

# Curriculum Vitae

## **T. Prabhakar Clement, Ph.D., P.E., F. ASCE**

Professor and Groome Endowed Scholar of Civil Engineering  
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Update on: November 26, 2016

## Summary

### Academic Accomplishments:

**Research Contributions:** 101 peer-reviewed publications (including 2 National Academy reports; 9 book chapters; 90 published/accepted journal articles; supervised/co-supervised 5 post-doctoral fellows, 10 PhD completions, and 26 masters completions.

**ISI Web Science Citation Data:** over 2050 citations; H-Index 26

**Google Scholar Citation Data:** over 4000 citations; H-Index 34

**Grant Projects:** 39 funded research grants

**Major National Awards & Recognitions:** John Hem Award for Excellence in Science & Engineering, National Groundwater Association (2016); Elected as ASCE Fellow (2013); Certificate of appreciation for outstanding, National Academy of Sciences and Engineering Board on Environmental Studies and Toxicology, 2009.

**Experience Summary:** Dr. Prabhakar Clement is a full professor in the Department of Civil Engineering at Auburn University, where he is currently the Harold Vince Groome Jr. Endowed Professor of Environmental Engineering. Dr. Clement joined Auburn University as an associate professor in 2002 and became a full professor in 2007. He was awarded the Arthur H. Feagin Chair Professorship in 2007, which he occupied from 2007 to 2012. Before joining Auburn University, Dr. Clement was a senior research engineer (1994-1999) at the Battelle Pacific Northwest National Laboratory, Washington. He later worked as a tenure-track faculty member (1999-2002) at the Department of Environmental Engineering, Center for Water Research, (CWR), University of Western Australia, Perth, Australia. Professor Clement's reactive transport modeling work has been internationally recognized. He is a registered professional engineer (PE) in the State of Washington, and he was elected as a Fellow of the American Society of Civil Engineers (ASCE) in 2013. His research interests include: flow and contaminant transport in groundwater aquifers, understanding the transport of anthropogenic contaminants in rivers, estuaries and coastal systems, oil spill management, and application of numerical models for simulating complex environmental systems. He is also interested in developing laboratory and field-scale experiments to study the fundamentals of environmental transport processes. He has authored several numerical models, and is the lead author of the widely used MODFLOW-family reactive transport model RT3D. He has served as an associate editor of several scientific journals including Water Resources Research, Journal of Hydrologic Engineering, Ground Water, Vadose Zone Journal, and the Journal of Contaminant Hydrology.

## Career History

- 2012 – 2017, Harold Vince Groome Jr. Endowed Professor of Civil Engineering, Auburn University.
- 2007 – 2012, Arthur H. Feagin Endowed Research Chair of Civil Engineering, Auburn University.
- 2007 – present, Professor, Department of Civil Engineering, Auburn University.
- 2002-2007, Associate Professor, Department of Civil Engineering, Auburn University, Alabama, USA.
- 1999 – 2002, Senior Lecturer (tenure-track), University of Western Australia.
- 1995-1999, Senior Research Engineer, Battelle Pacific Northwest National Laboratory, Richland, Washington, USA.
- 1994-1995, Post-doctoral Fellow, Battelle Pacific Northwest National Laboratory

- 1989-1993, Graduate Assistant, Auburn University, USA.
- 1987-1989, Research Engineer, Indian Institute of Technology, Bombay, India.
- 1987-1988, Project Engineer, AIC-Watson Environmental Consultants, Bombay.
- 1985-1987, Graduate Assistant with GATE Fellowship, IIT-Bombay, India.

## Professional Preparation

- P.E. (Civil Engineering), Registered Professional Engineer in the State of Washington, USA, 1998.
- Post-doctoral Fellow, Battelle Pacific Northwest National Laboratory, (1994-1995).
- Ph.D. (Civil Engineering), Auburn University, USA, 1993.
- M.Tech. (Environmental Sciences and Engineering), Indian Institute of Technology, Bombay, India, 1987.
- M.Sc. (Physics), American College, Madurai University, India, June 1985.
- B.Sc. (Physics), Loyola College, Madras University, India, June 1983.

## Honors, Awards and Recognitions

- NGWA's John Hem Award for excellence in Science & Engineering, in recognition of significant recent contributions to the understanding of groundwater, National Groundwater Association (2016).
- Elected as a Fellow of the American Society of Civil Engineers (2013)
- Globex Fellow, awarded by Peking University, China (2013)
- Appointed as Associate Editor of Water Resources Research, American Geophysical Union, 2012- 2014.
- Harold Vince Groome Jr. Endowed Professorship (2012-2017).
- Appointed to serve on the National Academy of Sciences & Engineering's NRC committee to review possible toxic effects from past environmental contamination at Fort Detrick, Maryland. April 2011.
- Arthur H. Feagin Chair Professorship (2007-2012).
- Certificate of appreciation for outstanding service on the NRC Committee on Contaminated Drinking Water at Camp Lejeune, North Carolina, from 2007 to 2009. Board of Environmental Studies and Toxicology, National Academy of Sciences & Engineering, Washington, DC.
- Montgomery-Watson-Harza consulting engineers-sponsored outstanding Master's thesis supervisor award (jointly received with my masters student Srinivasan), 2nd Place, Presented at the Association of Environmental Engineering Professors' (AEESP) National conference held at the University of Iowa, Iowa City. July 2009.
- Auburn Alumni Engineering Council's award for excellence in research. Senior level, 2006. This award represents the highest faculty honor for research accomplishments within the College of Engineering at Auburn University.
- Appointed as Associate Editor of Ground Water Journal, National Groundwater Association, 2009-2012.
- Appointed as Associate Editor of Journal of Contaminant Hydrology, Elsevier publishers, 2006-2008.
- Outstanding Civil Engineering Faculty Member; a Teaching Award: 2006.
- Appointed as Associate Editor of Soil Science Society of America's Vadose zone Journal, 2005-2007.
- Appointed as Associate Editor of American Society of Civil Engineers' Journal of

Hydrologic Engineering, 2004-2008.

- Federal Laboratory Consortium (FLC) seal of achievement. The FLC national awards committee recognized the technology transfer efforts related to the development of the RT3D computer tool. May 1999.
- Outstanding performance award in recognition for the support of the RT3D development project, Battelle Pacific Northwest National Laboratory, 1999.
- Associated Western Universities' Post-doctoral research fellowship award, sponsored by Pacific Northwest National Laboratory, January, 1994.
- National Academy of Sciences and Engineering and National Research Council's Research Associate Fellowship Award, Sponsored by USEPA, Athens, Georgia, December 1993 (I declined this award and instead accepted the Pacific Northwest Lab's AWU post-doctoral fellowship).
- Honor Society of Phi Kappa Phi (Auburn University's highest all discipline academic honor society), December 1993.
- Outstanding Graduate Student (GPA 4.0), Auburn University, 1992.
- GATE Fellowship Award to support my studies at IIT-Bombay, 1985.

## Memberships

- American Geophysical Union (AGU)
- American Society of Civil Engineering (ASCE)
- National Groundwater Association (NGWA)

## Invited Visits

Seoul National University, Korea; University of Hong Kong; University of Auckland, New Zealand; Denmark Technical University, Denmark; Delft University, Netherlands; Technical University of Cartagena, Spain; Vanderbilt University; Clemson University; University of Waterloo-Canada; Washington State University; Georgia Tech; Colorado School Mines; University of Hawaii; Rice University; University of Alabama-Tuscaloosa; University of Alabama-Birmingham; University of Florida; Florida State University; Tuskegee University; Louisiana State University; University of Washington at St. Louis; University of Pittsburgh; University of Iowa; University of Missouri-Rolla (Missouri S&T); Kymbago University, Uganda-Africa; University of Illinois at Urbana-Champaign; University of Nebraska; Brigham Young University; University New Castle, Australia; University of Wollongong, Sydney; Queensland University of Technology; University of Queensland; Griffith University; Asian Institute of Technology (AIT), Bangkok; Peking University, China; Tsinghua University, China; China University of Geosciences (Beijing); University of Nottingham at Ningbo, China; IIT-Madras, India; IIT-Bombay, India; SRM University, India; Anna University (Guindy campus), India; Indian Institute of Science, Bangalore, India; University of Peradeniya, Sri Lanka; KIGAM, Korea; EWHA University, Korea; University of Memphis; University of Houston; Oak Ridge National Lab; Idaho National Lab; Berkeley National Lab; Pacific Northwest National Lab; CSIRO Lab Perth Australia; Belgian Nuclear Research Centre, Belgium; USEPA Robert S. Kerr Lab, Ada, Oklahoma; USEPA Research Lab, Athens, Georgia; National Academy of Sciences & Engineering, Washington DC; USDOE Office of Science Program; and National Science Foundation.

## Peer-Reviewed Publications (total 100)

Most of the published book chapters and journal articles can be downloaded from my webpage: <http://www.eng.auburn.edu/~clemept/biogpc.html#JOURNAL>

## National Academy's NRC Study Reports (2)

1. Contaminated Water Supplies at Camp Lejeune: Assessing Potential Health Effects. Served as a member of the committee and co-authored a chapter on groundwater/exposure assessment. Board on Environmental Studies and Toxicology, National Academies Press, p.328, 2009. Available at: [http://www.nap.edu/catalog.php?record\\_id=12618](http://www.nap.edu/catalog.php?record_id=12618)
2. Review of studies of possible toxic effects from past environmental contamination at Fort Detrick, Board on Environmental Studies and Toxicology, National Academies Press, p.25, February, 2012.

## Journal Articles (90)

\* Indicates research completed under my direct supervision where I took the lead to prepare the article and served as the corresponding author and a guarantor.  
Underline identifies co-authors who were graduate students or post-docs.

### ***In press/ accepted/ under revision***

1. Jazaei, F., M.J. Simpson, and **T.P. Clement**, Understanding the characteristic times scales of steady-state fluxes and its implication on steady-state and steady-shape conditions, under revision.

### **2016**

2. John, G.F., Y. Han, **T.P. Clement**, Weathering patterns of polycyclic aromatic hydrocarbons contained in submerged Deepwater Horizon oil spill residues when re-exposed to sunlight, *Science of the Total Environment*, v.573, p. 189-202, 2016.
3. Bhattacharya, D., **T.P. Clement**, M.Dhanasekaran, Evaluating the neurotoxic effects of Deepwater Horizon oil spill residues trapped along Alabama's beaches, *Life Sciences*, v.155, p. 161-166, 2016.
4. Chang, S.W., K. Nemecek, L. Kalin, **T.P. Clement**, Impacts of climate change and urbanization on groundwater resources in a barrier island, *ASCE Journal of Environmental Engineering*, 10.1061/(ASCE)EE.1943-7870.0001123 , D4016001.
5. Jazaei, F., M.J. Simpson, and **T.P. Clement**, Spatial analysis of aquifer response times for radial flow processes: Non-dimensional analysis and laboratory-scale tests, *Journal of Hydrology*, v. 532, p. 1–8 2016.
6. Lu, X., G. Cao, X. Huang, **T.P. Clement**, C. Zheng, Performance evaluation of inertial pumps used for sampling groundwater from small-diameter wells, *Environmental Earth Sciences Journal*, 75:203, DOI 10.1007/s12665-015-4912-7, 2016.

### **2015**

7. Yin, F., J.S. Hayworth, **T.P. Clement\***, A Tale of Two Recent Spills – Comparison of 2014 Galveston Bay and 2010 Deepwater Horizon Oil Spill Residues, *PLOS ONE Journal*, Published: February 25, DOI:10.1371/journal.pone.0118098, 2015.
8. **Clement, T.P.\*** (2015), Who are co-authors and what should be their responsibilities? *Environmental Science and Technology*, v. 49 (6), pp 3265–3266. DOI: 10.1021/acs.est.5b00415.
9. Hayworth, J.S., **T.P. Clement\***, F. Yin, and G. F. John, Fate of Deepwater Horizon Oil in Alabama's Beach System: Understanding Physical Evolution Processes Based on Observational Data, *Marine Pollution Bulletin*, V. 90 (1-2), P. 95–105, 2015.
10. Yin, F., G. F. John, J.S. Hayworth, J.S. and **T.P. Clement\***, Long-Term Monitoring Data to Describe the Fate of Polycyclic Aromatic Hydrocarbons in Deepwater Horizon Oil Submerged Off Alabama's Beaches, *Science for Total Environment Journal*, v.508, p. 46–56, 2015.

### **2014**

11. Jazaei, F., M.J. Simpson, and **T.P. Clement**, An analytical framework for quantifying aquifer response time scales associated with transient boundary conditions, *Journal of Hydrology*, V 519, Part B, Pages 1642–1648, 2014.
12. John, G.F., F. Yin, Mulabagal, V., J.S. Hayworth, and **T.P. Clement\***, Development and application of an analytical method using gas chromatography-triple quadrupole mass spectrometry for characterizing alkylated chrysenes in crude oil samples, *Rapid Communications in Mass Spectrometry*, DOI: 10.1002/rcm.6868, v. 28, 948–956, 2014.
13. Zheng, M., M. Ahuja, D. Bhattacharya, **T.P. Clement**, J.S. Hayworth, M. Dhanasekaran, Evaluation of the differential cytotoxic effects of oil spill dispersant Corexit 9500, *Life Sciences*, Vol. 95, 30 (2), 2014.
14. **Clement, T.P.\***, Authorship Matrix - a rational approach to quantify individual contributions and responsibilities in multi-author scientific articles", accepted for publication, in press, *Science and Engineering Ethics Journal*, DOI: 10.1007/s11948-013-9454-3, v.20, p.345–361, 2014.

### **2013**

15. Simpson, M.J., F. Jazaei, and **T.P. Clement**, How long would it take for aquifer recharge and discharge processes to reach steady-state? *Journal of Hydrology*, Vol. 501 (25), P. 241–248, 2013.
16. Mulabagal, V., F. Yin, G.F. John, J.S. Hayworth, and **T.P. Clement\***, Chemical fingerprinting of petroleum biomarkers in Deepwater Horizon oil spill samples collected from Alabama shoreline, *Marine Pollution Bulletin*, v.70, p. 147–154, 2013.
17. Chang S.W., and **T.P. Clement\***, Laboratory and numerical investigation of transport processes occurring beneath a saltwater wedge, *Journal of Contaminant Hydrology*, 147 (2013) 14–24.
18. Chattanathan, S.A., **T.P. Clement**, S.R. Kanel, M.O. Barnett, and N. Chatakondi, Remediation of uranium-contaminated groundwater by sorption onto hydroxyapatite derived from catfish bones, *Water, Air, & Soil Pollution*, v.224:p.1429, 2013.
19. Torlapati, J. and **T.P. Clement\***, Benchmarking a Visual-Basic based Multi-Component One-Dimensional Reactive Transport Modeling Tool, *Computers & Geosciences*, v. 50. 72–83 (2013).

## 2012

20. Hayworth, J.S., and **T.P. Clement**, Provenance of Corexit-related chemical constituents found in nearshore and inland Gulf Coast waters, *Marine Pollution Bulletin*, Volume: 64 Issue: 10 P. 2005-2014 DOI: 10.1016/j.marpolbul.2012.06.031. 2012.
21. Chang, S.W. and **T.P. Clement\***, Experimental and numerical investigation of saltwater intrusion dynamics in flux controlled groundwater systems, *Water Resources Research*, Vol. 48, W09527.10 PP., doi:10.1029/2012WR012134, 2012.
22. Jeppu, G.P., and **T.P. Clement\***, A modified Langmuir-Freundlich isotherm model for simulating pH-dependent adsorption effects, *Journal of Contaminant Hydrology*, V.129–130, P. 46–53, 2012.
23. Torlapati, J., **T.P. Clement\***, C.E. Schaefer, and K.K. Lee, Modeling Dehalococcoides sp. augmented bioremediation in a single fracture system, *Groundwater Monitoring & Remediation Journal*, Vol. 32(3), p. 75–83, 2012.
24. Jeppu, G.P., **T.P. Clement\***, M.O. Barnett, and K.K. Lee, A modified batch reactor system to study equilibrium-reactive transport problems, *Journal of Contaminant Hydrology*, V. 129–130, P. 2–9, 2012.
25. Shoemaker, A., Zech, W.C., and **Clement, T.P.** Laboratory-scale Evaluation of Anionic Polyacrylamide as an Erosion and Sediment Control Measure at Highway Construction Sites, *Transactions of the ASABE*, 55(3): 809-820.
26. **Clement\*, T.P.**, Reply to discussion comments on “Complexities in Hindcasting Models—When should we say enough is enough?” vol. 50 (1), p.16-18, 2012.
27. Goswami, R.R., **T. P. Clement\***, and J. H. Hayworth. Comparison of numerical techniques used for simulating variable-density flow and transport experiments, *ASCE Journal of Hydrologic Engineering*, *Journal of Hydrologic Engineering*, v.17(2), p.272-282, 2012.
28. Yang, J. H., K.K. Lee, and **T.P. Clement**, Impact of seasonal variations in hydrological stresses and spatial variations in geologic conditions on a TCE plume at an industrial complex in Wonju, Korea, *Hydrological Processes Journal*, V. 26 (3), p. 317-325, 30, 2012.

## 2011

29. **Clement\*, T.P.** Complexities in Hindcasting Models-When should we say enough is enough? *Ground Water*, Vol. 49, No. 5-September-October p. 620-629, 2011.
30. Hayworth, J.S., and **T.P. Clement\***, BP's Operation Deep Clean-Could Dilution be the Solution to Beach Pollution? *Environmental Science & Technology*, V. 45(10), p. 4201-4202, 2011.
31. Chang, S. W., **T. P. Clement\***, M. J. Simpson, and K. K Lee. Does sea-level rise have an impact on saltwater intrusion? *Advances in Water Resources*, 34 (10), p. 1283-1291, 2011.
32. Sen, S. P. Srivastava, **T.P. Clement**, J.H. Dane, and H. Meng. Simulating hydrologic response of a pasture hillslope in North Alabama using the Hortonian Infiltration and Runoff/On model, *Journal of Soil and Water Conservation*, v.66(6): p.411-422; doi:10.2489/jswc.66.6.411, 2011.
33. Hayworth, J.S., **T. P. Clement\***, and J. F. Valentine, Deepwater Horizon oil spill impacts on Alabama beaches, *Hydrology and Earth System Sciences Journal*, v. 15, p. 3639-3649, 2011.
34. Kanel, S.R., **T.P. Clement**, M.O. Barnett, and M.N.Goltz. Nano-Scale Hydroxyapatite: Synthesis, two-dimensional transport experiments, and application for uranium remediation, *Journal of Nanotechnology*, Vol. 2011, Article ID 462382, p. 1-5, 2011.

## 2010

35. Jeppu, G., **T.P. Clement\***, M.O. Barnett, K.K. Lee, A scalable surface complexation modeling framework for predicting arsenate adsorption on goethite-coated sands: model development and testing, *Environmental Engineering Science Journal*, 27(2): 147-158, 2010.

**2009**

36. Abarca, E., and **T. P. Clement\***, A novel approach for characterizing the mixing zone of a saltwater wedge, *Geophysical Research Letters*, 36, L06402, doi:10.1029/2008GL036995, 2009.
37. Loganathan, V., M.O. Barnett, **T.P. Clement**, S.R. Kanel, Scaling of adsorption reactions: U(VI) experiments and modeling, *Applied Geochemistry Journal*, Vol. 24 (11), P. 2051-2060, 2009.
38. Goswami R.R., B. Ambale and **T.P. Clement\***, Estimating errors in concentration measurements obtained from image analysis, *Vadose Zone Journal*, vol.8(1), p.108-118, 2009.
39. Loganathan, V.A., Y. Feng, G.D. Sheng, and **T.P. Clement**, Influence of sorption and desorption on bioavailability of atrazine in soils, *Soil Science Society of America Journal*, 73:967-974, 2009.
40. Zech, W.C., J. S. McDonald, and **T. P. Clement**, Field evaluation of silt fence tieback systems at a highway construction site, *ASCE Practice Periodical on Structural Design and Construction*, vol.14(3), p105-112, 2009.

**2008**

41. Rolle, M., **T.P. Clement**, R. Sethi, A.D. Molfetta, A Kinetic Approach for Simulating Redox-controlled Fringe and Core Biodegradation Processes in Groundwater: Model Development and Application to a Landfill Site in Piedmont, Italy, *Hydrological Processes Journal*, Vol 22 (25), P 4905 - 492, 2008.
42. Kanel, S.R., R. R. Goswami, **T. P. Clement\***, M. O. Barnett, and D. Zhao, Two dimensional transport characteristics of surface stabilized zero-valent iron nanoparticles in porous media, *Environmental Science & Technology*, v.42, p.896-900, 2008.
43. Srinivasan, V. and **T.P. Clement\***, Analytical solutions for sequentially coupled one-dimensional reactive transport problems - Part I: Mathematical Derivations, *Advances in Water Resources*, v. 31(2), P. 203-218, 2008.
44. Srinivasan, V. and **T.P. Clement\***, Analytical solutions for sequentially coupled one-dimensional reactive transport problems - Part II: Special Cases, Implementation and Testing, *Advances in Water Resources*, v. 31(2), P. 219-232, 2008.
45. Zech, W.C., J.L. Halverson, and **T.P. Clement\***, Evaluating the effectiveness of silt fence installations to control sediment discharge from highway construction sites, *ASCE Journal of Hydrologic Engineering*, vol.13(6), p.497-504, 2008.
46. Xu, Y., D. Zhao and **T.P. Clement**, Modeling elution histories of copper and lead from a contaminated soil treated by Poly(amidoamine) dendrimers, *ASCE Journal of Environmental Engineering Division*, vol. 134 (4), p. 238-246, 2008.
47. V. Srinivasan and **T.P. Clement\***, Reply to discussion comments on "Domenico's Solution—Is It Valid?" by V. Srinivasan and T.P. Clement, *Ground Water*, Vol. 46, No. 5, p-668, 2008.
48. Radu, T., Kumar, A., **T.P. Clement\***, G. Jeppu, M.O. Barnett, Development of a scalable model for predicting arsenic transport coupled with oxidation and adsorption reactions, *Journal of Contaminant Hydrology*, v.95, pages 30-41, 2008.

**2007**

49. Goswami, R.R. and **T.P. Clement\***, Laboratory-scale investigation of saltwater intrusion dynamics, *Water Resources Research*, Vol. 43, W04418, doi:10.1029/2006WR005151, 2007.
50. Zech, W.C., J.L. Halverson, and **T.P. Clement**, Development of a silt fence tieback design methodology for highway construction installations, *Journal of Transportation Research Record*, No.2011 Environmental Issues, DOI 10.3141/2011-03, pp.21-28, 2007.
51. Lee, K.K., and **T.P. Clement**, Remediation of groundwater and soil environments: an emerging field of research in Korea, Guest Editorial Article, *Geosciences Journal*, vol. 11 (2), p. 93-94, 2007.
52. Truex, M.J., C.D. Johnson, J.R. Spencer, **T.P. Clement** and B.B. Looney, A deterministic approach to evaluate monitored natural attenuation for chlorinated solvents, *Remediation- The Journal of Environmental Cleanup Costs, Technologies & Techniques*, v. 17(4), p.23-40, 2007.
53. Phillippi, J.M., V.A. Loganathan, M. J. McIndoe, M. O. Barnett, **T.P. Clement** and E. E. Roden, Theoretical solid/solution ratio effects on adsorption and transport: uranium (VI) and carbonate, *Soil Science Society of America Journal*, 71:329-335, DOI: 10.2136/sssaj2006.0159, 2007.
54. Lim, MS, I.N. Yeo, **T.P. Clement**, Y. Roh, K.K. Lee, Mathematical model for predicting microbial reduction and transport of arsenic in groundwater systems, *Water Research*, Vol. 41 (10), P. 2079-2088, 2007.
55. Srinivasan, V., **T.P. Clement\***, and K.K. Lee, Domenico model - Is it valid? *Ground Water*, v45 (2), p. 136-146, 2007.

**2006**

56. Illangasekare, T., S W. Tyler, **T.P. Clement**, K.G. Villholth, A.P.G.R.L. Perera, J. Obeysekera, A., Gunatilaka, C.R. Panabokke, D. W. Hyndman, K. J. Cunningham, J. J. Kaluarachchi, W W-G. Yeh, M Van Genuchten, and K. Jensen, Impacts of the 2004 Tsunami on Groundwater Resources in Sri Lanka, Water Resources Research, doi:10.1029/2006WR004876, v.42 (5), p.1-9, 2006.
57. Jones, N.L., **T.P. Clement**, C.M. Hansen, A three-dimensional analytical modeling tool for solving reactive transport problems, Ground Water, vol. 44 (4), p 613-617, 2006.
58. Lee, M., K.K. Lee, **T.P. Clement**, and D. Hamilton, Nitrogen transformation and transport Modeling in groundwater aquifers, Ecological Modeling, vol. 192, p. 143-159, 2006.

## 2005

59. Simpson, M.J., K.L. Landman, and **T.P. Clement**, Assessment of a non-traditional operator split algorithm for simulation of reactive transport, Mathematics and Computer Simulations Journal, 70 (1): 44-60, 2005.
60. Westbrook S.J., J.L. Rayner, G.B. Davis, **T.P. Clement**, P.L. Bjerg, and S.J. Fisher, Interaction between shallow groundwater, saline surface water and contaminant discharge at a seasonally- and tidally-forced estuarine boundary, Journal of Hydrology, vol (302) p. 255-269, 2005.

## 2004

61. Quezada, C.R., **T.P. Clement\***, K.K. Lee, Generalized solution to multi-dimensional, multi-species transport equations coupled with a first-order reaction network involving distinct retardation factors, Advances in Water Resources Journal, vol. 27, p. 507-520, 2004.
62. **Clement\***, **T.P.**, Y.C. Kim, T.R. Gautam, and K.K. Lee, Experimental and numerical investigation of NAPL dissolution processes in a laboratory scale aquifer model, accepted for publication, Groundwater Monitoring and Remediation Journal, vol 24(4), p. 88-96, 2004.
63. **Clement\***, **T.P.**, T.R. Gautam, K.K. Lee, M.J. Truex, and G.B. Davis, Modeling Coupled NAPL-dissolution and rate-limited sorption reactions in biologically active porous media, Bioremediation Journal, 8(1-2): p.47-64, 2004.
64. Simpson, M.J., and **T.P. Clement\***, Improving the worthiness of the Henry problem as a benchmark for density-dependent groundwater flow models, Water Resources Research, vol 40 (1), W01504, doi:10.1029/2003WR002199, 2004.
65. Hipsey, M.R., M. Sivapalan, M. and **T.P. Clement**, A numerical and field investigation of surface heat fluxes from small wind-sheltered waterbodies in semi-arid Western Australia, Journal of Environmental Fluid Mechanics, vol 4. P. 79-106, 2004.
66. Wilkes, S.M., **T. P. Clement**, and C.J. Otto, An investigation of the hydrogeology of the Augustus River catchment, Western Australia, Hydrogeology Journal, 12:209-223, DOI 10.1007/s10040-003-0298-9, 2004.
67. Wilkes, S.M., **T.P. Clement**, and C.J. Otto, The hydro-geological significance of fractures within a weathered rock catchment, Australian Geomechanics, vol 39(2): 27-36 (2004).

## 2003

68. Simpson, M.J., and **T.P. Clement\***, Comparison of finite difference and finite element solutions to the variably saturated flow equation, v.270, p.49-64, Journal of Hydrology, 2003.
69. Simpson, M.J., and **T.P. Clement\***, Worthiness of the Henry and Elder problems for validating density-dependent flow models, Advances in Water Resources, vol (26) p. 17-31, 2003.
70. Simpson, M.J., **T.P. Clement\***, and F.E. Yeomans, An analytical method for computing groundwater residences times near a pumping well, Ground Water, vol 41 (3), p. 351-354, 2003.
71. Simpson, M.J., **T.P. Clement\***, and T.A. Gallop, Laboratory and numerical investigation of flow and transport near a seepage-face boundary, Ground Water, vol 41(5), p.690-700, 2003.

## 2002

72. **Clement\***, **T.P.**, M.J. Truex, and P. Lee, A Case Study for demonstrating the application of U.S. EPA's monitored natural attenuation screening protocol at a hazardous waste site, Journal of Contaminant Hydrology, vol 59 (nos.1-2), p.133-162, 2002.
73. Ginn, T. R., K. E. Nelson, T. D. Scheibe, E. M. Murphy, and **T. P. Clement**, Processes in Microbial Transport in the Natural Subsurface, Advances in Water Resources Journal, vol(25), p. 1017-1042, 2002.

## 2001

74. **Clement\***, **T.P.**, A generalized analytical method for solving multi-species transport equations coupled with a first-order reaction network, Water Resources Research, vol 37, p. 157-163, 2001.

## 2000



75. **Clement\*, T.P.**, C.D., Johnson, Y. Sun, G.M. Klecka, C. Bartlett, Natural attenuation of chlorinated solvent compounds: Model development and field-scale application, *Journal of Contaminant Hydrology*, vol.42, p.113-140, 2000.

### 1999

76. Lu, G., **T.P. Clement**, C. Zheng, and T.H. Wiedemeier, Natural attenuation of BTEX compounds: Model development and field-scale application, *Ground Water*, vol.37(5), p.707-717, 1999.
77. Sun, Y., J.N. Petersen, **T.P. Clement**, and R.S. Skeen, Development of analytical solutions for multi-species transport with serial and parallel reactions, *Water Resources Research*, Vol. 35, No. 1, p. 185-190, 1999.
78. Sun, Y., J.N. Petersen, **T.P. Clement**, A new analytical solution for multiple species reactive transport in multiple dimensions, *Journal of Contaminant Hydrology*, (35)4, pp. 429-440, 1999.
79. Sun, Y., J.N. Petersen, Bear, J., **T.P. Clement**, B.S. Hooker, Modeling microbial transport and biodegradation in a dual-porosity system, *Transport in Porous Media Journal*, vol.35(1), p. 49-65, 1999.
80. Sun, Y., and **T. P. Clement\***, A generalized decomposition method for solving coupled multi-species reactive transport problems, *Transport in Porous Media Journal*, 37/3 (December), pp. 327-346, 1999.

### 1998

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97. Hogan, M.B., R. R. Goswami, K. G. Villholth, T. H. Illangasekare, and **T. P. Clement**, Understanding the Flow and Mixing Dynamics of Saline Water Discharged into Coastal Freshwater Aquifers, *Proceeding of the SWIM/SWICA joint meeting, Cagliari, Chia Laguna, Italy, September 25th-29th, Section-2-Modeling to Elucidate Processes*, Edited by G. Barrocu, pages 55-61, 2006.
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## Popular News Media Citations and Articles

1. WSFA-Alabama report on tar balls on Alabama's beaches, aired on May 13, 2013: <http://www.wsfa.com/story/22236276/wsfa-12-news-special-report-toxic-tar-balls>  
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2. National Geographic News story on our beach sampling efforts, published on May 22, 2012: <http://news.nationalgeographic.com/news/energy/2012/03/120322-gulf-oil-spill-tar-balls-wash-up-on-beaches/>
3. Nature Journal news site story on our ES&T beach clean-up paper: [http://blogs.nature.com/news/2011/04/bps\\_beach\\_cleanup\\_contaminated.html](http://blogs.nature.com/news/2011/04/bps_beach_cleanup_contaminated.html)
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7. Reuters News story on our oil spill characterization work: <http://www.reuters.com/article/2011/09/21/us-oilspill-study-idUSTRE78K10P20110921>
8. **Clement, T.P.**, M. Kensler, and M. Worosz, Big Lessons, Newspaper editorial on BP oil spill published in the July 4<sup>th</sup> 2010 special issue of Mobile Press Register. [http://blog.al.com/press-register-commentary/2010/07/the\\_big\\_lesson.html](http://blog.al.com/press-register-commentary/2010/07/the_big_lesson.html)

## Conference Presentations and Seminars

1. Han, Y., S.A. Gustitus, F. Yin, and T.P. Clement. Peak-interpolation method for differentiating Deepwater Horizon crude oil from other Gulf of Mexico crude oils, Gulf of Mexico Oil Spill & Ecosystem Science Conference, Feb 1-4, 2016. Tampa, FL.
2. Organized and chaired a half-day session titled "Fate and Transport of Submerged Oil Mats and Surface Residual Oil Balls in Beaches and Coastal Wetlands" co-chairs Boufadel & Pardue 2105 Oil spill and ecosystem science conference, Houston, Texas, February 16-19, 2015.
3. Organized and chaired a one-day session titled "Fate and Transport of Oil Spill Residues and their Impacts on Nearshore Coastal Environments." Gulf of Mexico Oil Spill & Ecosystem Science Conference in Mobile, Alabama, January 26-29, 2014.
4. Invited talk titled "Understanding Saltwater Intrusion Processes: New Insights Learned from Laboratory Observations Coupled to Numerical Predictions" at the NGWA Pillars of Groundwater Innovation Conference, organized by NGWA, Phoenix Arizona, Nov 7-8, 2013.
5. Invited panel member (along with Drs. Hill, Zheng and Andrews), Groundwater models in prime time: using predictions to manage resources MODFLOW and MORE 2013 conference, Translating science into practice, Colorado School of Mines, June 2-5, 2013.
6. Clement, T.P. and J.S. Hayworth, What can the petroleum hydrocarbon remediation industry learn from Deepwater Horizon oil spil (and vice versa)? MODFLOW and MORE 2013 conference, Translating science into practice, Colorado School of Mines, June 2-5, 2013.
7. John, G., Clement, T.P., J.S. Hayworth, V.F., Mulabagal, F. Yin, Fate of Deepwater Horizon submerged oil and the associated tar balls in Alabama's beach environment, ASCE's 2013 World Environmental & Water Resources Congress, Cincinnati, Ohio, May 19-23, 2013.
8. Clement, T.P., J.S. Hayworth, V.F., Mulabagal, F. Yin, G. John, NAPL contamination of beach environment – Lessons learned from the Deepwater Horizon oil spill, IAHS International Groundwater Quality Conference (GQ13), University of Florida, April 21-26, 2013.
9. Mulabagal, V. F. Yin, G. John, J. Hayworth, and T.P. Clement, Chemical fingerprinting of hopane biomarkers in Deepwater Horizon oil spill samples collected along Alabama shoreline, Gulf of Mexico Oil Spill & Ecosystem Science Conference, Jan 21-23, 2013. New Orleans, LA.
10. Yin, F., G. John, V. Mulabagal, J. Hayworth, and T.P. Clement, Quantitation of USEPA priority PAHs in Deepwater Horizon oil spill samples using GC/MS/MS methods, Gulf of Mexico Oil Spill & Ecosystem Science Conference, Jan 21-23, 2013. New Orleans, LA.
11. John, G., F. Yin, V. Mulabagal, J. Hayworth, and T.P. Clement, Detection and quantitation of alkylated PAHs in Deepwater Horizon oil spill samples by GC/MS/MS methods, Gulf of Mexico Oil Spill & Ecosystem Science Conference, Jan 21-23, 2013. New Orleans, LA.
12. Clement, T.P., J. Hayworth, V. Mulabagal, F. Yin, and G. John, Impacts of Hurricane Isaac and Tropical Strom Lee on Mobilizing Deepwater Horizon Oil Spill Residues along Alabama's Beaches, Special Symposium on Deepwater Horizon/MC252 Well Incident Update: What Have We Learned? Society of Environmental Toxicology and Chemistry Annual Meeting (SETAC), Long Beach, California. Nov 11-15, 2012.
13. Chang, S.W. and T.P. Clement\*, Understanding Saltwater Intrusion Processes Using Laboratory-Scale Physical Models, National Groundwater Association NGWA Focus Conference on Gulf Coast Groundwater Issues, Baton Rouge, LA, October 16, 2012 to October 17, 2012.
14. Hayworth, J.S. and T.P. Clement\*, Impacts of Deep water Horizon Oil Spill on beaches – An Analysis of the Past, Present and Future Status of Alabama's Beaches, National Groundwater Association NGWA Focus Conference on Gulf Coast Groundwater Issues, Baton Rouge, LA, October 16, 2012 to October 17, 2012.
15. Clement\*, T.P., Complexities in hindcasting mathematical models-When should we say enough is enough? NGWA Ground Water Summit: Innovate and Integrate, Orange County, California, May 6-10, 2012, Korea, Korea Ministry of Environment, February 2-3, 2012.
16. BP oil spill and its impacts on Alabama's beaches, The second SEEDS workshop and research meeting, Seoul, Korea, Korea Ministry of Environment, February 2-3, 2012.
17. Clement, T.P., Understanding the worthiness of complex models for developing policy solutions to historic groundwater problems, Feb 8<sup>th</sup> 2012, Department of Civil Engineering, Indian Institute of Technology, Madras, India.
18. \*Clement, T.P., Impacts of Deepwater Horizon Oil Spill on Alabama Beaches – An Analysis of the Past, Current, and Future Status, Gulf oil spill symposium, Alabama Academy of Sciences annual meeting, Tuskegee University. Feb 24, 2012.
19. Clement, T.P., Dynamics of saltwater intrusion, Department of Civil Engineering, Kymbago

University, Uganda, Africa. October 12<sup>th</sup> 2011.

20. \*Clement, T.P. and S.W. Chang, Saltwater intrusion dynamics and climate change effects, Invited platform presentation, Natural disaster management session, American Geophysical Union Annual Meeting, San Francisco, December 7<sup>th</sup>, 2011.
21. Clement, T.P., Dynamics of saltwater intrusion, ASCE-EWRI's 3<sup>rd</sup> International Perspective on Current & Future state of water resources & the environment, January 5-7, 2010, Chennai, India.
22. \*Movement of saltwater in porous media systems, Dept of Civil Engineering, SRM University, Chennai India, Jan 13<sup>th</sup> 2010.
23. \*Clement, T.P., Modeling reactive transport in porous media systems contaminated with chlorinated solvent, Seoul National University, Korea, Feb 2<sup>nd</sup> 2010.
24. Clement, T.P., Limits of hindcasting models, Water Management conference, University Florida, Feb 25<sup>th</sup> 2010.
25. Clement, T.P., Summary of oil spill research efforts at Auburn University, NSF-sponsored oil spill research meeting in New Orleans, Nov 1-2<sup>nd</sup> 2010.
26. Clement, T.P., R. Goswami and M. Hogan, Experimental and numerical investigation of saltwater intrusion, ASCE-EWRI Annual Meeting, Rhode Island, May 17-19<sup>th</sup> 2010.
27. Donald, W.N., Zech, W.C., Clement, T.P. Development of a Large-Scale Erosion and Sediment Control Testing Facility, 10<sup>th</sup> Annual International Erosion Control Association (IECA) Environmental Connection Conference, Dallas, TX. February 16 – 20, 2010.
28. Wilson, W.T., Zech, W.C., Clement, T.P. and Shoemaker, A.L. Polymer-Enhanced Soft Armoring: An Erosion and Sediment Control Measure for Construction Fill Slopes, 10<sup>th</sup> Annual International Erosion Control Association (IECA) Environmental Connection Conference, Dallas, TX. February 16 – 20, 2010.
29. Clement, T.P., Are Groundwater Models Reliable Tools for Reconstructing Historical Contamination Scenarios? Platform presentation, Annual National Groundwater Association meeting, Tucson, Arizona, April 20<sup>th</sup> to 22<sup>nd</sup>, 2009.
30. Clement, T.P., Dynamics of Density-Coupled Flow Involving Stable and Unstable Interfaces, Annual Alabama Groundwater Conference, Platform presentation, June 10<sup>th</sup> 2009.
31. Chang, S.W. and T.P. Clement, Comparison of areal-recharge and regional-flux driven Henry Problems, AGU Fall 2009 Meeting. San Francisco, CA.
32. Goswami, RR and T.P. Clement, Benchmark problems for testing density coupled codes, International conference on saltwater intrusion management in Miami, Florida, from June 23<sup>rd</sup> to 26<sup>th</sup>. 2008.
33. Clement, T.P., R.Goswami, and S. Kanel, Two Dimensional Transport Characteristics of Iron Nanoparticles in Porous Media, MODFLOW 2008 international conference from May 19<sup>th</sup> to 22<sup>nd</sup> at Colorado School of Mines. 2008.
34. Hogan, M.B., R. R. Goswami, K. G. Villholth, T. H. Illangasekare, and T. P. Clement, Understanding the Flow and Mixing Dynamics of Saline Water Discharged into Coastal Freshwater Aquifers, Proceeding of the SWIM/SWICA joint meeting held in Sardinia, Italy, September 25<sup>th</sup>-29<sup>th</sup>, 2006.
35. Clement, T.P., R.R. Goswami, M. Hogan, Understanding the dynamics of freshwater and saltwater mixing processes in unconfined aquifers – laboratory scale model results, Proceedings of the international conference on MODFLOW and More 2006 Managing Ground Water Systems, Golden Colorado, May 2006, p. 16-17.
36. Johnson, C.D., M.J. Truex, and T.P. Clement, New features in RT3D for modeling MNA at chlorinated solvent sites, Proceedings of the international conference on MODFLOW and More 2006 Managing Ground Water Systems, Golden Colorado, May 2006, p. 185-189.
37. Hogan, M.B., R.R. Goswami, T.H. Illangasekare, and T.P. Clement, Understanding saltwater transport in tsunami-impacted coastal aquifers, accepted, Hydrological sciences for Managing Water Resources in the Asian Developing World meeting in Guangzhou, China, 8 – 10 June 2006.
38. Rolle, M., V. Zolla, R., Sethi, A. Di Molfetta, and T.P. Clement, Modeling TEAPs and computing redox zonation in contaminated aquifers, In press, Proceeding of the MODFLOW 2006 conference, May 22-24<sup>th</sup>, Golden, Colorado, 2006.
39. Dynamics of Fresh and Saltwater Mixing in Groundwater Systems – A brief summary of our research efforts, Invited feature presentation at the MODFLOW and More 2006 conference, May, 2006.

40. Goswami, R.R. and T.P. Clement, Methods for analyzing optimal spatial and temporal grids required for solving density-coupled groundwater models, National Ground Water Association Conference, San Antonio, April, 2006.
41. Goswami, R.R. and T.P. Clement, Methods for analyzing optimal spatial and temporal grids required for solving density-coupled groundwater models, National Ground Water Association Conference, San Antonio, April, 2006.
42. Cheng, T., M. O. Barnett, M. Romero, J. M. Phillippi, M. J. McIndoe, T. P. Clement and E. E. Roden (2006). Adsorption and transport of uranium(VI) and phosphate: An examination of the applicability of batch experiments to porous media transport. 231<sup>st</sup> American Chemical Society National Meeting, Atlanta, GA, March 26-30.
43. Hogan, M.B., R.R. Goswami, T.H. Illangasekare, and T.P. Clement, Understanding saltwater transport in tsunami-impacted coastal aquifers, Hydrological sciences for Managing Water Resources in the Asian Developing World meeting in Guangzhou, China, 8 – 10, June 2006.
44. Brakefield L., V. Srinivasan, C.R. Quezada, and T.P. Clement, Analytical models for predicting reactive transport at chlorinated solvent contaminated sites, accepted, Hydrological sciences for Managing Water Resources in the Asian Developing World meeting in Guangzhou, China, 8 – 10 June 2006.
45. Clement, T.P., R.R. Goswami, and M. Hogan, Laboratory investigation of submarine groundwater flow and recirculation patterns in coastal aquifers, H43F-0550, AGU Fall Meeting, San Francisco, California, December 5-9, 2005.
46. Goswami, R.R., M. Hogan, and T.P. Clement, Laboratory visualization and numerical investigation of saltwater intrusion processes in unconfined aquifers, Groundwater 2005, National Ground Water Association Conference, San Antonio, April 17-21, 2005.
47. Simpson, M.J. and T.P. Clement, Novel methods for benchmarking density-coupled groundwater flow codes, Platform presentation made at the 18<sup>th</sup> Saltwater Intrusion Meeting (SWIM), Technical University of Cartagena, Spain, May 31<sup>st</sup> to June 3<sup>rd</sup> 2004.
48. Barnett, M. O., J. Y. Choi, T. R. Gautam, M. J. McIndoe, J. M. Phillippi, T. P. Clement, C. R. Lange and E. E. Roden. "Subsurface reactive transport of U(VI)." Presented at the Biogeochemical Controls on the Mobility and Bioavailability of Metals in Soils and Groundwater International Conference, March 2-7, Monteverita, Switzerland, 2003.
49. Clement, T.P., Modeling and Design of Bioremediation Systems, Platform Presentation, Alabama's Water Environment Association, 26<sup>th</sup> Annual Conference, Orange Beach, Alabama, April 11<sup>th</sup> to 16<sup>th</sup>, 2003.
50. Clement, T.P. and T.R. Gautam, Moving from Batch to Field Using the RT3D Reactive Transport Modeling System, Poster Presented at the 2002 Fall Meeting of the American Geophysical Union, San Francisco, December 6-10, 2002, EOS Transactions AGU, 83(47), Fall Meeting Supplement, p. F238, 2002
51. Gautam, T.R, Kim, Y.C., Clement, T.P. and Lee, K-K, Use of Model Error as a Screening Tool for Selecting a Model Structures for a Lab-Scale NAPL Dissolution Experiment. Poster resented at the 2002 Fall Meeting of the American Geophysical Union, San Francisco, December 6-10 2002, EOS Transactions AGU, 83(47), Fall Meeting Supplement, p. F499, 2002.
52. Sun, Y., T.P. Clement, J.N. Petersen, R.S. Skeen, Effects of bioremediation on pump and treat design, poster presentation, Presented at the First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May, 1998.
53. Clement, T.P., RT3D- A computer tool for simulating reactive transport and natural attenuation processes in saturated porous media, Invited Speaker at the International Business Communications Environmental Monitoring Tools conference, Scottsdale, Arizona, December, 1997.
54. Hooker, B. S., M. J. Truex, T. P. Clement, and D. R. Newcomer, Preliminary Validation of Intrinsic Remediation of Carbon Tetrachloride at the Hanford Site., poster presentation, presented at the Intrinsic Remediation Conference, Salt Lake City, UT, April 1996.
55. Clement, T.P. and B.S. Hooker, Macroscopic models for predicting changes in the physical properties of porous media caused by biological growth, poster presentation, presented at the In-Situ and On-Site Bioreclamation, The Third International Symposium, San Diego, California, April, 1995.
56. Franzen, M.E., J.N. Petersen, T.P. Clement, R.S. Skeen, and B.S. Hooker, Determining nutrient addition strategies to minimize the time needed to complete In Situ bioremediation, Presented at

the In-Situ and On-Site Bioreclamation, The Third International Symposium, San Diego, California, April, 1995.

57. Clement T.P., B.S. Hooker, R.S. Skeen, Development of soil column (Cartesian) and Near-well (Radial) simulation design tools for in situ bioremediation, poster presentation, presented at the 1994 Annual meeting of American Institute of Chemical Engineers (AIChE), San Francisco, November, 13-18, 1994.
58. Clement, T. P., William R. Wise, Fred J. Molz, and Menghong Wen, Numerical Modeling of Seepage Faces: Saturated vs. Variably Saturated Formulations. Presented at the 1993 Spring Meeting of the American Geophysical Union, Baltimore, Maryland, May 24 28, 1993, EOS Transactions AGU, 74(16), Spring Meeting Supplement, p. 153, 1993.

## Articles Published in Conference Proceedings

1. Clement, T.P., R.R. Goswami, M. Hogan, Understanding the dynamics of freshwater and saltwater mixing processes in unconfined aquifers – laboratory scale model results, Proceedings of the international conference on MODFLOW and More 2006 Managing Ground Water Systems, Golden Colorado, May 2006, p. 16-17.
2. Johnson, C.D., M.J. Truex, and T.P. Clement, New features in RT3D for modeling MNA at chlorinated solvent sites, Proceedings of the international conference on MODFLOW and More 2006 Managing Ground Water Systems, Golden Colorado, May 2006, p. 185-189.
3. Rolle, M., V. Zolla, R. Seti, A. D. Molfetta, and T.P. Clement, Modeling TEAPs and computing redox zonation in contaminated aquifers, Proceedings of the international conference on MODFLOW and More 2006 Managing Ground Water Systems, Golden Colorado, May 2006, p. 215-219.
4. Rolle, M., V. Zolla, R., Sethi, A. Di Molfetta, and T.P. Clement, Modeling TEAPs and computing redox zonation in contaminated aquifers, In press, Proceeding of the MODFLOW 2006 conference, May 22-24<sup>th</sup>, Golden, Colorado, 2006.
5. Clement, T.P, K.K. Lee, and V. Srinivasan, Analytical Tools for Modeling Natural Attenuation Processes at Chlorinated Solvent Contaminated Sites, ASCE Environmental and Water Resources Conference, Alaska, May 2005.
6. Rolle, M, A. Di Molfetta, R. Sethi, T. P. Clement. Modeling of redox zonation down-gradient of landfill sites, ASCE Environmental and Water Resources Conference, Alaska, May 2005.
7. Méndez-Sánchez, N., T.P. Clement, and C.R. Lange, An assessment of microcosm tests used for evaluating chlorinated solvent bioremediation model parameters, Proceeding of the MODFLOW and more 2003: Understanding through modeling, Sept 17-19<sup>th</sup>, Golden, Colorado, vol-2, pages 814-818, 2003.
8. Quezada, C.R., C.M. Hansen, T.P. Clement, N.L. Jones, K.K. Lee, ART3D- An analytical model for predicting 3-dimensional reactive transport, Proceeding of the MODFLOW and more 2003: Understanding through modeling, Sept 17-19<sup>th</sup>, Golden, Colorado, vol-1, pages 275-279, 2003.
9. Lee, M., K.K. Lee, T.P. Clement, and D.P. Hamilton, Nitrogen transformation and transport model in saturated soils: Model formulation and field application, Accepted, Proceeding of the MODFLOW and more 2003: Understanding through modeling, Sept 17-19<sup>th</sup> 2003, Golden, Colorado.
10. Geistlinger, H., D. Eisermann, M. Schirmer, U. Mayer, and T.P. Clement Development of New Modeling Tools for Simulating and Designing Reactive Gas Walls, Proceedings of the Probabilistic Approaches & Groundwater Modeling Symposium, S. Mishra, Editor, ASCE World Water and Environmental Resources Congress held in Philadelphia, Pennsylvania, June 24-26, pp. 192-203, 2003.
11. Gautam, T.R. and Clement. T.P. Modeling of multiple limited reactive transport processes in saturated porous media . Fourteenth International Conference on Computational Methods in Water Resources (CMWR 2002), Delft University of Technology, The Netherlands, 23-28 June 2002, Vol 1: 735-742, 2002.
12. Gautam T.R., Y.C. Kim, T. P. Clement, and K.K. Lee, Modeling biodegradation coupled with NAPL dissolution processes using the RT3D code, will be presented at the Third International Conference on Water Resources and Environment Research (ICWRER), 22<sup>nd</sup> – 25<sup>th</sup> of July 2002 in Dresden, Germany.
13. Hiller, B.T., Dogramaci, S., Clement, T.P. and Wills, R. Solutes, stable isotopes and radiocarbon isotopes as tracers of groundwater flow, Carnarvon Basin, Western Australia. Processing of the

- International Groundwater Conference on Balancing the Groundwater Budget, Darwin, Northern Territory, Australia, May 12-17, 2002.
14. Wilkes, S.M., Clement, T.P., and C.J. Otto, The hydrogeology of a bauxite refinery in the upper Augustus river catchment, Western Australia, Processing of the International Groundwater Conference on Balancing the Groundwater Budget, Darwin, Northern Territory, Australia, May 12-17, 2002.
  15. Truex, M.J., C.D. Johnson, J.R. Spencer, and T.P. Clement, Evaluating Natural Attenuation Of Chlorinated Solvents At A Complex Site, Proceedings of the Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 20-23, 2002.
  16. Spencer, J.R., C.D. Johnson, and T.P. Clement, Modeling biological transformation of chlorinated ethanes and ethenes in support of natural attenuation, Proceedings of the Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 20-23, 2002.
  17. M.J. Simpson and T. P. Clement, 2001, Implication of Dupuit-Forchheimer approximations on solute transport, Proceedings of the 2<sup>nd</sup> Australia-New Zealand Conference on Environmental Geotechnics, GeoEnvironment 2001, Newcastle, 28-30 November, editors Smith, D., S. Fityus, and M. Allman, p. 215-220.
  18. M.J. Simpson and T. P. Clement, 2001, Density dependent groundwater flow thane g: An evaluation of common benchmark problems, Modeling in Hydrogeology, editors L. Elango and R. Jayakumar, UNESCO Workshop, Anna University, India, December 3<sup>rd</sup> – 7<sup>th</sup>, 2001, Allied Publishers, p.157-168.
  19. Clement, T. P., and T. R. Gautam, 2001, Modeling and design of bioremediation systems, Proceedings of the 2<sup>nd</sup> Australia-New Zealand Conference on Environmental Geotechnics, GeoEnvironment 2001, Newcastle, 28-30 November, editors Smith, D., S. Fityus, and M. Allman, p. 255-265 (Invited Paper).
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30. Clement, T.P., B.S. Hooker, and R.S. Skeen, Modeling biologically reactive transport in porous media, Proceedings of the international conference on mathematics and computations, reactor physics, and environmental analyses, Portland, Oregon, April-May 1995, Vol. 1., p. 192-201, 1995., USA, 23/09/10.

## Research Grants

Research Project Title/ Project Responsibility	Period	Agency	Funds
40) Sampling, Identification and Characterization of DWH Tar Balls Lingering along Alabama's Beaches. Role: PI	2015-2017	AEMA	139K
39) Understanding groundwater contamination from disposal of insufficiently treated municipal wastewater and excessive use of fertilizers. Role: supervisor of PhD research	2015-2018	Govt. of Jordan	45k & tuition
38) Location, characterization and persistence of MC 252 oil in Alabama's nearshore beach systems. Role: co-PI with Dr. Hayworth.	2014-2016	AEMA	459k
37) Administrative & Technical Support in Evaluating Public Input on Potential Enhancements to the State Solid Waste Program, Alabama Department of Environmental Management (ADEM). Role: Co-PI with Drs. Hayworth Andersen and Lebleu.	2012-2014	ADEM	497K
36) Understanding the behavioral and biochemical effects of gulf crude oil and COREXIT, AU VPR grant. Role: co-PI with Dr. Dhanasekaran	2011-2013	AU	44k
35) Geophysical detection and quantification of crude oil in beach systems, BP funding via Applied Research Associates Inc. (ARA). Co-PI with Dr Hayworth (PI).	2011-2012	ARA	84k
34) Laboratory scale investigation of a method for enhancing the effectiveness of oil dispersants in destabilizing water in oil emulsions, The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), U. S. Department of Interior, \$188,756.70. Role: co-PI with Dr Hayworth.	2011-2012	BOEMRE	188k
33) Development of biopores in the subsurface by burrowing organisms and their impacts on infiltration, runoff, and contaminant transport characteristics. Role: co-PI with Drs Twarakavi and Held.	2010-2014	NSF	220k
32) Presence and relative risk of remnant oil in Orange Beach system, and assessment of Orange Beach dispersant dataset. Gulf Coast Restoration funds via the City of Orange Beach, Alabama. Role: co-PI with Dr. Hayworth.	2011-2013	City of Orange Beach	238k
31) Prospects for oil distribution and marsh recovery in Alabama coastal marshes. Auburn University (AU) internal grant. Role: co-PI with Dr. Anderson.	2011-2012	AU	43k
30) Analysis of hydrocarbon in marine sediment samples GoMRI funds via the Marine Environmental Science Consortium (MESC). Role: PI	2011-2012	GoMRI / MESC	23k
29) Characterizing the recovery of beach environments and wetlands. Role. PI of this subtask.	2011-2012	GoMRI/ MESC	38k
28) Physical modeling of physical and chemical evolution of oil-contaminated sediments. Role: co-PI with Dr. Hayworth.	2011-2012	BP/ MESC	67k
27) Comparison of spatial and temporal distribution and evolution of remnant oil in cleaned and un-cleaned beach systems.	2011-2012	GoMRI / MESC	15k
26) Development of a Pyrolysis GC/MS Facility for Characterizing Oil-Contaminated Water, Sediment and	2010-2011	NSF	208k (NSF



Seafood Samples. NSF with 20% AU cost share for the instrument. Role: PI with Dr. Lange, Zhao, and Son.			148k, AU60)
25) Development of a test facility to evaluate the optimal design of BMPs for managing environmental problems at construction sites. Alabama Dept. of Transportation (ALDOT). Role: co-PI with Dr Zech.	2006-2012	ALDOT	496k
24) Assessing Performance Characteristics of Sediment Basins Constructed in Franklin County, Alabama Department of Transportation, Role: co-PI with Drs Fang and Zech.	2010-2012	ALDOT	155k
23) Assessment of Groundwater Resources of Dauphin Island and its Impact Future Urban Sprawl and Economic Growth, AU Centre for Forest Sustainability. Role: PI with Dr Kalin.	2009-2011	CFS	33k
22) Phase – II Korea project. Quantifying reaction kinetics of contaminants for remediation design. Role: Principal investigator; Source of Support: Korean Research Council (KRC) via Seoul National University. Role: PI (single investigator).	2008-2013	KRC Korea	49k
21) Development of a proto-type model for sediment pond based on field investigation \$9,000. Highway Research Center grant. Role: PI with co-Pis Drs Fang and Zech.	2009-2010	HRC	9K
20) DNAPL Dissolution in Bedrock Fractures and Fracture Networks. Funding agency: DOD SERDP/ESTCP Environmental Restoration Program (subcontracted from Shaw Environmental & Infrastructure): \$65,000. Role: PI (single investigator).	2009-2010	USDOD	65k
19) Evaluating the efficiency of erosion control blankets, Highway Research Center (HRC). Role co –PI with Dr Zech.	2008-2009	HRC	40k
18) Impacts of human activities and climate change on water resources and ecosystem health of Wolf Bay basin: Groundwater management Issues. Role PI of the groundwater subtask. AU Water Research Initiative Grant.	2008-2010	WRI	70k
17) Development of modeling methods and tools for predicting reactive transport processes in porous media under multiple scales, USDOE Environmental Management Science Program (EMSP) grant. Role: PI with Drs Barnett , Zheng and Jones.	2006-2009	USDOE	950K
16) Investigating the role of surface-ground water interactions on surface water quality by characterizing the hyporheic zone processes, April 2006 to March 2007. USGS Water Resources Program. Role: co-PI with Dr. Alhan.	2006-2007	USGS	25k
15) Development of RT3D reaction packages and tools for assessing monitored natural attenuation, USDOE' MNA/EPR project. Role: PI (single investigator).	2004-2006	USDOE	24k
14) Development of an analytical framework for modeling the natural attenuation patterns of chlorinated solvents. USDOE' MNA/EPR project. Role: PI (single investigator).	2004-2006	USDOE	46k
13) Spatial dynamics of runoff-contributing areas for effective management of phosphorous from land-applied poultry litter, State USGS Water Resources Program. Role: co-PI with Dr. Srivastava.	2005-2006	USGS	25k
12) Phase -1 Korea project: Development and application of reactive transport modeling tools – design bioremediation systems. Role: Principal investigator; Source of Support: Korean Research Council (KRC) Frontier 2000 program funding via Seoul National Univ. Role: PI (single investigator).	2003-2007	KRC Korea	214k
11) Characterization of the biodegradation rates of chlorinated compounds under natural and anthropogenic	2003-2004	USGS	25k

electron donor conditions. USGS water resources program. Role: PI with Dr Lange.			
10) Development of a design framework for modeling enhanced and natural bioremediation processes at groundwater contaminated sites (Jan 2001- Jan 2004). Role: Principal investigator; Source of Support: Australian Research Council (identical to NSF in the US). Role: PI (single investigator).	2001-2004	ARC	283k AUS \$
9) Application of the RT3D code (version 2.0) to design an active bioremediation system for cleaning a TCE plume at the US Department of Energy's Tan site in Idaho. Source of Funded by USDOE's Idaho National Engineering Lab and Battelle Pacific Northwest National Lab. Role: PI (single investigator).	2000-2001	USDOE	110k AUS \$
8) Application of RT3D to model natural attenuation processes at the Brooklawn Superfund site, Baton Rouge, Louisiana. Funded by USDOE's Battelle Pacific Northwest National Lab. Role: PI (single investigator).	2000-2002	USDOE	57k AUS \$
7) Experimental and numerical investigation of unconfined groundwater flow near a saltwater interface. Small ARC grant. Role: PI (single investigator).	2001-2002	ARC	13 k AUS \$
6) Laboratory analysis of unconfined groundwater flow with seepage-face boundaries. Source of Support: Small ARC grant. Role: PI (single investigator).	2000-2001	ARC	13 k AUS \$
5) Assessment of natural attenuation and DNAPL migration processes, and testing of microbial degradation pathways at the Brooklawn Superfund site. Project manager (until December, 1999). Source of Support: NPC Services Inc. Role: PI with Mr. Truex.	1998-2001	NPC	450k
4) Development of a RT3D reaction package to model couple Chlorinated ethane/thane at a Superfund Site. Source of Support: NPC Services Inc. Role: PI (single investigator).	1998-1999	NPC	60k
3) Development of the natural attenuation decision support system BIOCHLOR. Funded by Air Force Center for Environmental Excellence (AFCEE), San Antonio, Texas. Role: PI (single investigator).	1997-1998	AFCEE	16k
2) Technical Support for the Remediation Technology Development Forum on In Situ Bioremediation. Served as the project manager and principal investigator for RT3D software development and field application sub tasks. Funded by DOE's EM50 subsurface contamination focus area. Role: co-PI with Drs. Hooker and Skeen	1996-1999	USDOE	859k
1) Development of Risk Modules for the RT3D Bioremediation Code. Funded by Pacific Northwest National Laboratory LDRD grant. Role: PI (single investigator).	1996-1997	USDOE	30k

## Post Doctoral Fellows

1. Dr. Vanisree Mulabagal (2011- to date). Received her PhD degree in Organic Chemistry from India. Post-doctoral Research Project: Developing oil spill waste characterization techniques using GC/MS/MS system.
2. Dr. Elena Abarca, 2006-2008, she was a Fulbright Fellow from Spain. Received PhD from the University of Catalonia, Spain under Professor Jesus Carrera. Post-doctoral Research Project: Understanding saltwater intrusion dynamics using laboratory-scale physical experiments. Appointment: Research Fellow, MIT.
3. Dr. Sushil Kanel, 2005-2008, He received his PhD from Korea Institute of Science and Technology, Post-doctoral Research Project: Interaction of uranium with iron coated sediments, Funded by USDOE. Appointment: Research associate, Georgia Tech Univ.

4. Dr. Tirtha Gautam, 2001-2003. PhD from Asian Institute of Technology. Post-doctoral Research Project: Development of reactive transport models, project funded by Australian Research Council (ARC). Appointment: Hydrologist, Dept. of Natural Resour. And Mines, Queensland, Australia.
5. Dr. Yunwei Sun, 1996-1998. He received his PhD from Technion Institute of Technology, Israel under Professor Jacob Bear. Post-doctoral Research Project: Numerical and analytical solution to reactive transport equations involving chlorinated solvents. Funded by USDOE. Appointment: Research Engineer, Lawrence Livermore National Laboratory, California.

## PhD Supervision

### Current

1. Farhad Jazaei, 2012- present, Role: Major Professor. Past institution: MS Civil Engineering, Sharif University, Iran. PhD dissertation topic: Investigation of density dependent flow processes in porous media systems.
2. Vivek Bedekar, 2012-present, Role: Major Professor. Past institution: MS Civil Engineering, Indian Institute of Technology, Madras. PhD dissertation topic: Modeling reactive transport in porous media systems.
3. Yuling Han, 2014-present, Role: Major Professor. Past Institution: MS. Zhejiang University, China. Research topic: monitoring oil spill residues

### PhD Graduates

4. Gerald John 2012-present. Role: Major Professor. Past institution: BS Chemical Engineering, AC Tech. Madras, India. MS-Auburn University. PhD dissertation topic : Understanding the evolution of nearshore Deepwater Horizon oil spill residues and characterizing them using GC/MS/MS methods.
5. Fang Yin, 2012 to 2015, Major Professor. Past institution: BS/MS Environmental Sciences, Shanghai Ocean University, China. PhD dissertation topic: Chemical characterization and fingerprinting of Deepwater Horizon oil spill residues.
6. Dr. Jagdish Toralapati: 2007-2012. Role: Major Professor. Past institution: BS Civil Engineering, Indian Institute of Technology, Madras, India. PhD dissertation topic: Development and application of reactive transport models. Appointment: Research assistant, New Jersey Institute of Technology, New Jersey, USA.
7. Dr. Sun-Woo Chang, 2008-2012; Role: Major Professor. Past institution: BS/MS Civil and Environmental Engineering, Seoul National University, Korea. I have co-authored 3 journal articles with her. PhD dissertation topic: Dynamics of Saltwater Intrusion Processes in Saturated Porous Media Systems. Appointment: Research assistant, KIGAM, Korea.
8. Dr. Gautham Jeppu, 2004-2011. Role: Major Professor. Past institution: BE-Chemical Engineering, National Institute of Technology Karnataka, Surathkal, India. I have co-authored 3 journal articles with him. PhD Dissertation: Understanding the transport of arsenic in iron coated sand systems. Appointment: Research engineer, CSIRO, Perth, Australia.
9. Dr. Rohit Goswami, 2002-2008, Role: Major Professor, Auburn University. Past institution: BE Civil, Panjab Engineering College. Co-authored 4 journal articles with him. Dissertation topic: Experimental and numerical analysis of variable-density flow and transport scenarios. Appointment: Consulting Engineer, Geosyntech, Florida.
10. Dr. Sumit Sen, 2004-2009, Role: co-major professor with Dr. Srivastava, at Biosystems Engineering. Published a journal article with him. Dissertation topic: Runoff generation in pastures of the Appalachian Plateau region of North Alabama, Appointment: Research Associate.
11. Dr. Tanja Radu, 2002-2007, Role: co-major professor with Dr. Barnett, Auburn University. Published a journal article with her. Dissertation title: Factors affecting arsenic transport in experimental subsurface systems. Appointment: Research Assistant, Belfast University.
12. Dr. Massimo Rolle, 2004-2006. Role: Foreign advisor of an exchange student from Turin Polytechnic University, Italy. Massimo studied at Auburn University for year as a visiting PhD fellow. He took my classes at Auburn and completed substantial portion of his RT3D-based reactive transport modeling work under my supervision. Published a journal article with him. Dissertation topic: Modeling redox controlled reactive transport processes in groundwater aquifers. Appointment: Research fellow, Stanford University.
13. Dr. Matthew Simpson, 2000-2004, Major Professor. University of Western Australia. Past

institution: BS. Civil & Environmental, University of Newcastle. PhD Dissertation topic: Analysis of unconfined ground water flow characteristics near a seepage-face boundary. His dissertation received distinction award. Co-authored 5 journal articles with him. Appointment: Senior Lecturer, Department of Applied Mathematics, Queensland University of Technology, Brisbane, Australia.

14. Dr. Guoping Lu, 1997-2000. Role: External thesis advisor. Funded and co-supervised his work with Dr. Chunmiao Zheng (his major professor) at the University of Alabama. His RT3D-model development efforts were, in part, supported by one of my research grants from the Pacific Northwest National Laboratory. Published a journal article on RT3D application to a Hill AFB plume. Dissertation topic: Geological and biological processes in groundwater systems: field observations and modeling studies. Appointment: Research Scientist, Berkeley National Laboratory.

## Masters Graduates

1. Mr. Jacob Kearley, MS 2013, co-major professor (with Dr. Hayworth). Previous Degree: BS Civil Engineering, University of Alabama, Birmingham. Thesis title: An analysis of the municipal solid waste permitting and recycling programs of the State of Alabama.
2. Ms. Mengyuan Zheng, MS 2013, Co-major professor (with Dr. Dhanasekaran at Pharmacy), Previous Degree: BS Chemical and Environmental Engineering, Shanghai Ocean University, China. Thesis topic: Evaluate of toxicity levels and cytotoxicity mechanisms of oil spill dispersant Corexit 9500.
3. Mr. Fang Yin, MCE 2013, Major Professor, Previous Degree: BS Environmental Shanghai Ocean University, China. Project topic: Analysis of hopanes and steranes in oil spill samples collected from Alabama beaches.
4. Mr. Andrew Cardilla, MCE, 2012. Co-major Professor, Previous Degree: BS Architecture, Indiana, Project topic: Selective waste reduction in small communities.
5. Ms. Katherine Petty, MS 2011. Major Professor. Previous degree: BS Environmental Sciences, University of Virginia. Thesis topic: The Effects of Land Cover, Climate, and Urbanization on Groundwater Resources in Dauphin Island. Currently with USGS Miami.
6. Mr. Robert Cardwell, MCE, 2011. Major Professor, Auburn University. Previous degree: BS Civil, Auburn University. Project topic: Design of a small-scale model to evaluate the performance of sediment basins at construction site. Currently water treatment engineer, Arkansas.
7. Vivek Patil, MCE, 2010. Major Professor. Previous degree: Major Professor, BS Chemical Engineering, VKIT, Pune University, India. Project topic: Investigation of contaminant transport in dual domain systems. Currently PhD student Utah State University.
8. Mr. Shayamsunder Ayalur, MS, 2009, Major Professor. Auburn University. Previous degree: BE Chemical Engineering, Sri Venkateswara College of Engineering, Chennai. Thesis topic: Use of hydroxyapatite derived from catfish bones for remediating uranium contaminated groundwater. Currently PhD student Auburn University.
9. Mr. Jagdish Torlapati, MCE, 2009, Major Professor, Auburn University. Previous degree: BE Civil, Indian Institute of Technology, Madras. Project topic: Uncertainties in conceptual models used for simulating chlorinated solvent bioremediation systems.
10. Mr. Gautham Jeppu, MCE 2009. Major Professor. Auburn University. Previous degree: BE Chemical Engineering, NIT- Surathkal, India, Engineering project topic: Characterization of arsenic fate and transport in iron-oxide systems.
11. Mr. Gopal Saha, MS, 2009. Major Professor. Auburn University. Previous degree: Water Resources Engineering, Stuttgart University, Germany. Thesis topic: Experimental and numerical investigation of unconfined hill slope flows. Currently PhD student in Canada.
12. Mr. Anand Gupta, MS, 2009. Co-major Professor with Dr. Srivastava. Thesis topic: An ecologically-sustainable surface water withdrawal framework for managing cropland irrigation in Alabama.
13. Ms. Linzy Brakefield, MS, 2008. Major Professor. Auburn University. Previous degree: BS Mathematics, Maryville College, Tennessee. Thesis topic: Physical and numerical modeling of buoyant groundwater plumes. She received Len Assante Scholarship Award in recognition of best presentation at a NGWA conference and also the Outstanding Student Paper Award for her presentation at the American Geophysical Union (AGU) 2007 Fall Meeting. Currently with USGS-Miami.
14. Mr. Jared McLaughlin, MS, 2008. Co-supervised with Dr Norm Jones. Brigham Young University. Previous degree: BS Civil, BYU. Jared spent two semesters as an exchange student and

- studied at Auburn University and studied under my supervision. MS Thesis topic: Use of parallel computing techniques for solving reactive transport problems. Currently working as a civil engineer in a private company in Utah.
15. Mr. Venkat Srinivasan, MS, 2007. Major Professor. Auburn University. Previous degree: BS Civil Engineering, IIT-Madras, Chennai. Thesis topic: Analytical solution for sequentially coupled multi-species reactive transport problems. This thesis received a national award for best MS thesis. Association of Environmental Engineering and Science Professors sponsored Montgomery-Watson-Harza Cash Prize Award. Currently a PhD student at University of Illinois.
  16. Mr. Justin McDonald, MS, 2007. Co-major Professor with Dr. Zech. Auburn University. Previous degree: BE Civil, Auburn University. Thesis topic: Evaluation of silt fence and polymer additive to control sediment transport from construction sites. Currently with Army Corp of Engineers, Mobile.
  17. Mr. Rohit Goswami, MCE 2007. Major Professor. Auburn University. Previous degree: BE Civil, Panjab Engineering College. Engineering project topic: Solution to density coupled flows.
  18. Mr. Matthew Hogan, MS. 2006. Major Professor. Auburn University. Previous degree: BE Civil, Virginia Tech. Thesis topic: Understanding the flow and mixing dynamics of saline water discharged into coastal freshwater aquifers.
  19. Mr. Che-An Kuo, MCE, 2006. Major Professor, Auburn University. Engineering project topic: Visualization of contaminant transport in porous media systems.
  20. Mr. Anjani Kumar, MS 2006. Major Professor. Auburn University. Previous degree: BE Civil IIT-Roorkee. Thesis topic: Coupling transport codes with reactive transport models. Currently with a computer company in Madison, Wisconsin.
  21. Mr. Vijay Loganathan, MS. 2006. Co-major professor with Yucheng Feng. Auburn University. Previous degree: BE Civil. Anna University – Guindy Campus, Chennai. Thesis topic: Influence of sorption and desorption on bioavailability of atrazine in soils with crop residues. Currently at a research associate the Oakridge National Lab.
  22. Mr. Jarid Halverson, MS. 2005. Co-major professor with Dr Zech. Auburn University. Previous degree: BE Civil. The United States Military Academy at West Point. Thesis topic: Evaluation of silt fence performance using laboratory scale model of highway slopes. Co-authored two journal publications. Currently with a private consulting company in Michigan.
  23. Mr. John Phillipi, MS, 2004. Co-major professor with Dr Barnett. Auburn University. Previous degree: BE Civil, Auburn University. Thesis topic: Use of surface complexation models to study the effects of solid-to-solution ratios. Private consulting company in Alabama.
  24. Mr. Cristhian Quezada, MS. 2004. Major Professor. Auburn University. Previous degree: BE Civil, University of Chile, Santiago. Thesis topic: Generalized solute to multi-species transport equations coupled with a first-order reaction network with distinct retardation factors. He received the CH2MHILL-sponsored best graduate student award. Currently a research associate at Virginia Tech.
  25. Mr. Shane Wilkes, MS. 2004. Co-supervised with Dr. Reynolds. University of Western Australia. Thesis topic: An investigation of the hydro-geological significance of fractures on the hydrogeology of the Augustus River catchment, Western Australia.
  26. Ms. Mee Sun Lee, MS, 2003. Co-supervised with Dr K.K. Lee, Seoul National University. Mee-Sun studied at the Univ. of Western Australia, under my supervision, as a visiting graduate student for two semesters. Thesis topic: Understanding nitrogen transformation and transport in saturated soils: Model development and field application.
  27. Marley Franzen, MS. 1996. Co-supervised with Dr Petersen. Washington State University. Thesis topic: Modeling nutrient pulsing strategies using an injection well.
  28. Mr. David Jennings, MS. 1995. Co-supervised with Dr Petersen. Washington State University. Thesis topic: Understanding microbial growth and transport in porous media under denitrification conditions.

## Undergraduate Student Thesis Supervision

1. Mr. Thomas Gallop, first-class honors thesis (Nov 2000 – Oct 2001). Thesis title: Laboratory investigation of seepage-face boundaries. Tom secured 1<sup>st</sup> rank in the 2001 graduating class, and is currently employed as an environmental consultant.
2. Ms. Katina Thomas, first class honors thesis (Nov 2000 – Oct 2001). Thesis title "Bioremediation of acid mine drainage under sulfate reducing conditions. Katina secured 3<sup>rd</sup> rank in the 2001 graduating class, and she is currently employed as a Project Planning Engineering with the

Water Corporation in Perth, Australia.

3. Mr. Bradley Hiller, first-class honors thesis (Nov 2000 – Oct 2001). Thesis title: Dissolved solute, stable isotopes and radiocarbon isotopes as tracers of groundwater flow, Carnarvon Basin, Western Australia. Brad received best honours thesis award for 2001 and is now working as Environmental Engineering at the Water Corporation in Perth, Australia.
4. Ms. Ruth Bax, first class honors thesis (Nov 2000 – Oct 2001). Thesis title "Protocol for implementing artificial aquifer recharge for drinking water supply with a case study on the Albany region". She is currently pursuing her PhD degree at the Centre for Water Research, University of Western Australia.
5. Ms. Natalee Steeres, 2<sup>nd</sup> class honors thesis (Nov 2000 – Oct 2001). Thesis title: Laboratory and numerical investigation of contaminant transport in a model aquifer.
6. Ms. Sabika Abid, Honors project (Jan 2000 – Oct 2000). Thesis title "Modeling couple PCE-TCA reactive transport at a hazardous waste.

## Graduate Student Committees

Student Name	Degree	Year of Graduation
Carman Chosie	MS	2013
Kyle Moynihan	MS	2013
Wes Donald	PhD	Current
Liping Jiang	PhD	Current
KC Manoj	PhD	Current
Niranjan Dhakal	PhD	2012
Gabriel Leite	MS	2012
Thomas Hatcher	MS	2012
Bernado Trindade	MS	2012
Man (Rebecca) Zhang	PhD	2012
Yu Mao	MS	2012
Nathan Melson	MS	2011
Arthur Daniel	MS	2011
Dr. Vijay Loganathan	PhD	2011
Dr. Byungryl An	PhD	2011
Gerald John	MS	2011
Wes Donald	MS	2010
Anand Gupta	MS	2010
Wes Wilson	MS	2010
Niranjan Dhakal	MS	2010
Alex Shoemaker	MS	2009
Owen Kent Hartzog	MS	2009
Zhong (John) Xiong	PhD	2008
Chunwei Luo	MS	2008
Dr. Feng He	PhD	2007
Doug Kilgour	MS	2007
Yu Wang	MS	2006
Byungryl An	MS	2006
Dr. Lucida Xu	PhD	2006
Thomas Steinwinder	MS	2006
Katie Green	MS	2006
Christhian Broadbeck	MS	2005
Chris Johnson	MCE	2005
John Phillippi	MS	2004
Maria Romero	MS	2002
Melissa McIndoe	MS	2002
Clarrisa Hansen	MS	2001

Dr. Guoping Lu	PhD	2002
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## Teaching Philosophy

At Auburn and also at the University of Western Australia, I have enjoyed teaching an undergraduate applied math/computer programming class that focusses on using computational methods for solving applied engineering problems. In addition to this class, I am also interested in teaching groundwater hydraulics, unsaturated flow, contaminant transport, hydrology, water quality modeling, and advanced numerical modeling. I use my classroom to test new ideas and different innovative teaching methods. My recent teaching adventure is: "*reverse instruction*." The basic idea is simple--just reverse the order of teaching. In conventional teaching, we professors deliver long, mostly boring (not to us, but to students!) lectures to teach new concepts, and then our students go home to work on homework problems to apply these concepts. When they come back, we move on to the next concept. In this model, we have little time to have a meaningful intellectual conversation to reflect on any specific concept. This conventional model is similar to teaching someone a new language every day and not having the opportunity to have a conversation with them in the language that we just taught them! About a year back, I had an opportunity to listen to a lecture by Salman Khan, a former M.I.T-trained electrical engineer, who founded the nonprofit organization Khan Academy that provides free video tutorials for high school students. Khan proposed the idea of intentionally turning around the relationship between classroom instruction and homework upside down by using web-based video lectures. While Khan's original interest was high school teaching, university professors have started to recognize the power of web-based teaching. For example, a recent NY Times article<sup>1</sup> discusses a web-based class (developed by Stanford professors inspired by Khan's work), which has been taken by well over 50,000 students, worldwide. <sup>1</sup>[http://www.nytimes.com/2011/08/16/science/16stanford.html?\\_r=1](http://www.nytimes.com/2011/08/16/science/16stanford.html?_r=1)

I have tried to implement my own version of Khan's idea by using short web-based lecture videos to introduce concepts as a part of homework, and have used the classroom for discussions, problem solving, and concept quizzes. So far I have tried this idea in three different classes (an undergraduate class and two graduate classes) using this model. I have just started this effort, and my long-term goal is to develop these ideas into formal teaching methods. The following course websites have some of my video lectures and other details:

[http://www.eng.auburn.edu/~clemept/CEANALYSIS\\_FALL2011/ceanalysis2011fall.html](http://www.eng.auburn.edu/~clemept/CEANALYSIS_FALL2011/ceanalysis2011fall.html)

[http://www.eng.auburn.edu/~clemept/Numerical\\_methods/NumericalMethodsHomePage.html](http://www.eng.auburn.edu/~clemept/Numerical_methods/NumericalMethodsHomePage.html)