Shengli Chen

Department of Civil & Environmental Engineering, Louisiana State University
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RESEARCH INTERESTS

- Theoretical and computational geomechanics
- Poromechanics and constitutive modelling of geomaterials
- Pile foundation and soil structure interaction
- Tunnel excavation and wellbore stability
- Hydraulic fracturing

EDUCATION

Ph.D. Petroleum Engineering (Geomechanics), The University of Oklahoma **December 2012**
Dissertation: *Analytical and numerical analyses of wellbore drilled in elastoplastic porous formations*

Ph.D. Civil Engineering (Soil-structure interaction), Zhejiang University, China **June 2000**
Dissertation: *Vertical vibrations of foundations on saturated grounds*

B. S. Civil Engineering, Zhejiang University, China **June 1995**

EMPLOYMENT HISTORY

Department of Civil & Environmental Engineering — *Assistant Professor*
Louisiana State University — *08/2014-present*

Aramco Research Center — *Research Petroleum Engineer*
Houston, TX — *02/2013-08/2014*

Integrated PoroMechanics Institute — *Research Associate*
The University of Oklahoma — *11/2012-02/2013*

Department of Civil Engineering — *Associate Professor*
Shanghai Jiao Tong University — *09/2003-12/2006*

Department of Civil and Environmental Engineering — *Postdoctoral Research Fellow*
The Hong Kong University of Science and Technology — *03/2003-03/2004*

Department of Civil Engineering — *Assistant Professor*

Shanghai Jiao Tong University *10/2002-08/2003*
Department of Hydraulic Engineering *Postdoctoral Researcher*
Tsinghua University *09/2000-09/2002*

TEACHING @ LSU

- *Geotechnical Engineer III* (*CE 4310)*, Spring 2018
- *Numerical Methods in Geotechnical Engineering* (*CE 7700)*, Spring 2018
- *Geotechnical Engineer I* (*CE 3300)*, Fall 2017
- *Geotechnical Engineer III* (*CE 4310)*, Spring 2017
- *Mechanics of Materials* (*CE 3400)*, Spring 2017
- *Advanced Geotechnical Engineer I* (*CE 7300)*, Fall 2016
- *Mechanics of Materials* (*CE 3400)*, Spring 2016
- *Numerical Methods in Geotechnical Engineering* (*CE 7700)*, Spring 2016
- *Geotechnical Engineer I* (*CE 3300)*, Fall 2015
- *Geotechnical Engineer I* (*CE 3300)*, Spring 2015
- *Advanced Geotechnical Engineer I* (*CE 7300)*, Fall 2014

VISITING SCHOLARS

- Prof. Wang G. C. (August 2016 to August 2017). *Department of Civil Engineering, Zhejiang University of Technology, Hangzhou, China*.
- Zhang, H. (November 2015 to May 2016). *Department of Geotechnical Engineering, Tongji University, Shanghai, China*.

POST-DOCTORATES

- Dr. Li L. (December 2017 to May 2019). *Department of Geotechnical Engineering, Tongji University, Shanghai, China*.

GRADUATE STUDENTS ADVISEES

Ph.D. students:

- Huang C. (Expected graduation: December 2019). *Modelling hydraulic fracturing initiation and propagation in porous rock formations*. Ph.D. student, Louisiana State University, Baton Rouge, LA, USA.
- Liu, K. (Expected graduation: May 2019). *Analytical modelling and numerical simulations of cavity problems in anisotropic poroelastoplastic geomaterials*. Ph.D. student, Louisiana State University, Baton Rouge, LA, USA.

- Jafari, M. (Expected graduation: May 2018). *Pore-scale and conventional wettability measurement considerations for improving certainty for geological CO2 sequestration*. Ph.D. candidate, Louisiana State University, Baton Rouge, LA, USA (co-advisor: Dr. Jung Jongwon).
- Cao S. C. (2017). *Microfluidic pore model study on physical and geomechanical factors influencing fluid flow behavior in porous media.* Ph.D. dissertation, Louisiana State University, Baton Rouge, LA, USA (co-advisor: Dr. Jung Jongwon).
- Zhang, H. (2017). *Kinematic interaction analysis of pile groups.* Ph.D. dissertation, Tongji University, Shanghai, China (co-advisor: Dr. Liang Fayun).

M.S. students:

- Lee, J. (Expected graduation: May 2020). *A numerical approach to estimate the shaft friction of driven piles in clay*. M.S. student, Louisiana State University, Baton Rouge, LA, USA.
- Adhikari, K. (Expected graduation: May 2019). *Development of simulation tool for hydraulic fracturing initiation in porous rock formations*. M.S. student, Louisiana State University, Baton Rouge, LA, USA.
- Melton, J. M. (Expected graduation: December 2019). Non-thesis M.S. student, Louisiana State University, Baton Rouge, LA, USA.
- Tsai, C. (Expected graduation: December 2018). Non-thesis M.S. student, Louisiana State University, Baton Rouge, LA, USA.
- Chen, H. B. (2011). *Lateral response of single pile under axial loading and note on two-pile interaction factor*. M.S. thesis, Tongji University, Shanghai, China (co-advisor: Dr. Liang Fayun).
- Zhan, H. (2007). *Theoretical and numerical analyses of soil behavior due to pile installation*. M.S. thesis, Shanghai Jiao Tong University, Shanghai, China.

PROFESSIONAL ACTIVITIES

- **Associate Editor:**

  SPE Journal, Society of Petroleum Engineering (SPE), 2014-present.

- **Committee Member:**

  Engineering Mechanics Institute (EMI) Elasticity Committee-ASCE, 2016-present.

  Engineering Mechanics Institute (EMI) Poromechanics Committee-ASCE, 2017-present.

- **Reviewer for proposals*:***

  University Coalition for Fossil Energy Research, National Energy Technology Laboratory, Department of Energy

  Petroleum Research Fund, American Chemical Society

University of Missouri Research Board

- **Reviewer for journals *(23 publications):***

  Acta Geotechnica
  Acta Mechanica Solida Sinica
  Applied Mathematical Modelling
  ASCE International Journal of Geomechanics
  ASCE Journal of Engineering Mechanics
  ASCE Journal of Materials in Civil Engineering
  ASME Journal of Applied Mechanics
  ASME Journal of Energy Resources Technology
  Canadian Geotechnical Journal
  Experimental Mechanics
  Geophysical Journal International
  Geotechnical Testing Journal
  Geotechnique
  International Journal for Numerical and Analytical Methods in Geomechanics
  International Journal of Oil, Gas and Coal Technology
  Journal of Applied Mathematics
  Journal of Geophysical Research (Solid Earth)
  Journal of Petroleum Science and Engineering
  Marine Georesources & Geotechnology
  Mechanics Research Communications
  Petroleum Science
  Soil Dynamics and Earthquake Engineering
  SPE Journal

HONORS AND AWARDS

- Award of Excellence, "Top 10" Poster Presentation at AAPG Annual Convention, 2012
- Outstanding Ph.D. Student Award, Mewbourne School of Petroleum & Geological Engineering, The University of Oklahoma (twice, April 2010/2011)
- Science and Technology Progress Award, Zhejiang Electric Power Construction Co., Ltd., China, 2003
- Guanghua Scholarship (for graduate students with academic excellence), Zhejiang University, China, 1999
- Excellent Paper Award for research work on nonlinear vibration of foundations, Zhejiang

Province, China, 1998

- Graduation with Honor, Zhejiang University, 1995

RESEARCH PROJECTS FUNDED *($560,993)*

- Economic Development Assistantship, Louisiana State University, "*A comprehensive study on hydraulic fracture initiation and propagation in unconventional shale reservoirs*." $100,000, July 2018-June 2022 (PI).
- Louisiana Transportation Research Center, "*Analysis of driven pile capacity within pre-bored soil.*" $129,159, September 2017-February 2019 (PI).
- Faculty Research Grant Program, Louisiana State University, "*A technique for characterizing the mechanical properties of shales by nanoscratch test results.*" $10,000, July 2017-June 2018 (PI).
- The ACS Petroleum Research Fund, American Chemical Society, "*Analytical modelling and numerical simulations for hydraulic fracturing initiation in porous rock formations*." $110,000, September 2016-August 2018 (PI).
- Transportation Innovation for Research Exploration Program [TIRE], Louisiana Transportation Research Center, "*Advanced modelling of piezocone penetration test using cavity expansion theory and interpretation simulator development*." $30,000, July 2016-June 2017 (PI).
- Industrial Ties Research Subprogram [ITRS], Board of Regents, Louisiana, "*A simulation tool for hydraulic fracturing modelling in porous rock formations*." $171,834, July 2016-June 2019 (PI).
- Faculty Research Grant Program, Louisiana State University, "*Analytical and numerical modelling of hydraulic fracturing in transversely anisotropic porous rock formation*." $10,000, July 2015-June 2016 (PI).

PUBLICATIONS *(graduate student co-authors underlined)*

Journal Papers Published/Accepted:

31. Wang, G. C., **Chen, S. L.**, Liu, Q. Q., and Zhang, Y. (2018). Wave-induced dynamic response and liquefaction analysis in a porous seabed. ***Journal of Geotechnical and Geoenvironmental Engineering, ASCE***, accepted.
30. **Chen, S. L.**, and Liu, K. (2018). Undrained cylindrical cavity expansion in anisotropic critical state soils. ***Geotechnique***, tentatively accepted.
29. **Chen, S. L.**, and Abousleiman, Y. N. (2018). Cavity expansion in strain hardening frictional soils under drained condition. ***International Journal for Numerical and Analytical Methods in Geomechanics***, 42: 132-142.
28. Huang, C., Akbari, B, and **Chen, S. L.** (2018). A quick approximate elastoplastic solution of wellbore stability problems based on numerical simulation and statistical analysis. ***Journal of Natural Gas Science & Engineering***, 51: 147-154.

27. Qian, J. G., Zhou, R. Y., **Chen, S. L.**, Gu, X. Q., and Huang, M. S. (2018). The influence of pavement roughness on dynamic stresses in saturated subsoil subjected to moving traffic loading. ***International Journal of Geomechanics, ASCE***, 18(4): 04018012.

26. **Chen, S. L.**, and Abousleiman, Y. N. (2017). Wellbore stability analysis using strain hardening and/or softening plasticity models. ***International Journal of Rock Mechanics and Mining Sciences***, 93: 260-268.

25. Liu, K., and **Chen, S. L.** (2017). Finite element implementation of strain hardening Drucker-Prager plasticity model with applications to tunnel excavation. ***Underground Space***, 2(3): 168-174.

24. Zhang, H., **Chen, S. L.**, and Liang F. Y. (2017). Effects of scour-hole dimensions and soil stress history on the behavior of laterally loaded piles in soft clay under scour conditions. ***Computers and Geotechnics***, 84: 198-209.

23. Lin, B. T., **Chen, S. L.**, and Jin, Y. (2017). Evaluation of reservoir deformation induced by water injection in SAGD wells considering formation anisotropy, heterogeneity and thermal effect. ***Journal of Petroleum Science and Engineering***, 157: 767-779.

22. Lin, B. T., Jin, Y., and **Chen, S. L.** (2017). A criterion for evaluating the efficiency of water injection in oil sand reservoirs. ***Journal of Petroleum Science and Engineering***, 149: 322-330.

21. **Chen, S. L.** (2016). *Discussion* on "A semi-analytical solution for cylindrical cavity expansion in elastic- perfectly plastic soil under biaxial in situ stress field." ***Geotechnique***, 66(9): 786-788.

20. **Chen, S. L.**, and Abousleiman, Y. N. (2016). Drained and undrained analyses of cylindrical cavity contractions by bounding surface plasticity. ***Canadian Geotechnical Journal***, 53(9): 1398-1411.

19. **Chen, S. L.**, Kong, L. G., and Zhang, L. M. (2016). Analysis of pile groups subjected to torsional loading. ***Computers and Geotechnics***, 71: 115-123.

18. **Chen, S. L.**, and Abousleiman, Y. N. (2016). Stress analysis of borehole subjected to fluid injection in transversely isotropic poroelastic medium. ***Mechanics Research Communications***, 73: 63-75.

17. **Chen, S. L.**, and Abousleiman, Y. N. (2013). Exact drained solution for cylindrical cavity expansion in modified Cam clay soil. ***Geotechnique***, 63(6): 510-517.

16. **Chen, S. L.**, and Abousleiman, Y. N. (2012). Exact undrained elastoplastic solution for cylindrical cavity expansion in modified Cam clay soil. ***Geotechnique***, 62(5): 447-456.

15. **Chen, S. L.**, Abousleiman, Y. N., and Muraleetharan, K. K. (2012). A closed-form elastoplastic solution for the wellbore problem in strain hardening/softening rock formation. ***International Journal of Geomechanics, ASCE***, 12(4): 494-507.

14. Liang, F. Y., Chen, H. B., and **Chen, S. L.** (2011). Influences of axial load on the lateral response of single pile with integral equation method. ***International Journal for Numerical and Analytical Methods in Geomechanics***, 36: 1831-1845.

13. **Chen, S. L.**, Song, C. Y., and Chen, L. Z. (2011). Two pile interaction factor revisited. ***Canadian Geotechnical Journal***, 48(5): 754-766.

12. **Chen, S.**, and Abousleiman, Y. N. (2010). *Discussion* on "Closed-form solution for plastic zone formation around a circular tunnel in half-space obeying Mohr–Coulomb criterion." ***Geotechnique***, 60(7): 569-571.

11. Abousleiman, Y. N., and **Chen, S. L.** (2010). Poromechanics response of an inclined borehole subjected to in-situ stress and finite length fluid discharge. ***Journal of Mechanics of Materials and Structures***, 5(1): 47-66.

10. **Shengli Chen**, and Younane Abousleiman (2010). Time-dependent behavior of a rigid foundation on a transversely isotropic soil layer. ***International Journal for Numerical and Analytical Methods in Geomechanics***, 34(9): 937-952.

9. **Chen, S. L.** (2009). Vertical vibration of a flexible foundation resting on saturated layered soil half-space. ***International Journal of Geomechanics, ASCE***, 9(3): 113-121.

8. **Chen, S. L.**, and Chen, L. Z. (2008). A note on interaction factor for two laterally loaded piles. ***Journal of Geotechnical and Geoenvironmental Engineeering, ASCE***, 134(11): 1685-1690.

7. **Chen, S. L.**, Chen, L. Z., and Pan, E. (2007). Dynamic responses of flexible plate with rigid core on saturated ground. ***Journal of Engineering Mechanics, ASCE***, 133(3): 326-337.

6. **Chen, S. L.**, Chen, L. Z., and Pan, E. (2007). Three-dimensional time-harmonic Green's functions of saturated soil under buried loading. ***Soil Dynamics and Earthquake Engineering***, 27: 448-462.

5. Cao, M., Chen, L. Z., and **Chen, S. L.** (2007). An innovative approach to evaluate the behaviour of vertically loaded pile groups based on elastic theory. ***Journal of Lowland Technology International***, 9(1): 1-10.

4. **Chen, S. L.**, Chen, L. Z., and Zhang, J. M. (2006). Dynamic responses of a flexible plate on saturated soil layer. ***Soil Dynamics and Earthquake Engineering***, 26: 637-647.

3. **Chen, S. L.**, Zhang, L. M., and Chen, L. Z. (2005). Consolidation of a finite transversely isotropic saturated soil on rough impervious base. ***Journal of Engineering Mechanics, ASCE***, 131(12): 1279-1290.

2. **Chen, S. L.**, Chen, L. Z., and Zhang, L. M. (2005). Axisymmetric consolidation of a semi-infinite transversely isotropic saturated soil. ***International Journal for Numerical and Analytical Methods in Geomechanics***, 29: 1249-1270.

1. **Chen, S. L.**, and Chen, L. Z. (2002). The axisymmetric mixed boundary-value problem of the vertical vibration of a rigid foundation on saturated layered soil subgrade. ***Applied Mathematics and Mechanics***, 23(2): 218-225.

Conference Papers and Invited Talks:

21. **Chen, S. L.** (2018). Undrained cylindrical cavity expansion in anisotropic critical state soils. *Tongji University*, Shanghai, January 2018.

20. Liu, K., and **Chen, S. L.** (2017). Undrained cylindrical cavity expansion in anisotropic critical state soils. *EMI 2017 Conferences*, San Diego, California, USA, 4-7 June 2017.

19. Liu, K., and **Chen, S. L.** (2017). Wellbore stability analysis under drained conditions using anisotropic Cam Clay model. *The 51th US Rock Mechanics/Geomechanics Symposium,* San Francisco, California, USA, 25-28 June 2017.

18. **Chen, S. L.** Analytical and numerical analyses of cavity problems in poroelastoplastic geomaterials. *Zhejiang University of Technology*, Hangzhou, July 2016.

17. **Chen, S. L.** Analytical and numerical analyses of wellbore stability using plasticity models. *Peking University*, Beijing, July 2016.

16. **Chen, S. L.** Analytical and numerical analyses of wellbore stability using plasticity models. *China University of Petroleum*, Beijing, July 2016.

15. **Chen, S. L.** Analytical and numerical analyses of cavity problems in poroelastoplastic geomaterials. *Tongji University*, Shanghai, July 2016.

14. **Chen, S. L.** Analytical and numerical analyses of cavity problems in poro-elasto-plastic geomechanics. *Shanghai Jiao Tong University*, Shanghai, July 2016.

13. **Chen, S. L.**, and Abousleiman, Y. N. (2016). An analytical solution for wellbore stability problem using strain hardening Drucker-Prager plasticity model. *The 50th US Rock Mechanics/Geomechanics Symposium,* Houston, Texas, USA, 26-29 June 2016.

12. **Chen, S. L.** (2016). Three dimensional poroelastic solution of an inclined borehole subjected to finite length fluid injection. *EMI 2016/PMC 2016 Conferences,* Vanderbilt University, Nashville, Tennessee, 22-25 May 2016.

11. **Chen, S. L.**, Al-Muntasheri, G., and Abousleiman, Y. N. Implementation of bounding surface model into ABAQUS and its application to wellbore stability analysis. *American Geophysical Union fall meeting*, San Francisco, December 15-19, 2014 (Poster).

10. **Chen, S. L.**, Abousleiman, Y., and Abass, H. An analytical elasto-plastic analysis for stability of axisymmetric wellbore. *33rd International Conference on Ocean, Offshore, and Arctic Engineering*, San Francisco, June 2014.

9. **Chen, S. L.** Analytical and numerical analyses of cavity problems in elastoplastic porous geomaterials. *The Hong Kong Polytechnic University*, Hong Kong, December 2012.

8. **Chen, S. L.** Analytical and numerical analyses of cavity problems in poroelastoplastic geomaterials. *Carleton University*, Ottawa, September 2012.

7. **Chen, S. L.** Analytical and numerical analyses of wellbore drilled in poroelastoplastic rock formations. *Texas Tech University*, Lubbock, May 2012.

6. **Chen, S. L.** Poroelastoplastic analytical solution of a cylindrical cavity in saturated rock formation. *University of Southern California*, Los Angeles, April 2012.

5. **Chen, S. L.**, and Abousleiman, Y. Exact undrained elasto-plastic analysis of wellbore stability problem using bounding surface model. *Engineering Mechanics Institute Annual Conference*, the University of Notre Dame, June 2012.

4. Tran, M. H., **Chen, S. L.**, Rafael, S. P., and Abousleiman, Y. A geomechanics approach to evaluate gas shale fracability: a case study with the Woodford Shale. *AAPG 2012 Annual Convention & Exhibition (poster presentation),* Long Beach, April 2012 (Award of Excellence, Top 10 Poster Presentation).

3. **Chen, S. L.**, and Abousleiman, Y. Analysis of undrained cylindrical cavity expansion in modified Cam Clay critical state soil. *Engineering Mechanics Institute Annual Conference*, Boston, June 2011.

2. Abousleiman, Y., and **Chen, S. L.** Generalized poroelastic solution of a borehole subjected to finite length fluid discharge. *Proceedings, Biot IV Conference,* Columbia, NY, June 2009.

1. **Chen, S. L.**, and Abousleiman, Y. Time-dependent behaviour of a rigid foundation on a transversely isotropic soil layer. *Proceedings, Biot IV Conference,* Columbia, NY, June 25 2009.