Geotechnical Reliability, Denver, Colorado, 1992.

### **Professional Reports**

- “Resistivity Test Results Southside Habitat for Humanity Homes, Easton, Pennsylvania,” Langan Engineering and Environmental Services, P.C., May 2003.