CURRICULUM VITAE (updated Dec/2013)

Tian-Chyi "Jim" Yeh

Summary

Dr. Yeh presently holds a Professor in the Department of Hydrology and Water Resources at the University of Arizona (number 1 ranking in Hydogeology by US News) and an Adjunct Professor at the Department of Resources Engineering, National Cheng Kung University, Taiwan, Republic of China. Department of Soil, Water, and Environmental Science, The University of Arizona, Tucson, Arizona; Department of Earth & Environmental Sciences, University of Waterloo. Professor Yeh is also an outstanding lecturer of Department of Education, China to Jilin University, China.

Professor Yeh is an internationally renowned leader in stochastic/numerical analysis and laboratory/field investigations, as applied to heterogeneity effects on flow and solute transport in the saturated and unsaturated geologic media. He pioneered stochastic analysis of the effects of spatial variability on flow in unsaturated geologic media; he discovered and developed the theory of moisture-dependent anisotropy for unsaturated hydraulic conductivity, which has significantly advanced our understanding, characterization, and prediction of unsaturated and saturated zone processes. His three classic papers on this subject have been referenced 606 times since their publications. Dr. Yeh also was the first to explore the conditional simulations and inverse modeling of flow and transport processes in variably saturated geologic media. He recently invented the sequential successive linear estimation technique as an innovation that overcomes difficulties of the traditional inverse modeling technique. This innovation has led to the development of robust hydraulic, tracer, electrical resistivity tomography, and stochastic fusion methods to image the subsurface heterogeneity. The impact of his innovation is well-documented by the number of citations of his two recent papers: Hydraulic tomography: development of a new aquifer test method (136 citations since 2000, 9.71/yr) and characterization of aquifer heterogeneity using transient hydraulic tomography (87 times since 2005, 9.67/yr). These two papers revolutionize the way we collect and analyze data for characterization of hydraulic properties the subsurface. Success of the stochastic fusion method brings about his concept of exploiting naturally occurring stimuli (storm, earthquake, river stage, lightning, etc.) as energy sources for basin-scale subsurface tomographic surveys. He believes this new concept is the future of hydrologic sciences and other disciplines of environmental sciences and engineering.

He teaches stochastic methods in subsurface hydrology, hydrological transport processes, and advanced subsurface hydrology. He has also organized and taught many short courses on subsurface characterization, monitoring, and prediction during the last 20 years for scientists, engineers, and geologists from private consulting firms, national laboratories, and various federal agencies. He has collaborated with scientists and engineers from many different disciplines including microbiology, chemistry, soil physics, geophysics, geology, atmospheric sciences, computer engineering, and others).

His 109 publications have been cited more than 2,857 up to date (cited 26.21 times per year) with h-index 31 according to The ISI Web of Knowledge (Dec, 2013). He served as an associate Editor of the international journal Water Resources Research and as a member of review panels of DOE, EPA, DOD, and NSF in the past. He has been awarded and secured research funding of millions of dollars from DOD, DOE, EPA, USGS, NSF, and industries. Visit www.hwr.arizona.edu/yeh for details.

1. CHRONOLOGY OF EDUCATION

College of Chinese Culture, Taiwan, R.O.C., B.S. in Geology, May 1975.
University of Illinois, Chicago, M.S. in Geology, May 1979.
New Mexico Institute of Mining and Technology, Ph.D. in Hydrology, May 1983.

Major Fields
Stochastic analysis, numerical modeling, field and laboratory investigation of water flow and transport of contaminants in geological formations.

2. CHRONOLOGY OF EMPLOYMENT

1998- present	Professor, Department of Hydrology and Water Resources; Adjunct Professor, Department of Soil, Water, and Environmental Science, The University of Arizona, Tucson, Arizona; at Department of Resources Engineering, National Cheng Kung University, Taiwan, R. O. C. (starting 2006);at Department of Earth & Environmental Sciences, University of Waterloo
1992-1998	Adjunct Associate Professor, Department of Soil and Water Science, The University of Arizona, Tucson, Arizona.
1991-1998	Associate Professor, Department of Hydrology and Water Resources, The University of Arizona, Tucson, Arizona.
1986-1991	Assistant Professor, Department of Hydrology and Water Resources, The University of Arizona, Tucson, Arizona.
1983-1986	Assistant Professor, Department of Environmental Sciences, University of Virginia, Charlottesville, Virginia.
1982-1983	Research Associate, Petroleum Recovery Research Center, New Mexico Institute of Mining and Technology, Socorro, New Mexico.
1979-1982	Research Assistant, Department of Geoscience, New Mexico Institute of Mining and Technology, Socorro, New Mexico.
1979	Assistant Project Engineer, Dames and Moore, Burlington, Massachusetts.
1976-1978	Teaching Assistant, Department of Geoscience, University of Illinois, Chicago, Illinois.
1977	Computer Programmer, School of Public Health, University of Illinois, Chicago, Illinois.

3. HONORS AND AWARDS

Outstanding Scientists Award, Chinese Education Department through Jilin University, Jilin, China, 2010-2015.
The Chinese Institute of Environmental Engineering, Taipei, Taiwan, R.O.C. (2007)
Excellence at the Student Interface, College of Engineering, The University of Arizona (2004).
Distinguished lecturer, Texas A&M University (Spring 2003).
Summer fellowship from Idaho National Engineering and Environmental Laboratory (1999).
American Geophysical Union, Editor's Citation for Excellence in Refereeing (1989)
American Water Works Association Award (1978).
Who's Who Among Students in American Universities and Colleges Award (1978)..

Nominations:

American Geophysical Union Fellow 2002;
Director of Desert Research Institute;
Associate Editor of Vadose Zone Hydrology

4. SERVICE

Intramural, all at The University of Arizona
Chair of Search committee, Department of Hydrology & Water Resources (HWR)vadose zone hydrology faculty position: 1994. 1995.
Search committee, HWR vadose zone hydrology faculty position: 1992.
Search committee, HWR geohydrology faculty position: 1992, 1994
Department graduate study committee: 1992, 1993, 1994, 1995, 1996, 1997.
Summer field camp committee: 1992, 1993, 1994, 1995, 1996, 1997.
Physical space committee: 1992, 1993, 1994.
Graduate College Representative: 1992 through 2002.

Extramural

1) Associate Editor
Water Resources Research, 1994 through 2002.

2) Lecturer
Short course, "Chemical behavior of organic contaminants," sponsored by Salt River Project and the Arizona Department of Environment Quality, Phoenix, Arizona, Sept. 28 - Oct. 2, 1987.
Short course, "Flow and transport through unsaturated geologic media," sponsored by Arizona Department of Water Resources, Arizona Department of Environmental Quality, Salt River Project, Water Resources Associates, Dames and Moore, SCS Engineers, Phoenix, Arizona, Jan. 25 - March 8, 1988.
Short course, "Characterization and modeling techniques," sponsored by Dept. of Hydrology and Water Resources and Dept. of Soil and Water Science, The University of Arizona, Tucson, Arizona, March, 1990, 1991, 1992, 1993, 1994, 1996, 1999, 2000.

Summer Course, "Stochastic methods in subsurface hydrology," sponsored by Institute of Environmental Engineering, National Chaio Tung University, 1993.
Short Course, "Applied vadose zone flow and transport modeling", Sandia National Laboratories, Albuquerque, New Mexico, November 16-17, 1994.
Short Course, "Flow and solute transport in porous media", Centro studi, Villa La Colombella, Perugia, ITALY, October 18-23, 1999.

3) Consulting

Science Applications International Corp, Technical Review Group, Tank Closure and Waste Management environmental impact statement for the Hanford site, Richland, Washington, 2006-present.
Obayashi Corporation, Tokyo, Japan, Mapping fractures using hydraulic tomography (2007-present).
U.S. Department of Energy, Oak Ridge Associated Universities, External technical review panel: net infiltration for present-day and potential future climates (2007-2008).
ACADIS, Analysis of electrical resistivity tomographic surveys, 2005-2006.
Fluor Federal Services, Inc., Richland, Washington, 1998, 1999, 2001-2007.
ASARCO Incorporated, expert witness, 1993.
Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas, 1991-1995.
Errol L. Montgomery & Associates, Inc. Tucson, Arizona, 1991, 1993.
Consortium for International Development, Egypt, "Modeling of groundwater systems in the Sinai Peninsula," 1990.
Daniel B. Stephens and Associates, "Uncertainty analysis of ground water travel time and path in high level nuclear waste sites," 1986-1988.
Industrial Technology Research Institute, Taiwan, Republic of China, "Seepage through Ren-Yee Dam," Dec 25-Jan 7, 1988.
Taiwan Power Company, 1999, 2000.
Waste Management of North America, "Design of liner systems of waste landfills", 1990-1992.
Water Resources Management, Tucson, 1996, 2000, 2001, 2002, 2003, 2004.
Westinghouse Hanford, 1995.

4) Reviewer

Journals: Water Resources Research, Advances in Water Resources, Journal of Environmental Engineering, Journal of Hydrology, Soil Science Society of America Proceedings, Ground Water, Hydrologic Processes, Journal of Contaminant Hydrology, and Journal of American Society of Civil Engineers, IEEE.

Proposals: National Science Foundation (NSF), United States Department of Energy (DOE), United States Geological Survey (USGS), United States Environmental Protection Agency (EPA), United States Department of Agriculture (USDA) (NRICGP) National Sciences and Engineering Research Council of Canada, University of Hawaii, SEA Grant.
United States Civilian Research and Development Foundation, Israel Science Foundation,

Hong Kong Science Foundation, Natural Environment Research Council (NERC), UK.

5) Others

a) Review Committee: DOE Environmental Science Research Center, 1990, 1991.

b) Peer Review Committee: EPA, 1994.

c) Expert Panel: DOE, Battelle: Technical Protocol for the Implementation of Groundwater Circulating Wells for Site Remediation, 1996.

d) DOE vadose zone roadmap committee: 1999, 2000

e) Outside reviewer for promotion and tenure:

Department of Civil and Environmental Engineering, Michigan State University, 2007
Department of Geological Sciences, Florida State University, 2007.
Department of Civil and Environmental Engineering, University of Connecticut, 2007.
Department of Geological Sciences, Michigan State University, 2006.
Department of Civil and Environmental Engineering & IIHR ~ Hydroscience and Engineering, College of Engineering, The University of Iowa**,** 2006.
Department of Civil and Environmental Engineering, University of North Carolina, 2005.
Department of Geological Science, University of Iowa, 2005.
Department of Geological Science, University of Mississippi, 2005.
Department of Geological Sciences, Florida State University, 2004.
Department of Geosciences, University of Las Vegas, Nevada, 2004.
Department of Civil and Environmental Engineering, University of Virginia, 2004.
Department of Geological Sciences, Michigan State University, 2004.
Department of Civil and Environmental Engineering, University of Connecticut, 2004.
Department of Earth and Environmental Sciences, New Mexico Institute of Mining and Technology, 2001.
Department of Geological Sciences, University of South Carolina, 2000.
Department of Civil and Environmental Engineering, Utah State University, Logan, 2000.
Department of Geological Sciences, The Ohio State University, 1999.
Department of Civil and Environmental Engineering, Utah State University, Logan, 1999.
Department of Geological Sciences, University of Alberta, Canada, 1996.
Department of Land, Air, and Water, University of California, Davis, 1996.
Department of Civil and Environmental Engineering, University of Colorado, Boulder, 1996.
Department of Geosciences, University of Hawaii at Manoa, 1990.
Department of Land, Air, and Water, University of California, Davis, 1988.

International Dissertation reviewer: Cairo University, Giza-Egypt. IIT, India, National Taiwan University, National Cheng-Kung University.

Conference Chair:

1. Section Chair of the hydrology program of the Western Pacific Geophysical Meeting, Taipei, 2010.
2. Organization member of the hydrology program of the Western Pacific Geophysical Meeting, Beijing, 2006.
3. Chair of the session "Exploiting natural stimuli for groundwater resources investigations" Fall AGU, December, 2004.
4. Co-Chair of the session "Advances in information fusion technologies in Hydrological Sciences," Fall AGU, December, 2002.
5. Session chair, Gordon Research Conference, Modeling of Flow in Permeable Media, August 2-7, 1998.
6. Co-Chair of the Hydrology Program in Western Pacific Geophysical Meeting, Taipei, Taiwan, July, 1998.
7. Organizer of the Hydrology Section in Western Pacific Geophysical Meeting, Hong Kong, August, 1994.
8. Section organizer of the Groundwater Section in Western Pacific Geophysical Meeting, Hong Kong, August, 1992.
9. Section chair of the International Conference on Computer Applications in Water Resources, Taipei, Taiwan, R.O.C., July 3-6, 1991.
10. Section chair of workshop, Characterization of Transport Phenomena in the Vadose Zone, sponsored by SSSA and AGU, April 2-5, 1991.
11. Program committee for workshop, Characterization of Transport Phenomena in the Vadose Zone, co-sponsored by the Soil Science Society of America (SSSA) and the American Geophysical Union (AGU), April 2-5, 1991.
12. General Ground Water Hydrology, AGU Fall Meeting, San Francisco, 1990-1992.
13. Unsaturated Zone Hydrology, AGU Fall Meeting, San Francisco, 1989.

5. PUBLICATIONS

Books

Cai, X and T.-C. J Yeh, Editors, Quantitative Information Fusion for Hydrological Sciences, Springer, 2007.

Chapters in Books

1. Yeh, T-C. J., CK, Lee, KC Hsu, YC Tan, Fusion Of Active and Passive Hydrological and Geophysical Surveys: the Future of Subsurface Characterization, "Data Integration in Subsurface Hydrology", edited by David W. Hyndman, Frederick D. Day-Lewis, and Kamini Singha, AGU Monograph, 2007.
2. Yeh, T.-C. J., J. Zhu, A. Englert, A. Guzman, and S. Flaherty, A Successive Linear Estimator for Electrical Resistivity Tomography, Applied Hydrogeophysics, edited by H. Vereecken, A. Binely, G. Cassiani, A. Revil, K. Titov., NATO Science Series, Springer, pp383, 2006.
3. Yeh, T.-C. J., P. Wierenga, R. Khaleel, R. J. Glass, Isotropy and anisotropy,

Encyclopedia of Soils in the Environment, edited by Daniel Hillel, Elsevier Ltd., 2005.
4. Yeh, T.-C. J., Scale issues of heterogeneity in vadose-zone hydrology, in Scale Dependence and Scale Invariance in Hydrology, edited by G. Sposito, Cambridge Press, 224-265, 1998.
5. Yeh, T.-C. J. Stochastic Modeling of Flow and Solute Transport in the Vadose Zone, in Groundwater Models for Resources Analysis and Management, edited by A. El-Kadi , CRC Press Inc, 1995.
6. Yeh, T.-C. J. and A. Guzman, Tensiometry in Handbook of Vadose Zone Characterization & Monitoring, edited by L. G. Wilson, L. G. Everett, and S. J. Cullen, CRC Press Inc., 1995.
7. Yeh, T.-C. J. and L. W. Gelhar, Unsaturated flow in heterogeneous soils, in Role of the Unsaturated Zones in Radioactive and Hazardous Waste Disposal, edited by J. W. Mercer et al., Ann Arbor Science, 71-79, 1983.

Referred Journal Articles

1. Massari, C, T.-C. J. Yeh, B. Brunone et al. (2013), Diagnosis of Pipe Systems by means of a Stochastic Successive Linear Estimator, WATER RESOURCES MANAGEMENT, 27(13) Pages: 4637-4654 DOI: 10.1007/s11269-013-0433-x Published: OCT 2013
2. Hao, Y, J. Wu, Q, Sun, T.-C. J. Yeh et al., (2013), Simulating effect of anthropogenic activities and climate variation on Liulin Springs discharge depletion by using the ARIMAX model, HYDROLOGICAL PROCESSES, 27(18), 2605-2613 DOI: 10.1002/hyp.9381.
3. Sun, R, T.-C. J. Yeh, D. Mao, et al., (2013), A temporal sampling strategy for hydraulic tomography analysis, WATER RESOURCES RESEARCH, 49(7), 3881-3896 , DOI: 10.1002/wrcr.20337.
4. Mao, D,, T.-C. J. Yeh, L. Wan et al., (2013) Joint interpretation of sequential pumping tests in unconfined aquifers, WATER RESOURCES RESEARCH, 49 (4) , 1782-1796, DOI: 10.1002/wrcr.20129 .
5. Hao, Y, B. Cao, X. Chen, T.-C. J. Yeh. et al., (2013), A Piecewise Grey System Model for Study the Effects of Anthropogenic Activities on Karst Hydrological Processes, WATER RESOURCES MANAGEMENT, 27(5), 1207-1220, DOI: 10.1007/s11269-012-0231-x.
6. Mao, D,, T.-C. J. Yeh, L. Wan et al., (2013), Cross-correlation analysis and information content of observed heads during pumping in unconfined aquifers, WATER RESOURCES RESEARCH, 49(2), 713-731, DOI: 10.1002/wrcr.20066. Mao, D., T.C. J. Yeh, L. Wan, (2013), Necessary conditions for inverse modeling of flow through variably saturated porous media, Advances In Water Resources Volume: 52 Pages: 50-61 DOI: 10.1016/j.advwatres.2012.08.001.
7. Hao, Y., B. Cao, P. Zhang, T.-C. J. Yeh, (2012), Differences in karst processes between northern and southern China, Carbonates And Evaporites Volume: 27 Issue: 3-4 Pages: 331-342 DOI: 10.1007/s13146-012-0116-3 .

8. Sharmeen, R., W. Illman, S. Berg, T.-C. J. Yeh, (2012), Transient hydraulic tomography in a fractured dolostone: Laboratory rock block experiments, Water Resources Research, Volume: 48 Article Number: W10532 DOI: 10.1029/2012WR012216 .
9. Hao, Y., G. Liu, H. Li, T.-C. J. Yeh, (2012), Investigation of karstic hydrological processes of Niangziguan Springs (North China) using wavelet analysis, Hydrological Processes, Volume: 26 Issue: 20 Pages: 3062-3069 DOI: 10.1002/hyp.8265.
10. Hao, Y, J. Zhao, H. Li, T.-C. J. Yeh, (2012), Karst Hydrological Processes and Grey System Model, Journal Amer. Water Resour. Assoc., Volume: 48 Issue: 4 Pages: 656-666 DOI: 10.1111/j.1752-1688.2012.00640.x.
11. Yeh, T.-C. J., D. Mao, L. Wan, C.-H. Lee, J.-C. Wen, and W. Lu (2012), Replies to comments on "A revisit of drawdown behavior during pumping in unconfined aquifers" by Neuman and Mishra, *Water Resour. Res.*, 48, W02802, doi:10.1029/2011WR011153.
12. Huang, S.-Y., J.-C. Wen, T.-C. J. Yeh, W. Lu, H.-L. Juan, C.-M. Tseng, J.-H. Lee, and K.-C. Chang (2011), Robustness of joint interpretation of sequential pumping tests: Numerical and field experiments, Water Resour. Res., 47, W10530, doi:10.1029/2011WR010698.
13. Mao, D., L. Wan, T.-C. J. Yeh, C.-H. Lee, K.-C. Hsu, J.-C. Wen, and W. Lu (2011), A revisit of drawdown behavior during pumping in unconfined aquifers, Water Resour. Res., 47, W05502, doi:10.1029/2010WR009326.
14. Illman, W., SJ Berg, T.-C. J. Yeh, (2011), Comparison of Approaches for Predicting Solute Transport: Sandbox Experiments. Ground Water. 08/2011; DOI: 10.1111/j.1745-6584.2011.00859.x
15. Wen, JC, CM Wu, TCJ Yeh et al. (2010), Estimation of effective aquifer hydraulic properties from an aquifer test with multi-well observations (Taiwan), HYDROGEOLOGY JOURNAL Volume: 18 Issue: 5 Pages: 1143-1155.
16. Jiang, XW, L Wan, TCJ Yeh et al. (2010), Steady-state discharge into tunnels in formations with random variability and depth-decaying trend of hydraulic conductivity , JOURNAL OF HYDROLOGY Volume: 387 Issue: 3-4 Pages: 320-327.
17. Hao YH, YJ Wang, Y. Zhu, TCJ Yeh et al. (2009), Response of karst springs to climate change and anthropogenic activities: the Niangziguan Springs, China , PROGRESS IN PHYSICAL GEOGRAPHY Volume: 33 Issue: 5 Pages: 634-649.
18. Hao YH, YE. Zhu, Y Zhao, TCJ Yeh et al. (2009), The Role of Climate and Human Influences in the Dry-Up of the Jinci Springs, China, Journal American Water Resources Association Volume: 45 Issue: 5 Pages: 1228-1237.
19. Ni CF, Yeh TCJ, Chen JS (2009), Cost-Effective Hydraulic Tomography Surveys for Predicting Flow and Transport in Heterogeneous Aquifers , Environmental Science & Technology Volume: 43 Issue: 10 Pages: 3720-3727.
20. Zhu JF, Cai X, Yeh TCJ (2009) Analysis of tracer tomography using temporal moments of tracer breakthrough curves , Adv. Water Resour., Volume: 32 Issue: 3 Pages: 391-400.

21. Illman W. A., X. Liu, S. Takeuchi, T.-C. J. Yeh, K. Ando, H. Saegusa (2009), Hydraulic tomography in fractured granite: Mizunami Underground Research site, Japan, Water Resour. Res., 45, W01406, doi:10.1029/2007WR006715.
22. Xiang J., T.-C. J. Yeh, C.-H. Lee, K.-C. Hsu, J.-C. Wen (2009), A simultaneous successive linear estimator and a guide for hydraulic tomography analysis, Water Resour. Res., 45, W02432, doi:10.1029/2008WR007180.
23. Yeh T.-C. J., J. Xiang, R. M. Suribhatla, K.-C. Hsu, C.-H. Lee, J.-C. Wen (2009), River stage tomography: A new approach for characterizing groundwater basins, Water Resour. Res., 45, W05409, doi:10.1029/2008WR007233.
24. Yeh T.-C. J., et al. (2008), A view toward the future of subsurface characterization: CAT scanning groundwater basins, Water Resour. Res., 44, W03301, doi:10.1029/2007WR006375.
25. Ni CF, Yeh TCJ , Stochastic inversion of pneumatic cross-hole tests and barometric pressure fluctuations in heterogeneous unsaturated formations , ADVANCES IN WATER RESOURCES Volume: 31 Issue: 12 Pages: 1708-1718: DEC 2008
26. Kuhlman KL, Hinnell AC, Mishra PK, Yeh T.C.J., Basin-scale transmissivity and storativity estimation using hydraulic tomography, GROUND WATER Volume: 46 Issue: 5 Pages: 706-715, SEP-OCT 2008.
27. Yeh TCJ, Lee CH, Hsu KC, et al., Fusion of hydrologic and geophysical tomographic surveys , GEOSCIENCES JOURNAL, Volume: 12 Issue: 2 Pages: 159-167 , JUN 2008.
28. Hao, Y.H., T.-C. J. Yeh, J. Xiang, W. A. Illman, K. Ando, K-C Hsu, C.-K. Lee, Hydraulic Tomography for Detecting Fracture Connectivity, Ground Water, 2007.
29. Yeh T.-C. J., J. Zhu (2007), Hydraulic/partitioning tracer tomography for characterization of dense nonaqueous phase liquid source zones, Water Resour. Res., 43, W06435, doi:10.1029/2006WR004877.
30. Straface, S., T.-C. J. Yeh, J. Zhu, S. Troisi, and C. H. Lee, Sequential aquifer tests at a well field, Montalto Uffugo Scalo, Italy, Water Resour. Res., 43, W07432, doi:10.1029/2006WR005287, 2007.
31. Liu, X., W. A. Illman, A. J. Craig, J. Zhu, and T.-C. J. Yeh, Laboratory sandbox validation of transient hydraulic tomography, Water Resour. Res., 43, W05404, doi:10.1029/2006WR005144, 2007.
32. Yeh, T.-C. J. and C-H Lee, Time to Change the Way We Collect and Analyze Data for Aquifer Characterization, GROUND WATER, Vol. 45, No. 2, 116–118, 2007.
33. Hao, YH, Yeh TCJ, Wang YR, et al., Analysis of karst aquifer spring flows with a gray system decomposition model, Ground Water 45 (1): 46-52, Jan-Feb, 2007.
34. Hao, YH, Yeh TCJ, Gao ZQ, et al., A gray system model for studying the response to climatic change: The Liulin karst springs, China. *Journal of Hydrology*, 328 (3-4): 668-676, Sp. Iss. SI SEP 15, 2006.
35. Hao, YH, Yeh TCJ, Hu CH, et al., Karst groundwater management by defining protection zones based on regional geological structures and groundwater flow fields, *Environmental Geology* 50 (3): 415-422, 2006.
36. Lu, CC, Chen CH, Yeh TCJ, et al., Integration of transfer function model and back propagation neural network for forecasting storm sewer flow in Taipei metropolis *Stochastic Environmental Research And Risk Assessment* 20 (1-2): 6-22, JAN, 2006.
37. Zhu, JF, Yeh T-C. J, Analysis of hydraulic tomography using temporal moments of

drawdown recovery data, *Water Resources Res*. 42 (2): Art. No. W02403 FEB 1, 2006.
38. Ye, M., R. Khaleel, and T-C J. Yeh, Stochastic analysis of moisture plume dynamics of a field injection experiment, *Water Resour. Res*., 41, W03013, doi:10, 1029/2004WR003735, 2005.
39. Yeh, T.-C. J, M. Ye, and R. Khaleel, Estimation of effective unsaturated hydraulic conductivity tensor using spatial moment of observed moisture plumes, *Water Resour. Res.*, 41, W03014, doi:10, 1029/2004WR003736, 2005.
40. Zhu, JF and T-C J. Yeh, Characterization of Aquifer Heterogeneity Using Transient Hydraulic Tomography, *Water Resour. Res.*, W07028, doi:101029/ 2004WR003790, 2005.
41. Wu, C-M, T-C. J. Yeh, T-H. Lee, N-S. Hsu, C-H. Chen, A. F. Sancho, Traditional aquifer tests: comparing apples to oranges? , *Water Resour. Res.*, 41(9), W09402, 101029/2004WR003717, 2005.
42. Chen JF, Lee CH, Yeh T-C. J, et al., A water budget model for the Yun-Lin plain, Taiwan , *Water Resources Management* , 19 (5): 483-504 OCT, 2005.
43. Glass RJ, JR Brainard, T.-C. J Yeh, Infiltration in unsaturated layered fluvial deposits at Rio Bravo: Macroscopic anisotropy and heterogeneous transport *Vadose Zone Journal,* 4(1), 22-31, 2005.
44. Blanford, W. J., M. L. Brusseau, T.C. J. Yeh, C. P. Gerba, R. Harvey, Influence of water chemistry and travel distance on bacteriophage PRD-1 transport in a sandy aquifer, *Water Research*, 39, 2345–2357, 2005.
45. Ke, KY, Tan YC, Chen CH, et al., Experimental study of consolidation properties of unsaturated soils during draining , *Hydrological Processes* 18 (13): 2565-2578 SEP 2004.
46. Lin, Y-B, Y-C Tan, T-C J. Yeh, C-W Liu, and C-H Chen, "A visco-elastic model groundwater level changes in the Cho-Shui river alluvial fan after the Chi-Chi earthquake in Taiwan", *Water Resour. Res.*, 40, W04213, doi: 10, 1029 10.1029/2003WR002412, 2004.
47. Liu, S. and T.-C. J. Yeh, An integrative approach for monitoring water movement in the vadose zone, *Vadose Zone Journal* 3, 681–692, 2004.
48. Ke, K-Y, Y-C Tan, C-H Chen, K-S Chim and T-C J. Yeh, Experimental study of consolidation properties of unsaturated soils during draining, *Hydrol. Process,* Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/hyp.1467. (2003)
49. Ferrante, M, B. Brunone, and T.-C. Yeh, Uncertainty analysis of transient unsaturated flow in bounded domain, *Water Resour. Res.*, 38(2), 10.1029/2000 WR001015, 2002.
50. Liu, S., T. -C. J. Yeh and R. Gardiner, Effectiveness of Hydraulic Tomography: Numerical and Sandbox Experiments, *Water Resour. Res.*, 38(4), 10.1029/2001 WR000338, 2002.
51. Lee, C.-C., Y.C. Tan, C.-H. Chen, T.C. J. Yeh, Development and application of a stochastic series lumped rainfall-runoff model for a watershed in Taiwan, *J. of Hydrology*, 249, 30-45, 2001.
52. Khaleel, R., T.-C. J. Yeh, and Z. Liu, Upscaled flow and transport properties for heterogeneous unsaturated media, *Water Resour. Res.*, 38(5), 10.1029/2000

WR000072, 2002.
53. Vargas-Guzman, J.A., and T.-C. J. Yeh, The successive linear estimator: a revisit, *Adv. Water Resour*. 25: 773-781, 2002.
54. Yeh, T.-C. J., S. Liu, R. J. Glass, K. Baker, J.R. Brainard, D. Alumbaugh, and D. LaBrecque, A geostatistically based inverse model for electrical resistivity surveys and its applications to vadose zone hydrology, *Water Resour. Res.*, 38(12), doi: 10.1029/2001WR001204, 2002.
55. Yeh, T.-C. J. and J. Simunek, Stochastic fusion of information for characterizing and monitoring the vadose zone, *Vadose Zone Journal*, 1, 207-221, 2002.
56. Hughson, D. L. and T.-C. J. Yeh, An inverse model for three-dimensional flow in variably saturated porous media, *Water Resour. Res.*, 829-839, 36(4), 2000.
57. Yeh, T.-C. J. and S. Liu, Hydraulic tomography: development of a new aquifer test method, *Water Resour. Res.*, 2095-2105, 36(8), 2000.
58. Padilla, I.Y., T.-C. J. Yeh, and M. H. Conklin, The effect of water content on solute transport in unsaturated porous media, *Water Resour. Res.*, 35(11), 3303-3313, 1999.
59. Li, B. and T.-C. J. Yeh, Cokriging estimation of the conductivity field under variably saturated flow conditions, *Water Resour. Res.*, 35(12), 3663-3674, 1999.
60. Vargas-Guzman, J.A., and T.-C. J. Yeh, Sequential kriging and cokriging: two powerful geostatistical approaches, *Stochastic Environmental Research and Risk Assessment*, 13(6), 416-435, 1999.
61. Ferrante, M. and T.-C. J, Yeh, Head and flux variability in heterogeneous unsaturated soils under transient flow conditions, *Water Resour. Res.*, 35(4) 1471-1479, 1999.
62. Li, B. and T.-C. J. Yeh, Sensitivity and moment analyses of head in variably saturated regimes, *Advances in Water Resour.*, 477-485, 21(6), 1998.
63. Hanna, S. and T.-C. J. Yeh, Estimation of co-conditional moments of transmissivity, hydraulic head, and velocity fields, *Advances in Water Resour.*, 22(1), 87-93, 1998.
64. Harter, T, T.C. J. Yeh, Flow in unsaturated random porous media, nonlinear numerical analysis and comparison to analytical stochastic models, *Advances in Water Resources*, 257-272, 22(3), 1998.
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80. Yeh, T.-C.J., and J. Mas-Pla, J.F. McCarthy, T.M. Williams, Modeling of natural organic matter transport processes in groundwater, *Envir. Health Perspectives*, 103 (Suppl 1):41-46, 1995
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85. Yeh, T.-C. J., Stochastic modeling of groundwater flow and solute transport in aquifers, *J. of Hydrologic Processes*, Vol. 6, 369-395, 1992.
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92. Bosch, D. D. and T.-C. J. Yeh, Effective unsaturated hydraulic conductivity for computing one-dimensional flow in heterogeneous porous media, *Transactions of the ASAE*, 32(6), 2035-2040, 1989.
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101. Yeh, T.-C. J., L. W. Gelhar, and A. L. Gutjahr, Stochastic analysis of unsaturated flow in heterogeneous soils: 2, statistically anisotropic media, *Water Resour. Res.*, 21(4), 457-464, 1985.
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6. WORK IN PROGRESS

Text Books

1. Flow through Heterogeneous Geologic Media (99% completed: delivery date

End of April). Unlike traditional groundwater hydrology textbooks, this textbook integrates classical principles of flow through porous media with recently developed stochastic analyses to provide new insight to subsurface hydrology. It is not a collection of recipes for solving groundwater problems. On the contrary, it examines classical principles of groundwater flow and transport in geological media in a stochastic context, explains their limitations to real-world problems, and provides better solutions to the problems.

The book starts with basic fluid mechanic concepts and proceeds to present classical principles of flow and transport in porous media at laboratory scales. Stochastic concepts are introduced to address heterogeneity issues at field scales. Stochastic mean equations for flow and solute transport for the field scale are derived, effective hydraulic parameter concepts are introduced, and methods for quantifying uncertainty are presented. Finally, inverse problems and model calibrations in subsurface hydrology are visited and stochastic conditional approaches that assimilate geological, hydrological, and geophysical information are discussed.

2. Hydraulic Tomography and Successive Linear Estimator (60% completed).
3. Hydrologic Transport Processes (50% completed).

7. SCHOLARLY PRESENTATIONS

Keynote and Invited Speaker

1. Invited speaker, Fall AGU 2013, Innovative methods for charactering aquifers.
2. Invited speaker, Fall AGU 2012. Advances in Groundwater Hydrology
3. Distinguished Expert in a workshop “2010 Groundwater Resources Technology in Mountainous Regions of Taiwan”, sponsored by Central Geological Survey, Ministry of Economic Affairs, Taiwan. 09/12-09/18/2010.
4. Distinguished lecturer, Department of Geosciences, University of Wyoming, Laramie, Sept 22, 2008.
5. Tufts University, Department of Civil and Environmental Engineering, Sept. 16, 2008.
6. 2008 Kaohsiung City International Symposium of Remediation technology on soil and groundwater pollution, Kaohsiung, Taiwan, ROC, Aug. 14-15, 2008.
7. International Conference on Emerging Water Treatment and Groundwater Remediation Issues, (The Chinese Institute of Environmental Engineering) Kaohsiung, Taiwan, Nov. 22, 2007.
8. “Exploiting natural stimuli for “CAT-scanning” groundwater basins”, Frontier lecture, Western Pacific Geophysical Meeting, Beijing, July 24-27, 2006.
9. “Exploiting natural stimuli for “CAT-scanning” groundwater basins”, International groundwater symposium, Korea Institute of Geosciences and Mineral Resources (KIGAM), Jeju Island, Korea, May 24-26, 2006.
10. “Hydraulic tomography for characterizing fractures in Fractured Rocks”, Japan, Tokyo, March, 2006.
11. Exploiting natural stimuli for “CAT-scanning” groundwater basins, Louisiana State University, February 20, 2006.
12. Exploiting natural stimuli for “CAT-scanning” groundwater basins, Arizona State

University, January 25, 2006.

13. "Autonomic fusion of information for monitoring, characterizing, and forecasting subsurface processes, Department of Civil and Environmental Engineering, Pennsylvania State University, January 21, 2005.
14. "Autonomic fusion of information for monitoring, characterizing, and forecasting subsurface processes, **EES Frontiers in Geoscience Colloquium**, Los Alamos National Laboratory, February 14, 2005.
15. "Autonomic fusion of information for monitoring, characterizing, and forecasting subsurface processes", Department of Civil and Environmental Engineering, Utah State University, 2004.
16. "Autonomic fusion of information for monitoring, characterizing, and forecasting subsurface processes", Department of Civil and Environmental Engineering, University of Iowa, 2004.
17. "Autonomic fusion of information for monitoring, characterizing, and forecasting subsurface processes", Academia Sinica, Taiwan, 2004.
18. "Integrated water resources planning", Taiwanwater 2004, Taiwan, 2004.
19. **Heiland Lecturer**, "Autonomic fusion of information for monitoring, characterizing, and forecasting subsurface processes, Department of Geophysics, Colorado School of Mines, 2004.
20. **Distinguished Lecturer**, "Adaptive fusion of information for subsurface characterization", Texas, A&M University, 2003.
21. "Fusion of Hydrologic and Geophysical Information", NATO, Advances in Hydrogeophysics, Czech Republic, July 18-28, 2002.
22. "An integrated approach for characterizing and monitoring the vadose zone", The 12-th Hydraulic and Hydrology Conference in Taiwan, The Cheng-Kung University, July 12 and 13, 2002.
23. "Applied stochastic analysis for subsurface hydrology", National Taiwan University, Department of Bioenvironmental System Engineering, and Hydrotech Research Institute. July 9-16, 2002.
24. "Joint Hydrological/Geophysical Inversion for Characterizing the Vadose Zone", Stanford University, Department of Geophysics**,** California, March 1, 2001.
25. "Hydraulic tomograph", National Hydraulics and Hydrology Institute, Tainan, Taiwan, July 17, 2001.
26. "Observations and simulations of three-dimensional chloride plumes in a coastal sandy aquifer, Georgetown, South Carolina", Taiwan Water Resources Administration Bureau, Taichumg, Taiwan, July, 2001.
27. "Stochastic analysis of flow and solute transport in vadose zones and aquifers: Where we've been and where we are going." Desert Research Institute, Reno, Nevada, September 25 and 26, 2001.
28. "Stochastic analysis of flow and solute transport in vadose zones and aquifers: Where we've been and where we are going", Desert Research Institute, Las Vegas, Nevada, September 27, 2001.
29. "Applied stochastic subsurface hydrology", University of Calabria, Soil Conservation Department, Rendu, Italy, November 13-16, 2001.
30. Hydraulic/pneumatic tomography: a new site characterization method, Advanced Groundwater/Vadose Zone Integration Project, Advanced Vadose Zone

Characterization Workshop, Richland, Washington, January 19-21, 2000.

31. An integrated approach for characterizing and monitoring the vadose zone and aquifer, Advanced Groundwater/Vadose Zone Integration Project, Advanced Vadose Zone. Characterization Workshop, Richland, Washington, January 19-21, 2000.
32. The new direction in subsurface hydrology: information integration via stochastic approaches, National Center for high-performance computing, Hsinchu, Taiwan, ROC., January 25 and 26, 2000.
33. An innovated aquifer characterization method, Department of Agriculture Engineering, National Taiwan University, Taipei, Taiwan, January 24, 2000.
34. Hydrogeophysical joint inversion, Institute of applied geology, National central university, Chung-Li, Taiwan, January 27, 2000.
35. Hydraulic tomography, National Yunlin University of Science and Technology, Yunlin, Taiwan, January 27, 2000.
36. An innovated aquifer characterization method, Hydraulic and ocean engineering department, National Chen Kung University, Tainan, Taiwan, January 28, 2000.
37. An Integrated approach for characterizing and monitoring the vadose zone, Gordon Research Conference, Modeling of Flow in Permeable Media, August 6-11, 2000.
38. Two decades study of subsurface hydrological heterogeneity: What have we learned? No magic, no panacea, In workshop on A testable stochastic features of subsurface structures, flow and transport, at the Centro Stefano Franscini, Monte Verita Ascona, Switzerland, October 24-29, 1999.
39. Parameter identification for vadose zone hydrology, Soil Science Society of America Annual Meeting, Baltimore, Maryland, 1998.
40. Stochastic vadose zone hydrology, Department of Geology, University of South Carolina, Columbia, South Carolina, September 22, 1997.
41. Stochastic analysis of flow and transport in the vadose zone: what have we learned after a decade’s research? AGU Fall Meeting 1997.
42. New approaches to characterization and monitor of vadose zones and aquifers, European geophysical society meeting, The Hague, The Netherlands, 1998.
43. Scale issues of heterogeneity in vadose zone hydrology and practical solutions, U.S. Salinity Lab. Riverside California, 1996.
44. Scale problems and stochastic modeling of transport in the vadose zone, AGU, 1995.
45. Stochastic modeling of water flow and solute transport in the vadose zone, Pacific Northwest /Ocean conference, assessment of models for groundwater resources analysis and management, University of Hawaii at Manoa, March 21-23, 1994.
46. "Observations and simulation of three-dimensional chloride plumes in a sandy aquifer," New Mexico Tech., 1992.
47. "Effective unsaturated hydraulic conductivity: from theory to field measurement techniques," keynote lecture in Nordic Hydrology workshop, Denmark, June 27-29, 1990.
48. "Spatial variability and preferential flow in unsaturated zone," workshop on "Preferential Flows," sponsored by the Utah State University, March 20, 1989.
49. "Spatial variability of hydraulic parameters of unsaturated soils," New Mexico Institute of Mining and Technology (New Mexico Tech.), 1987.

50. "Flow and solute transport in heterogeneous unsaturated soils," Shell Development Company, 1985.
51. "Spatial variability and stochastic analysis of flow through unsaturated porous media," AGU Fall Meeting, 1985.
52. "Effects of spatial variability on unsaturated flow," Kansas Geological Survey, 1983.

8. GRANTS AND CONTRACTS AWARDED

1. Field demonstration of Hydraulic Tomography for Characterizing DNAPL source zone, ESTCP, through a subcontract from AMEC., 09/20/2012 to 12/04/2015, $1,200,000.00, (33% P.I.).
2. Development of River-Stage Tomography for Characterizing Groundwater Basins, NSF, 09/20/2010 to 12/04/2015, $463,998.00, (100% P.I.).
3. Computational and Experimental Investigation of Contaminant Plume Response to DNAPL Source Zone Architecture and Depletion in Porous and Fractured Media, SERDP, ER-1610, subcontract from University of Waterloo, ~$300K (2008-2010), (100% P.I.).
4. Fusion of tomography tests for DNAPL sources zone characterization: Technology development and validation, Strategic Environmental Research and Development Program (SERDP), 05/01/05 to 04/30/08, ~$600,000 (100% P.I.), subcontract from University of Iowa.
5. Collaborative Research: River Stage Tomography for Automatic Characterization of Fluxes between Surface and Groundwater Reservoirs: a Pilot Study U of Arizona Awarded 06/07/2005 07/26/2004 $348,084, NSF (EAR) 0450388.
6. Collaborative Research: Adaptive Fusion of Stochastic Information for Imaging Fractures Vadose Zone, NSF, 09/01/04 to 08/31/07, $551,269. P.I.
7. A Hydrological Geophysical Method for Characterizing Flow and Transport processes within the Vadose Zone, DOE/University of Wisconsin, 10/15/1999 to 9/15/2003, ~$180,109 (100% P.I.).
8. A method for characterizing the vadose zone and monitoring solute transport, United States Environmental Protection Agency (EPA), 10/01/98-6/30/03, ~$359,955 (100% P.I.).
9. A hybrid hydrologic and geophysical inverse technique for the assessment and monitoring of leachate in the vadose zone, DOE/Sandia National Laboratories (SNL), 10/96-10/99, ~$513,000. (100%, P.I.)
10. “Three-dimensional co-conditional simulation of VOC contaminant migrations", Define acronym here (NIEHS), ~$940,000, 4/94-6/99 (30%, Co-P.I. with Bales, Conklin).
11. "Three-dimensional co-conditional simulation of contaminant migration: from landsurface through the vadose zone to ground water reservoirs", NSF, ~$240,000, 6/94-6/97 (100%, P.I.).
12. Laboratory analysis of fate and transport of VOC in unsaturated porous media, NIEHS, ~$200,000, 4/94-4/95. (50%, Co-P.I. with Zreda).
13. "Analysis and Modeling of Hydrology and Particle Transport," Martin Marietta Energy Systems, Inc., March 1, 1991 through September 30, 1992, ~$61,879

(100%, P.I.).

14. "Characterization of fate and transport of volatile organic compounds in porous media under unsaturated conditions," USGS, ~$124,000, 9/92 to 8/94 (100%, P.I.).
15. "Stochastic modeling of macrodispersion in unsaturated porous media," United States Department of Energy (DOE), ~$350,000, July 1991 to 8, 1993 (100%, P.I.).
16. "Conditional stochastic modeling of transport of nonreactive and reactive contaminants in the vadose zone," United States Geological Survey (USGS), ~$116,000, 9/91 to 8/93 (100%, P.I.).
17. "Modeling of groundwater systems in the Sinai Peninsula," Consortium for International Development, ~$11,700, May 25 to June 25, 1990 (100%, P. I.).
18. "Analysis of uncertainties in prediction of leakage from waste disposal basins," EPA, ~$350,000, Oct. 1989 through Sept. 1992 (100%, P. I.).
19. "Water conductivity and radionuclide transport for partially saturated rock fractures," United States Nuclear Regulatory Commission (NRC), ~$250,000, Oct., 1987 to Sept. 1990 (30%, Co-Investigator with D. Evans and T. Rasmussen).
20. "Dependence of effective hydraulic conductivities on soil and flow conditions in unsaturated heterogeneous soils," Small Grants Program, The University of Arizona, ~$5,000, May 1987 through June 1988 (100%, P. I.).
21. "Effects of heterogeneity on seepage from open channels," National Science Foundation (NSF), ~$48,000, January 1986 to June 1988 (100%, P. I.).

9. RECENT HOST OF INTERNATIONAL VISITING SCHOLARS.

1. Dr. Dong, Haizhou, Associate Professor, School of Earth Sciences and Engineering, Hohai University, P.R.China, 2014-2015.
2. Dr. Abdelfattah Elsheikh, Hydrology Department, DRC, Matarya, Cairo, Egypt, 2014-2015.
3. Professor Gao, Zongjun, College of Geoogical Science and Engineering, Shandong University of Science and Technology, 2014-2015.
4. Professor Yang, Zhongping, College of Civil Engineering, Chongqing University, 2013-2014.
5. Mr. Zha, Yuanyuan, Jointly supervised Ph.D. candidate, Wuhan University, China, 2012-2014.
6. Ms. Zhang, Hexin, Jointly supervised Ph.D. scandidate, China University of Geosciences, Beijing, 2011-2013.
7. Professor, Sun, Ronglin, China University of Geosciences, Wuhan, 2010-2011.
8. Dr. Christian Massari, Dipartimento di Ingegneria Civile ed Ambientale, Università degli Studi di Perugia, Italy, 2010-2011.
9. Professor, Yonghon Hao, Shanxi University, China, from July, 2005 to July 2006.
10. Dr. Andreas Englert, Institut für Chemie und Dynamik der Geosphäre, ICG IV, Agrosphäre, Stofftransport in Böden und Grundwasser, Forschungszentrum Jülich GmbH 52425 JÜLICH, March to July, 2005.
11. Dr. Albert Floch, Span, February to June 2004.
12. Dr. Cheng-Mau Wu, Department of Civil and Environmental Engineering, National Taiwan University, February to December 2004.
13. Professor, Ing. Salvatore Straface, University of Calabria, Soil Conservation

Department, Ponte P.Bucci 42B, 8704 Rende (CS), Italy, 2000.
14. Professor Marco Ferrante, Dipartimento di Ingegneria Civile ed Ambientale Via G. Duranti, 93 - 06125 Perugia, Italy, 1995-1996.

10. COURSES OFFERED

HWR535, Advanced Subsurface Hydrology: Fall semester, from 1986 through 1994: spring semester from 1995 to now.
HWR516, Hydrologic Transport Processes: Spring semester, 1986 through 1994; Fall semester 1995 to now.
HWR645, Stochastic Methods in Subsurface Hydrology: Spring semester, every other year since 1987.
HWR505, Vadose Zone Hydrology: Spring semester, 1990, 1992.

HWR6XX, Mathematics for Hydrologists, 1990.

11. PH.D. STUDENTS GRADUATED

1. **Deqiang Mao**, 201, Joint interpretation of sequential pumping tests in unconfined aquifers.
2. **Jianwei Xiang**, 2007, Stochastic estimation of spatial hydrologic properties.
3. **Junfeng Zhu**, 2005, Characterization of subsurface heterogeneity using transient hydraulic and tracer tomography.
4. **Shuyun Lu**, 2001, A sequential inverse approach for hydraulic tomography and electrical resisitivty tomogrgaphy: an effective method for site characterization.
5. **Bailing Li**, 1998, Unconditional and conditional analysis of flow and solute transport in variably saturated porous media.
6. **Padila, Ingrid**, 1998, Transport of nonreactive and volatile solutes in unsaturated porous media under wetting and draining conditions.
7. **Abraham Rojano Agulilar**, 1998, A theoretical study of gas flow in porous media with a spherical source.
8. **Ron Chaoka**, 1997, Three-dimensional simulation of the Columbus tritium plume.
9. **Jinqi Zhang**, 1995, An iterative stochastic inverse approach for steady-state flow in heterogeneous, variably saturated porous media.
10. **Samuel Hanna**, 1995, An iterative Monte Carlo technique for estimating conditional means and variances of transmissivity and hydraulic head fields.
11. **Dennis Norton**, 1995, Evaluation, Extension, and Application of a full field light transmission technique for the investigation of hysteresis in thin homogeneous sand slabs.
12. **Thomas Harter**, 1994, Unconditional and conditional simulation of flow and transport in heterogeneous, variably saturated porous media.
13. **Joseph Mas-pla**, 1993, Modeling the transport of natural organic matter in heterogeneous porous media: analysis of a field-scale experiment at the Georgetown site, South Carolina.

14. **David Bosch**, 1990, Derivation and application of effective parameters for modeling moisture flow in heterogeneous unsaturated porous media.

12. MASTER DEGREE STUDENTS GRADUATED

1. **Andrew Hartz,** 2011, Hydraulic tomography analysis of a sandbox experiment.
2. **Ailco Wolf**, 2002**,** Comprehensive Geostatistical Based Parameter Optimization And Inverse Modeling Of North Avra Valley, Arizona.
3. **Ryan Gardner**, 2000, Application of an inverse algorithm using a 2-D laboratory soil model.
4. **Derek Blazer**, 1999, A systematic method for steady-state groundwater flow model calibration.
5. **John Salter**, 1996, Numerical modeling of two-phase flow in heterogeneous, anisotropic porous media.
6. **Hale Barter**, 1995, Numerical simulation of three-dimensional unsaturated flow in a heterogeneous porous medium.
7. **Xuezhong Bao**, 1995, Mesh Design for Numerical Solution of Richards' Equation.
8. **Shyh-shyan Hsu**, 1993, Verification of the inverse model: multi-step steady outflow method using numerical and experimental data.
9. **Curtis Muller**, 1992, A multi-step steady-state inverse method for the determination of unsaturated hydraulic conductivity in soil columns-a new parameter estimation technique.
10. **Debbie Greenholtz**, 1990, Spatial variability of hydrologic properties in an irrigated soil.
11. **Donald Harvey**, 1989, The effective hydraulic conductivity of unsaturated layered sands.
12. **James Mathieu**, 1988, Two-dimensional water flow through stratified, unsaturated porous media: laboratory sandbox experiments.
13. **John Gannon**, 1987, Numerical analysis of the effects of heterogeneities on dispersion.

13. Synergistic Activities

Yeh's synergistic activities involve conducting a wide range of collaborative research with a focused objective: development of new-generation technologies to improve our ability to image subsurface and improve our prediction of fluid flow in the subsurface from laboratory, basin, to continental scales. For example, Yeh collaborated with engineers, geologists, hydrologists, geophysicists, and mathematicians from US, China, Taiwan, Canada and Norway to formulate a vision for the future of subsurface science. This vision is published as an article in Water Resources Research (2008) titled "A view toward the future of subsurface characterization: CAT scanning groundwater basins".

Yeh was also the leading PI for a collaborative research project "Adaptive fusion of stochastic information for imaging fractured vadose zones", which involved engineers

from information technology, electrical engineering, geophysics, geotechnical engineering, and hydrologists. They have organized many AGU and WPGM sessions to promote fusion of information for imaging the subsurface.

Dr. Yeh worked with Drs. Ralf Brauchler and Martin Sauter at Geowissenschaftliches Zentrum der Universität Göttingen, Angewandte Geologie and Dr. S. Q. Wu from Nanjing Hydraulic Lab, China to develop proposals for the NSFChina/ DFGermany-Joint funding program "Land Use and Water Resources Management under Changing Environmental Conditions. He has worked with Professor C.-H. Lee at National Cheng-Kung University in Taiwan to analyze groundwater level and river stage data of Zoushuixi alluvial fan in Taiwan with the support from the Water Resources Bureau of Taiwan. Simultaneously, he has developed technology for imaging fractured rocks at a nuclear waste storage site with collaboration with Japan Atomic Energy Agency and Obayashi Corporation.

Collaborators and Co-Editors

K. Ando (Obayashi Corporation Japan.), W. Barrash (Boise State U.), X. Cai (U. of Oslo), Jeff Daniels (U. of Ohio), Y. Hao (Tainjin Normal U.), A. C. Hinnell (U. of A), K-C. Hsu (National Cheng-Kung U.), K. L. Kuhlman (Sandia Lab), C.-H. Lee (NCKU), G. Li (China Sina), H. Saegusa (Obayashi Corporation Japan), E. Sudicky (U. of Waterloo), S. Takeuchi (Obayashi Corporation Japan), L. Wan (China U. of Geoscience), C. L. Winter (U. of A), J.-C. Wen (National Yunlin Tech U.), W.A. Illman (U. of Waterloo), and C.M. Mok (GSI Environmental).

Graduate Advisors: Lynn Gelhar (New Mexico Tech. and MIT)

Postdoctoral Sponsor

Yu Zhang, Minghuei Jin, Jose A. Vargas-Guzman, Debra L. Hughson, C-F Ni (National Central U.), R. M. Suribhatla (AMEC Inc.), J. Xiang (D. D. Consulting), J. Zhu (Kentucky Geological Survey), and Deqiang Mao (Colorado School of Mines).