Riyadh Ibrahim Al-Raoush, PhD, PE
Associate Professor
Department of Civil and Architectural Engineering
Qatar University
Doha, Qatar
Email: riyadh@qu.edu.qa
Phone: (+974) 4403 4188

Nationality: U.S. Citizen

RESEARCH INTERESTS

- Fate and transport of contaminates in subsurface systems
- Environmental fluid dynamics
- Multiphase flow through porous media
- Nondestructive imaging and visualization of pore-scale processes
- Multiscale modeling of environmental processes

EDUCATION

Ph.D Civil Engineering, December 2002
Specialization: Environmental and Water Resources Engineering
Louisiana State University, Baton Rouge, Louisiana
Dissertation: "Extraction of physically-realistic network properties from high-resolution three-dimensional images of porous media systems using synchrotron X-ray microtomography"

M.S. Civil Engineering, June 1997
Specialization: Environmental and Water Resources Engineering
Jordan University of Science and Technology, Irbid, Jordan
Thesis: "Gaseous transport of contaminants in porous media: perturbation solution of the dusty gas model equations for ternary systems"

B.S. Civil Engineering, June 1994
Specialization: Environmental and Water Resources Engineering
Jordan University of Science and Technology, Irbid, Jordan

PROFESSIONAL REGISTRATION

Professional Civil Engineer (PE) in the state of Louisiana, USA (License # PE.0033258).

PROFESSIONAL EXPERIENCE

9/2013 – present: **Associate Professor**
Department of Civil and Architectural Engineering, Qatar University, Doha, Qatar

8/2009 - 8/2013: **Associate Professor (with tenure)**
Department of Civil and Environmental Engineering, Southern University and A&M College, Baton Rouge, Louisiana, USA

8/2003 - 8/2009: **Assistant Professor**
Department of Civil and Environmental Engineering, Southern University and A&M College, Baton Rouge, Louisiana, USA

8/2002 - 7/2003: **Post-doctoral Researcher and Instructor**
Department of Civil and Environmental Engineering, Louisiana State University, Baton Rouge, Louisiana; Research Advisor: Dr. Clinton Willson

8/1998 - 7/2002: **Graduate Research Assistant**
Department of Civil and Environmental Engineering, Louisiana State University, Baton Rouge, Louisiana; Advisor: Dr. Clinton Willson

9/1994 - 6/1997: **Graduate Teaching Assistant**
Jordan University of Science and Technology, Irbid, Jordan

VISITING APPOINTMENTS AND COLLABORATIONS

5/2011 - 8/2011: **Visiting Faculty Researcher**
Division of Earth and Environmental Sciences, Los Alamos National Laboratory (LANL), Los Alamos, New Mexico, USA
Host/Collaborator: Dr. Qinjun Kang and Dr. Mark Porter

5/2010 - 8/2010: **Visiting Faculty Researcher**
Advanced Photon Source (APS), Argonne National Laboratory (ANL), Argonne, Illinois, USA
Host/Collaborator: Dr. Mark Rivers

5/2009 - 8/2009: **Visiting Faculty Researcher**
Division of Energy and Environment, Pacific Northwest National Laboratory (PNNL), Richland, Washington, USA
Host/Collaborator: Dr. Andy Ward

5/2008 - 8/2008: **Visiting Faculty Researcher**
Advanced Photon Source (APS), Argonne National Laboratory (ANL), Argonne, Illinois, USA
Host/Collaborator: Dr. Mark Rivers and Dr. Peter Eng

COURSES DEVELOPED AND TAUGHT (AT QATAR UNIVERSITY, DOHA, QATAR)

- Environmental Modeling and Simulation (EEMP507, graduate course)
- Selected Topics in Environmental Engineering (EEMP538, graduate course)
- Design Project (EEMP510, graduate course)
- Hazardous Waste and Contaminated Site Management (EEMP522, graduate course)
- Special Topics in Environmental Engineering (CVEN453)
- Selected Topics in Water Resources (CVEN442)
- Fluid Mechanics (CVEN 212)
- Analysis and Design of Hydraulic Systems (CVEN 340)
- Introduction to Environmental Engineering (CVEN 435)
- Numerical Analysis (GENG 300)
- Civil Engineering Design Project I & II (CVEN401 & CVEN402)

COURSES DEVELOPED AND TAUGHT (AT SOUTHERN UNIVERSITY, USA)

- Topics in Environmental Engineering (CIEN 588, graduate course)
- Biological Wastewater Treatment (CIEN 512, graduate course)
- Probability and Statistics (CIEN 500, graduate course)
- Design of Hydraulic Structures (CIEN 476)
- Water Supply and Pollution Control (CIEN 461)
- Water Resources Engineering (CIEN 323)
- Fluid Mechanics (CIEN 321)
- Introduction to Environmental Engineering (CIEN 325)
- Statistics for Engineers (ENGR 320)
- Computer Aided Design in Civil Engineering (CIEN 311)
- Elementary Surveying (CIEN 201)
- Introduction to Application Programs and Technical Communications (CIEN 130)

PEER-REVIEWED JOURNAL PAPERS

1. Andrew M Druckrey, A. M, Khalid Alshibli, K. A., **Al-Raoush, R.I**, 3D Characterization of Sand Particle-to-Particle Contact and Morphology, Computers and Geotechnics 74, 26-35, 2016.

2. Alshibli, K.A., Druckrey, A.M, **Al-Raoush, R.I**., Weiskitte, T., and Lavrik, N. V., Quantifying Morphology of Sands Using 3D Imaging, ASCE Journal of Materials in Civil Engineering, 27, (10), 20015

3. **Al-Raoush, R.I.,** Experimental investigation of the influence of grain geometry on residual NAPL using synchrotron microtomography, Journal of Contaminant Hydrology, 159, 1–10, 2014

4. **Al-Raoush, R.I.,** Change in microstructure parameters of porous media over representative elementary volume for porosity", Particulate Science and Technology, 30,1-16, 2012

5. **Al-Raoush, R.I** and A. Papadopoulos, "Representative elementary volume analysis of porous media using X-ray computed tomography ," Powder Technology, 200, 69-77, 2010

6. **Al-Raoush, R.I,** "Impact of wettability on pore-scale characteristics of residual nonaqueous phase liquids," Environmental Science and Technology, 43, 4796-4801, 2009

7. **Al-Raoush, R.I,** and M. Alsaleh, "Simulation of random packings of polydisperse particles," Powder Technology, 176 (1), 47-55, 2007 (Ranked # 10 among the Top 25 articles in ScienceDirect list of July-September, 2007)

8. **Al-Raoush, R.I.,** "Microstructure characterization of granular materials," Physica A, 377, 545 -558, 2007 (Ranked # 12 among the Top 25 articles in ScienceDirect list of January-March, 2007)

9. Abu-El-Sha'r, W. Y., **Al-Raoush. R.I.,** and K. Asfar, "Perturbation Solution of the Jackson's Dusty Gas Model Equations for Ternary Gaseous Systems," Jordan Journal of Civil Engineering, 1(3), 245-272, 2007.

10. **Al-Raoush, R.I.,** and K. Alshibli, "Calculation of local void ratios of granular materials from three-dimensional images," Physica A, 359, 713-728, 2006

11. **Al-Raoush, R.I.,** and C. S. Willson, "Extraction of physically-realistic pore network properties from three-dimensional synchrotron microtomography images of unconsolidated porous media systems," Journal of Hydrology, 300: 44-64, 2005

12. **Al-Raoush, R.I.,** and C. S. Willson, "A pore-scale investigation of a multiphase porous media system," Journal of Contaminant Hydrology, 77(1-2): 67-89, 2005 (Ranked # 4 among the Top 25 articles in ScienceDirect list of April-June, 2005)

13. Kyungmin H, J. Hua, **Al-Raoush, R.I,** X. Xie, L. S. Simeral, C. S. Willson, G. Byerly, L. S. Simeral, M. L. Rivers, R. L. Kurtz, and L. G. Butler, "Three-dimensional chemical analysis with synchrotron tomography at multiple x-ray energies: brominated aromatic flame retardant and antimony oxide in polystyrene," Chemistry of Materials, 16, 4032–4042, 2004

14. **Al-Raoush, R.I.,** K. Thompson, and C. S. Willson, "Comparison of network generation techniques for unconsolidated porous media," Soil Science Society Journal of America, 67:1687-1700, 2003

15. Willson, C. S. and **Al-Raoush, R.I.** "The use of synchrotron microtomography for three-dimensional statistical characterization of non-aqueous phase liquids (NAPL) in porous media systems," the 2001 International Symposium on Environmental Hydraulics, Tempe, Arizona, December 5-8, 2001

CONFERENCE PRESENTATIONS AND PROCEEDINGS

1. **Al-Raoush, R**. and I. Madhoun., "Relating Tortuosity to Geometrical Characteristics of Porous Media", the American Geophysical Union Fall Meeting, San Francisco, California, December 14-18, 2015

2. Alshibli, K., Druckrey, A. M., Jarrar, M. and **Al-Raoush,R**., "3D Experimental Characterization of Particle Rotation and Local Dilatancy in Angular Sand", XV PanAmerican conference on soil mechanics and geotechnical engineering, Buenos Aires, Argentina, 15-18, November, 2015

3. **Al-Raoush, R.,** "Computed Tomography: An Emerging Technology to Characterize Oil-Contaminated Subsurface Systems", 7th Symposium on Environmental Progress in the Petroleum & Petrochemical Industry, Al Khobar, Kingdom of Saudi Arabia, 24-26 February 2014

4. **Al-Raoush, R.,** "Tomographic Measurements of Pore-Scale Morphology of Trapped Non-Wetting Fluids in Porous Media", Maersk Oil, QSTP, Doha, Qatar, April 27, 2014

5. Jonathan Striblet, LeChell Rush, Myles Floyd, Mark Porter and **Al-Raoush, R.,** "Combined use of computed tomography and the lattice-Boltzmann method to investigate the influence of pore geometry of porous media on the permeability tensor", the American Geophysical Union Fall Meeting, San Francisco, California, December 5-9, 2011

6. **Al-Raoush, R.,** "Tomographic quantification of the relationship between pressure, saturation and interfacial area during imbibition in fractionally-wet porous media", the American Geophysical Union Fall Meeting, San Francisco, California, December 5-9, 2011

7. **Al-Raoush, R.,** "Use of Computed Tomography to Characterize Trapped Immiscible Fluids in Porous Media", Invited Presentation, Department of Chemical Engineering, Qatar University, Doha, Qatar, November 14, 2011

8. Gordon, C., Robins, S., Richardson, J., and **Al-Raoush, R.,** "Pore-scale Characterization of Residual NAPL in Heterogeneous Porous Media Systems", The 3rd Annual Conference for Undergraduate Research (The Triple EX), Louisiana State University, Baton Rouge, Louisiana, November 4, 2011

9. Striblet, J., Rush, L., Floyd, M., Porter, M., and **Al-Raoush, R.,** "Combined use of computed tomography and the lattice–Boltzmman method to investigate the influence of pore geometry of porous media on the permeability tensor", The 3rd Annual Conference for Undergraduate Research (The Triple EX), Louisiana State University, Baton Rouge, Louisiana, November 4, 2011

10. **Al-Raoush, R.,** " Use of computed tomography to characterize residual NAPL in porous media systems", 27th Annual International Conference on Soils, Sediments, Water, & Energy, Amherst, Massachusetts, October 17-20, 2011

11. **Al-Raoush, R.,** " Use of computed tomography to characterize trapped non-wetting fluids in porous media systems", Division of Earth and Enviroenmtal sciences, Los Alamos National Laboratory, July 25, 2011

12. **Al-Raoush, R.,** "Pore-scale measurements of residual NAPL/water interfacial area in heterogeneous porous media systems", the World Environmental and Water Resources Congress, Palm Springs, California, May 22-26, 2011

13. **Al-Raoush, R.,** "Pore-scale characterization of residual NAPL in heterogeneous porous media systems", the World Environmental and Water Resources Congress, Palm Springs, California, May 22-26, 2011

14. **Al-Raoush, R.,** Gordon, C., Robins, S. and Richardson, J." Characterization of immiscible non-wetting fluids in porous media systems using synchrotron tomography", the 241th American Chemical Society National Meeting & Exposition, Anaheim, California, USA, March 27-31, 2011

15. **Al-Raoush, R.,** and Gordon, C. " Measuring the Functional Relationship between Interfacial Area, Capillary Pressure and Saturation in Fractionally Wet Porous Media using Synchrotron Microtomography", the 241th American Chemical Society National Meeting & Exposition, Anaheim, California, USA, March 27-31, 2011

16. **Al-Raoush, R.,** "Tomographic investigation of the influence of initial wetting saturation, wettability and geometry of porous media on residual NAPL/water interfacial area", the American Geophysical Union Fall Meeting, San Francisco, California, December 13-17, 2010

17. Gordon, C., and **Al-Raoush, R.,** "Tomographic characterization of residual NAPL in porous media systems ", the American Geophysical Union Fall Meeting, San Francisco, California, December 13-17, 2010

18. Gordon, C., Richardson, J., Robins, S., and **Al-Raoush, R.,** " Tomographic investigation of the characteristics of trapped nonaqueous phase liquids in three-phase porous media systems", Division of Educational Programs, Argonne National Laboratory, Argonne, Illinois, August 4, 2010

19. **Al-Raoush, R.**, and Ward, A., "Prediction of transport properties in reconstructed unconsolidated porous media", the World Environmental and Water Resources Congress, Providence, Rhode Island, May 16-20, 2010

20. **Al-Raoush, R.,** and Ward, A., "An approach to quantifying transport properties in realistic pore geometries of unconsolidated porous media", the XVIII Conference on Computational Methods in Water Resources, Barcelona, Spain, June 21-24, 2010

21. **Al-Raoush, R.,** "Pore- and particle-scale studies using Synchrotron X-ray microtomography" Invited presentation to the Hydrology Group at the Pacific Northwest National Laboratory Richland, Washington, July 16, 2009

22. **Al-Raoush, R.,** "Impact of wettability on pore-scale characteristics of residual nonaqueous phase liquids" World Environmental and Water Resources Congress, Kansas City, Missouri, May 17-21, 2009

23. **Al-Raoush, R.,** "Characterization of residual nonaqueous phase liquids at different fractional wettability" the 237th American Chemical Society National Meeting & Exposition, Salt Lake City, Utah, March 22-26, 2009

24. Johnson, M, and R. **Al-Raoush,** "Impact of wettability on pore-scale characteristics of residual nonaqueous phase liquids" Argonne National Laboratory, Argonne, Illinois, November 15, 2008

25. Johnson, M, and **R. Al-Raoush,** "Impact of the wettability on the distribution of residual non-aqueous phase liquid (NAPL) in saturated porous media using microtomography," HBCU-UP National Conference, Atlanta, Georgia, October 23-27, 2008

26. Pinkney, M., M. Johnson, L. Thomas, and **R. Al-Raoush,** "Imaging residual immiscible fluids at different wettability conditions of permeable media," HBCU-UP National Conference, Atlanta, Georgia, October 23-27, 2008

27. Johnson, M, M. Pinkney, L. Thomas, and **R. Al-Raoush,** "Imaging residual immiscible fluids at different wettability conditions of permeable media," Argonne National Laboratory, Argonne, Illinois, July 31, 2008

28. **Al-Raoush, R.,** and A. Papadopoulos, "A methodology to sand from high resolution 3D images," the European Geophysical Union General Assembly (EGU), Vienna, Austria, April 13-18, 2008

29. **Al-Raoush, R.,** and A. Papadopoulos, "Representative elementary volume analysis of sand using x-ray microtomography," the European Geophysical Union General Assembly (EGU), Vienna, Austria, April 13-18, 2008

30. **Al-Raoush, R.** "Geometrical and topological properties of soil," X-ray Computed Tomography of Soil '07 Conference, Guelph, Ontario, Canada, August 19-22, 2007

31. **Al-Raoush, R.,** and M. Alsaleh, "Physically-based micro-structural parameters of granulate assemblies," the 18th Engineering Mechanics Division Conference of the American Society of Civil Engineers, Blacksburg, Virginia, June 3-6, 2007

32. Alsaleh, M. and **R. Al-Raoush,** "Using micro-structural properties into micropolar-based finite element model for granular assemblies," the 18th Engineering Mechanics Division Conference of the American Society of Civil Engineers, Blacksburg, Virginia, June 3-6, 2007

33. **Al-Raoush, R.,** "Dam Break Analysis using HEC GEO-RAS," Workshop on Dam Safety and Training, Southern University, Baton Rouge, Louisiana, January 29- February 2, 2007

34. **Al-Raoush, R.,** "Simulation of random packing of polydisperse particles," the American Geophysical Union (AGU) Fall meeting, San Francisco, California, December 11-15, 2006

35. **Al-Raoush, R.,** "Simulation of random packs of particles," invited presentation at the Machine Research Division, Caterpillar Inc., Peoria, Illinois, October 5, 2006

36. **Al-Raoush, R.,** and K. Alshibli, "Computation of local void ratio in porous media systems form 3D X-ray microtomography images," the ASCE Earth & Space Conference, Houston, Texas, March 2006

37. **Al-Raoush, R.,** "Characterization of residual NAPL in saturated porous media using high-resolution, three-dimensional synchrotron X-ray microtomography," invited presentation, Department of Civil and Environmental Engineering, California State University, Long Beach, California, April 16, 2003

38. **Al-Raoush, R.,** Z. Abu-Salem, and C. S. Willson, "Characterization of non-wetting phase fluids in porous media systems using high-resolution, three-dimensional synchrotron X-ray microtomography," the 225th American Chemical Society national meeting, New Orleans, Louisiana, March 23-27, 2003

39. **Al-Raoush, R.,** K. E. Thompson, and C. S. Willson, "The impact of network structure on pore-scale simulation of fluid transport," the American Geophysical Union Fall meeting, San Francisco, California, December 6-10, 2002

40. Reed, A. H., R. Al-**Raoush**, C. S. Willson, and J. E. Cable, "Influence of image resolution on pore size distributions and permeability predictions in marine sand," the American Geophysical Union Fall meeting, San Francisco, California, December 6-10, 2002

41. **Al-Raoush, R.,** "The use of synchrotron microtomography to investigate microscale properties of porous media systems," invited presentation, Geophysical technology group, Sandia National Laboratory, Albuquerque, New Mexico, December, 4, 2002

42. Reed, A. H., **R. Al-Raoush,** C. S. Willson, and J. E. Cable, "Comparative differences of pore geometry from planar and volumetric computed tomography images of marine sands," the American Geophysical Union Spring Meeting, Washington, DC, May 28-31, 2002

43. **Al-Raoush, R.,** K. E. Thompson, and C. S. Willson, "Comparison of approaches for obtaining pore network structures," presented at the American Geophysical Union Fall Meeting, San Francisco, California, December 10-14, 2001

44. **Al-Raoush, R.,** and C. S. Willson, "Statistical characterization of three-dimensional porous media systems using synchrotron microtomography," presented at the American Geophysical Union Spring Meeting, Boston, Massachusetts, May 29-June 2, 2001

45. Willson, C. S., **R. Al-Raoush,** "The use of synchrotron microtomography for investigating multiphase porous media systems," the 2000 Geological Society of America Annual Meeting, Reno, Nevada, November 9-18, 2000

46. Willson, C. S., **R. Al-Raoush**, A. Rahman, “Groundwater research in civil and environmental engineering,” the 2000 Environmental State of the State Conference, Baton Rouge, Louisiana, November 16-17, 2000

FUNDED PROJECTS

1. “Gas Production form hydrate-bearing sediments “, funded by Qatar National Research Fund (QNRF), 06/1/16-06/1/19, $809,990, **Role: Lead PI**.

2. “Groundwater Pollution by Petroleum-Derived Contaminants in Coastal (Semi)-Arid Environment”, funded by Qatar National Research Fund (QNRF), 06/15/16-06/15/19, $672,000, **Role: Lead PI.**

3. “SIMUPOR: Simulation of microscale biogeochemical processes in porous media using advanced computer vision methodologies”, funded by Qatar National Research Fund (QNRF), 06/15/16-06/15/19, $781,264, **Role: PI.**

4. "Lattice-Boltzmann modeling of flow processes in statistically reconstructed porous media," funded by NSF-HBCU-UP, 06/01/11-08/06/11, $26,750, **Role: PI.**

5. "Lattice-Boltzmann modeling of flow processes in statistically reconstructed porous media," funded by Louisiana Board of Regents, 06/01/11-08/06/11, $24,000**, Role: Lead PI.**

6. "Tomographic investigation of the functional relationship between interfacial area, capillary pressure and saturation in fractionally wet porous media," funded by Louisiana Board of Regents, 06/01/10-08/06/10, $15,000, **Role: Lead PI.**

7. "Use of Synchrotron Microtomography to Investigate the Influence of Initial Saturation and Flow Rates on non-aqueous phase liquids (NAPLs) infiltration in Porous Media," funded by NSF-HBCU-UP, 06/01/10-08/06/10, $26,750, **Role: PI.**

8. "Use of Synchrotron Microtomography to Investigate the Influence of Initial Saturation and Flow Rates on non-aqueous phase liquids (NAPLs) infiltration in Porous Media," funded by Argonne National Laboratory, 06/01/10-08/06/10, $2,000, **Role: Lead PI.**

9. "Measuring Non-wetting/Wetting Interfacial areas in Fractionally Wet Porous Media", funded by the SU College of Engineering, 9/1/2009-9/1/2010, $14,500, **Role: Lead PI.**

10. “A Rock Physics Approach to Quantifying Transport Properties and Diagenetic Processes in Realistic Pore Geometries of Unconsolidated Porous Media,” funded by DoE/PNNL, 05/19/09-07/24/09, $20,700, **Role: Lead PI.**

11. “A Rock Physics Approach to Quantifying Transport Properties and Diagenetic Processes in Realistic Pore Geometries of Unconsolidated Porous Media,” funded by Louisiana Board of Regents, 05/19/09-07/24/09, $10,000, **Role: Lead PI.**

12. "Imaging Residual Organic Immiscible Fluids in Fractionally Wet Permeable Media," Funded by NSF, 05/29/08-07/31/08, $29,850, **Role: Lead PI**.

13. "Preliminary Planning and Investigation for the Buffalo Cove, Beau Bayou, and Cocodrie Swamp Water Management Units," Sub-contacted funded by the U.S. Army Corps of Engineers (New Orleans District), 8/1/2006-7/31/2007, $12,000, **Role: PI.**
14. "Flood Plain Management Service Program," Sub-contract funded by the U.S. Army Corps of Engineers (New Orleans District), 10/31/2007-4/30/2008, $6,000, **Role: PI.**

15. "Microstructure Characterization of Granular Materials," funded by SU College of Engineering, 6/1/2006-5/31/2007, $12,000, **Role: Lead PI.**

16. "Investigating the spatial correlation of disordered sphere packing," funded by SU Chancellor's Fund, 24/2/2005-24/2/2006, $3,000, **Role: Lead PI.**

HONORS AND AWARDS

- U.S. Department of Energy faculty fellowship, 2008, 2009, 2010 and 2011.
- Who's Who in America, 2009
- Louisiana engineering faculty professionalism award, 2008
- Three of my papers ranked among the top 10 articles in Science-Direct list in 2005, 2007 and 2010
- Obtained U.S. permanent residency based on outstanding researcher/professor category
- ASAI Scholarship, USA, 1998-2000
- Jordan Ministry of Higher Education Scholarship for undergraduate degree, 1989-1994

SUMMARY OF ALGORITHMS AND COMPUTER CODES DEVELOPED:

The following is a list of algorithms I have developed and implemented in 3D, robust and efficient codes in my research in the area of porous media characterization, fluid/solid interaction, and flow and transport of fluids in microstructures:

- Variety of image processing and enhancement techniques such as intensity transformation, spatial filtering, morphological operations and wavelet analysis.
- Segmentation of phases in 3D images based on watershed transform.
- Identification of individual irregular objects in 3D images (pattern recognition).
- Identification of components (i.e., phases) in images using 3D connected components labeling algorithm.
- Extraction of pore-networks for pore-network simulations of multiphase fluids; this includes computing sizes and shapes of pore-bodies and pore-throats with their connectivity and characteristics such as aspect ratio and spatial correlations.
- Complete microstructure characterization of granular materials from 3D images.
- Computation of properties of 3D objects such as volume, surface area, angularity, sphericity, boundaries and moment of inertial (spatial orientation).
- Computation of local void ratio distributions in materials based on 3D skeletonization algorithm.
- Extraction of parameters required to develop physically-realistic Discrete Elements Models of granular materials based on 3D images; this includes computing distributions of number

of contacts, network of contacts, radial functions, tangential and normal vectors of forces.

- Simulation of random packings of spherical shapes based on optimization algorithms. The packs mimic experimental conditions for pore-scale simulations (pore-network and Lattice Boltzmann methods).
- Simulation of random packings of irregular shapes based on optimization algorithms. The packs mimic experimental conditions for pore-scale simulations (pore-network and Lattice Boltzmann methods).
- Simulation of permeability of fluids through porous media using percolation theory.
- Simulation of entrapment of non-aqueous phase liquids in porous media using morphological approach.

REPORTS

- "Tomographic investigation of the functional relationship between interfacial area, capillary pressure and saturation in fractionally wet porous media," Report Submitted to Louisiana Board of Regents, October 11, 2010.

- "Tomographic investigation of the functional relationship between interfacial area, capillary pressure and saturation in fractionally wet porous media," Report submitted to Argonne's Division of Educational Programs, August 6, 2010.

- "A rock physics approach to quantifying transport properties and diagenetic processes in realistic pore geometries of unconsolidated porous media," Report submitted to the Louisiana Board of Regents, October 31, 2009

- "A rock physics approach to quantifying transport properties and diagenetic processes in Realistic Pore Geometries of Unconsolidated Porous Media," Report submitted to the Pacific Northwest National Laboratory, Richland, Washington, July 31, 2009

- "Imaging residual organic immiscible fluids in fractionally wet permeable media," Report submitted to the Argonne's Division of Educational Programs, Argonne National Laboratory, Argonne, Illinois, July 28, 2008

- "Preliminary planning and investigation for the Buffalo Cove, Beau Bayou, and Cocodrie swamp water management units," Report submitted to the U.S. Army Corps of Engineers (New Orleans District), July 31, 2007

- "Flood plain management service program" Report submitted to the U.S. Army Corps of Engineers (New Orleans District), April, 30, 2008

- "Investigating the spatial correlation of disordered sphere packing," Technical report submitted to the Office of Sponsored Programs at Southern University, September, 1, 2006

PROFESSIONAL SERVICE

- Southern University **Representative**, Louisiana Sea Grant's Academic Advisory Panel, 2006-2012
- **Judge**, Outstanding Student Paper Award, American Geophysical Union Fall meeting, 2006, 2010, 2011, 2015.
- Session **Co-Chair**, American Geophysical Union (AGU) meeting, session entitled "Interfacial Processes in Subsurface Flow and Transport: Linking the Pore-Scale to the Continuum-Scale", December 5-9, 2011
- Session **Co-Chair**, American Society of Engineering Education (ASEE)-Gulf –Southwest section meeting, session entitled "Engineering and Research", March 15-17, 2006

- **Reviewer for the following international journals:**
  - Water Resources Research
  - Advances in Water Resources
  - Vadose Zone Journal
  - Journal of Environmental Informatics
  - Environmental Science and Technology
  - Journal of Colloid and Interface Science
  - International Journal of Hydrology Science and Technology
  - Experimental Thermal and Fluid Science
  - Journal of Hazardous Materials
  - Journal of Irrigation and Drainage Engineering
  - Computers and Geosciences
  - Particulate Science and Technology
  - Information Sciences
  - Soils and Foundations
  - Journal of Computational Physics
  - Journal of Microscopy
  - Soft Matter
  - Powder Technology
  - ASCE-GeoX2010 Special Publications

PROFESSIONAL AFFILIATIONS

- American Geophysical Union (AGU), Member
- American Society of Civil Engineers (ASCE), Affiliate Member
- American Society of Engineering Education (ASEE), Member
- Louisiana Engineering Society (LES), Member

UNIVERSITY SERVICE (Qatar University)

University Level

- Water, air and food security focus group, member

College level

- Research Committee, member
- Strategic Planning, member
- Environmental Engineering Master Program Committee, member

Department Level

- Strategic Planning, Chair
- Faculty Requirement Committee, member
- Promotion Committee, member
- Students Summer Training, Committee
- Assessment Committee, member
- Research Committee, member
- Internal Examiner for Senior Design Project (Environmental/Water Resources Area)

UNIVERSITY SERVICE (Southern University, USA)

- Academic Computing Committee, Chair
- ABET Advisement Committee, Chair
- The Engineers Week Committee, Chair
- ABET Self-Study Report Preparation, Member
- ABET Assessment Committee, Member
- Catalog and Curriculum Development Committee, Member
- Graduate Program Committee, Member
- Engineering Graduate Faculty Committee, Member (Civil Eng. Dept.'s Representative)
- Faculty Search Committee, Member
- Undergraduate Laboratory Committee, Member
- College of Engineering Council, Member
- College of Engineering Advisory Council for Students Recruiting, Member

PROFESSIONAL WORKSHOPS ATTENDED

- Collaborative Scientific Research Opportunities Related to the Gulf Oil Spill, New Orleans, Louisiana, November, 1-2, 2010
- MSI Technical Workshop, Dallas, Texas, September, 20-24, 2010
- MSI Technical Workshop, Dallas, Texas, September, 21-23, 2009
- AutoCAD 2009-The essential course, ECAD, Inc. Baton Rouge, Louisiana, October, 17, 24, 31, 2008
- AutoCAD 2009-Update for AutoCAD 06-07 Users, ECAD, Inc. Baton Rouge, Louisiana, September, 15-16, 2008
- ABET Faculty Workshop on Assessing Program Outcomes, Nashville, Tennessee, March 15, 2008
- Faculty Mentor-leader workshop, Southern University, Baton Rouge, Louisiana, February 27, 2008
- National Science Foundation Grant Workshop, Arlington, Virginia, February, 11-12, 2008
- National Science Foundation Grant Workshop, Arlington, Virginia, February 27-28, 2007

- Post-Katrina/Rita Research and Education Forum; Science Recovery and Discovery: the Role of Higher Education in Securing a Sustainable Future, New Orleans, Louisiana, April 2-4, 2006
- Office of Sponsored Programs' Proposal Preparing Workshop, Southern University, Baton Rouge, Louisiana, November 9, 2005

Graduate Students Supervision (Qatar University)

- **Iman T. Madhoun**, Advisor, M.S. Thesis, "Relating Tortuosity to Geometrical Properties of Porous Media", September, 2016.

- **Ansaruddin Kunju Aliyaru Kunju**, Committee Member, M.S. Thesis, "Performance of Microbial Fuel Cells in Treating Petroleum Refinery Wastewater", December 30, 2015.

- **Khaled Hassan Rabie**, Committee Member, M.S. Thesis, "Drained Residual shear strength of fine-grained soils and soil-solid interfaces at low to medium effective normal stresses: Analyses and Applications", January , 2016

RESEARCH PROJECTS SUPERVISED (SOUTHERN UNIVERSITY)

- **Vindhya Kemisetti,** Advisor M.S. Thesis, "Fate and Transport of Nanoparticles in the Environment", Graduated: May 2011

- **Clayton Driggs,** Committee member, M.S. Thesis, " Investigating the Effects of Nitrification on Gray's Creek", Graduated: December 2007

- **Shannon L. Chambers,** Advisor, Honors Senior Thesis, "Design of a Storm Drainage System for Cypress Hill Subdivision", Graduated: May 2005

- **Meagan Pinkney,** Advisor, Research Project at Argonne National Lab, "Imaging Residual Immiscible Fluids at Different Wettability Conditions of Permeable Media", Project completed: August 2008

- **Maude Johnson,** Advisor, Research Project at Argonne National Lab, "Imaging Residual Immiscible Fluids at Different Wettability Conditions of Permeable Media", Project completed: August 2008

- **Lindsey Thomas,** Advisor, Research Project at Argonne National Lab, "Imaging Residual Immiscible Fluids at Different Wettability Conditions of Permeable Media", Project completed: August 2008

- **Julesa Holland,** Advisor, Research Project at Pacific Northwest National Lab, "A Rock Physics Approach to Quantifying Transport Properties and Diagenetic Processes in Realistic Pore Geometries of Unconsolidated Porous Media ", Project completed: August 2009

- **Courtney Gordon,** Advisor, Research Project at Argonne National Lab, "Tomographic Investigation of the Functional Relationship between Interfacial Area, Capillary Pressure and Saturation in Fractionally Wet Porous Media", Project completed: August 2010

- **Steven Robins,** Advisor, Research Project at Argonne National Lab, "Tomographic Investigation of the Functional Relationship between Interfacial Area, Capillary Pressure and Saturation in Fractionally Wet Porous Media", Project completed: August 2010

- **Jasmin Richardson,** Advisor, Research Project at Argonne National Lab, "Tomographic Investigation of the Functional Relationship between Interfacial Area, Capillary Pressure and Saturation in Fractionally Wet Porous Media", Project completed: August 2010

- **Myles Floyd,** Advisor, Research Project at Los Alamos National Lab, "Lattice-Boltzmann modeling of flow processes in statistically reconstructed porous media", Project completed: August 2011

- **LeChell Rush,** Advisor, Research Project at Los Alamos National Lab, "Lattice-Boltzmann modeling of flow processes in statistically reconstructed porous media", Project completed: August 2011

- **Jonathan Striblet,** Advisor, Research Project at Los Alamos National Lab, "Lattice-Boltzmann modeling of flow processes in statistically reconstructed porous media", Project completed: August 2011