Luming Shen

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Education

- Graduate Certificate in Educational Studies (Higher Education), The University of Sydney, 2010
- PhD, Civil Engineering, University of Missouri, Columbia, Missouri, USA, 2004
- Master of Engineering, Structural Engineering, Tongji University, China, 1997
- Bachelor of Engineering, Building Engineering, Tongji University, China, 1994

Academic and Professional Positions

- Professor, School of Civil Engineering, The University of Sydney, January 2020–
- Associate Professor, School of Civil Engineering, The University of Sydney, January 2014–December 2019
- Senior Lecturer, School of Civil Engineering, The University of Sydney, July 2008–December 2013
- Lecturer, Department of Civil Engineering, Monash University, January 2006–July 2008
- Post-Doctoral Fellow, Department of Civil and Environmental Engineering, University of Missouri, Columbia, Missouri, USA, July 2004–January 2006
- Structural Engineer, Shanghai Research Institute of Building Sciences, China, April 1997–July 1999

Administrative Positions

- Associate Head of School (Research), School of Civil Engineering, The University of Sydney, 2023–
- Deputy Head of School (Education), School of Civil Engineering, The University of Sydney, 2020–2022
- Director of IT, School of Civil Engineering, The University of Sydney, 2010–2020

Committees

- Member of Australian Research Council (ARC) College of Experts, 2022–
- Co-opted member of Standards Australia Technical Committee MT–006 *Mechanical Testing of Metals,* 2018–
- Member of National Computational Merit Allocation Committee (NCMAC), 2017–

Editorials

- Member of International Editorial Board for *Materials & Design* (Elsevier, ISSN: 0264-1275), 2019–

Associations

- Certified Materials Professional (CMP) of Materials Australia, 2010–
- Member of the Australian Association for Computational Mechanics, 2007–
- Member of the International Chinese Association for Computational Mechanics, 2007–

Units Coordinated/Taught

- CIV2206 Mechanics of Solids (Monash), 2006–2008
- CIV2226 Design of Concrete and Masonry Structures (Monash), 2006–2007
- CIV4212 Civil Engineering Practice (Monash), 2006–2007
- CIV4234 Advanced Structural Analysis (Monash), 2006–2008
- CIVL4022/4023/4024/4025 Honours Thesis and Engineering Project (USyd), 2009–2017
- ENGG1802/9802 Engineering Mechanics (USyd), 2008–2017
- CIVL1802/9802 Statics (USyd), 2018–

Research Interests

- Mechanics of materials
- Multiscale modelling and mechanical characterisation
- Multiphase interactions
- Impact engineering
- Advanced structural materials

Research Grants

Australian Research Council (ARC) Grants:

- Wang, S., **Shen, L.**, Chen, X. *A new intelligent control model for tunnel boring machines*. ARC LP230201048, 2024-2026, $394,520.
- **Shen, L.**, Mukherjee, A., Dias-da-Costa, D., Jefferson, A. *Unlocking self-healing bio-concrete through multiscale modelling*. ARC DP240100851, 2024-2026, $523,390.
- **Shen, L.** and Dias-da-Costa, D. *Energy dissipation characterisation in dynamic brittle fracture*. ARC DP230100749, 2023-2025, AU$427,820.
- **Shen, L.**, Chen, Z., Maggi, F., and Pan, Z. *Multiscale modelling of multiphase interactions in shale gas reservoirs*. ARC DP200101919, 2020-2022, AU$455,000.
- **Shen, L.** *Modelling fluid-solid interaction in micro- and nano-porous media*. ARC DP190102954, 2019-2021, AU$314,000.
- **Shen, L.**, Maggi, F., Gan, Y., El-Zien, A. and Pan, Z. *Assessing reservoir performance for carbon storage in saline aquifers*. ARC DP170102886, 2017-2019, AU$350,000.

- **Shen, L.**, Nguyen, G.D., El-Zein, A. and Maggi, F. *A multi-scale theory of unsaturated porous media under extreme loading*. ARC DP140100945, 2014-2016, AU$405,000.
- Einav, I. and **Shen, L.** *Propagating fragmentation waves in granular materials.* ARC DP130101291, 2013-2015, AU$380,000.
- **Shen, L.**, *Multi-Scale Model-Based Simulation of Glass Fragmentation under Blast Loading*, ARC DP0772478, 2007-2009, AU$101,982.
- Wu, X., Muddle, B.C., Nordmann, A., Hodgson, H.D., Schaffer, G., Ferry, M., Ringer, S.P., Xia, K., Nie, J., Davies, C.H., Hutchinson, C.R., Barnett, M.R., Dahle, A.K., Caceres, C.H., Hoffman, M.J., Dunlop, G.L., Couper, M., Embury, J.D., Lortto M.H., Humphreys, F.J., Arnberg, L.E., Fraser, H.L., Brechet, Y., Atrens, A., Birbilis, N., Estrin, Y., Ma, Q., **Shen**, **L.** Zhang, M., Hirsch, J.R., Hutchinson, B., Liu, Q., Poole, W.J. and Zhang, X.. *Design in Light Metals*, ARC Centre of Excellence Extension CE0561574, 2010-2013, AU$8,050,000.
- Zhao, J., Ranjith, P. G., Khalili, N., Dyskin, A.V., Liyanapathirana, S., Williams, D.J., Einav, I., Karakus, M., Sanjayan, J.G., **Shen, L.**, Ma, G., Wu, C., Xu, C., Scheuermann, A., Pasternak, E., Leo, C.J., Zhao, G., Perera, S. *Three dimensionally compressed and monitored Hopkinson bar*. ARC LE150100058, 2015, AU$560,000.
- Radom, L., Cairns, I., Crawford, J., **Shen, L.**, Wade, C., Wilkins, M., Abbass, H., Dzurak, A., Wen, W., Poulton, C., Arnold, M., Botten, L., Ford, M., Rahmani, A., O'Neill, C., Cheung, K., Johnson, M., Henskens, F., Borwein, J., Marchant, T., Hagenbuchner, M., Tieu, K., Rose, A., Gillies, S., Harrison, P., Waters, D., Leedham, G., Murison, R. *Flexible architecture high-performance computing facility for the intersect consortium of New South Wales*, ARC LE110100143, 2011, AU$500,000.
- **Shen, L.**, Hoffman, M., Einav, I., Ranzi, G., Liao, X., Mai, Y.-W., Bradford, M., Gilbert, R., Foster, S., Liu, Z. *Split Hopkinson Bar Facility for High Strain Rate Testing of Materials*, ARC LE100100045, 2010, AU$260,000.

Other National Competitive Grants:

- Paradowska, A., Proust, G., Hadigheh, S., Rasmussen, K., **Shen, L.**, Bambach, M., Khezri, M., *Sovereign Manufacturing Automation for Composites (SoMAC) Cooperative Research Centre (SoMAC CRC)*, University of Sydney Node. SoMAC CRC subproject: Shen, L. and Dias-da-Costa, D., *Structural Optimisation for Circular Design 4.0*, 2023-2026, ~AU$150,000.
- **Shen, L.** and Pham, C.H. *Bolt mechanisms validation and lightweight pole structures optimization*. Department of Industry, Innovation and Science/Client Commissioned Research, 2018, AU$15,000.

International Competitive Grants:

- Ye, H. and **Shen, L.** *The controllable transport behavior of multiphase flow inside nanopores under the coupled electro-thermo-mechanical effect*. The National Natural Science Foundation of China (No. 11672063), 2017-2020, CNY620,000.
- Zhang, H., Chen, Z., Zheng Y., Duan, Q., Zhang, Z., Xing, H., **Shen, L.**, Wang, P., Lian, Z., Liu, Y., *Multilevel Modeling and Computational Method for Mechanical Analysis of Fluid-Saturated Porous Media*, The National Natural Science Foundation of China (No. 11232003), 2013-2017, CNY3,000,000.
- Khanna, S.K., Chen, Z., Biard, J. and **Shen, L.** *Developing a New Glass Window Panel for Security Against Projectile and Small Explosion Threats at Close Proximity*, International Research in Homeland Security Science & Technology Mission Areas, US/Department of Homeland Security (2008-ST-108), 2008-2009, US$249,845.

Internal Grants:

- **Shen, L.** and Tong, J. *Next-generation offshore floating energy platform enabled by fibre-reinforced self-repairing bio-cementitious composites.* Office of Global Engagement/Ignition Grants, The University of Sydney, 2024 ($25,000)
- **Shen, L.** and Shen, Y. *Modelling fracture–fluid interactions at microscale*. SJTU Research Project Grants, Office of Global Engagement, The University of Sydney, 2019-2020 ($19,510)
- **Shen, L.** and Chauhan, K. *Controlling fluid flow at solid surfaces*. Civil Engineering Research Development Scheme, The University of Sydney, 2016-2017, AU$36,000.
- **Shen, L.** *Bioinspired nacre-like aluminium composite plates for impact applications*. Mid-Career Researcher Development Scheme, Faculty of Engineering and IT, The University of Sydney, 2015-2016, AU$26,628.
- **Shen, L.**, Gan, Y., Dong, A. Hanaor, D. and Flores-Johnson, E. Controlled crumpling of mesostructures for impact absorption. Civil Engineering Research Development Scheme, The University of Sydney, 2015, AU$50,000
- **Shen, L.,** Hanaor, D., Proust, G., Alonso-Marroquín, F., Gan, Y. and Flores-Johnson, E. *Multiscale mechanics of fractal surfaces*. Civil Engineering Research Development Scheme, The University of Sydney, 2013-2015, AU$80,000.
- **Shen, L.**, Proust, G. and Airey, D. *3D multiscale surface profilometer for Particles and Grains Laboratory. Major Equipment Scheme*, Faculty of Engineering and IT, The University of Sydney, 2013, AU$48,634.
- **Shen**, L., Gelet, R., Guiamatsia, I., Nguyen, G.D. *Experimental and numerical study of unsaturated soil response to impact"*, Civil Engineering Research Development Scheme, The University of Sydney, 2012, AU$26,000.

- **Shen, L.** *Computing for Clean Water – An International Effort*, International Program Development Fund, The University of Sydney, 2011-2012, AU$5,000.
- **Shen, L.** *Characterization, Modelling, and Applications of Ultrananocrystalline Diamond Films*, Early Career Researcher Scheme, Faculty of Engineering and IT, The University of Sydney, 2009, AU$20,000.
- **Shen, L.** *Modeling of Ultrananocrystalline Diamond Films*, Faculty of Engineering New Staff Member Research Funds, Monash University, 2008, AU$20,000.
- **Shen, L.** and Zhao, X.L. (Mentor), *A preliminary study of nanostructured high performance high strength concrete for high temperatures*, Faculty of Engineering Small Grants, Monash University, 2008, AU$15,500.
- **Shen, L.**, and Zhao, X.L. (Mentor), *A Preliminary Study of Epoxy/Nanomaterials as Adhesives for Retrofitting Structures with CFRP*, Faculty of Engineering Small Grants, Monash University, 2007, AU$15,500.
- **Shen, L.**, *A Numerical and Experimental Investigation on the Delamination of CFRP Sheet from Steel Plate*, Faculty of Engineering New Staff Member Research Funds, Monash University, 2006, AU$20,000.

HDR Supervision (all as main supervisor unless otherwise specified)

PhD completions (including 3 as co-supervisor)

1. **Haydar Faleh**, *Development of nanoparticle enhanced epoxy for CFRP retrofitting in steel structures*, 2011 (Monash University, Main Supervisor/External Supervisor)
2. **Ling Li**, *Crystal Plasticity Finite Element Modelling of the Effects of the Microstructure and Texture on the Mechanical Behaviour of Aluminium Alloys*, 2014
3. **Sagar Das**, *A strain-rate dependent tensile damage model for brittle materials under impact loading*, 2016
4. **Katherine McDonell**, *Modification of single-walled carbon nanotubes properties through irradiation induced intertube bonding*, 2016 (as co-supervisor).
5. **Sheng Jiang**, *Fracture and Fragmentation of Granular Materials under Impact,* 2018
6. **Seyed Aliakbar Mirmohammadi**, *Study of Heat Transfer Performance of Silver Nanofluid at Nano- and Macro-Scale*, 2018
7. **Saba Gharehdash**, *Numerical study of the mechanical and hydraulic behaviour of blast induced fractures in rocks*, 2018
8. **Pengyu Huang**, *Multiscale Modelling of Dynamic Contact Angles for CO2-Water-Silica Systems*, 2019
9. **Mansour Sharafisafa**, *Characterization of quasi-static and dynamic fracture behaviour of rock-like materials using digital image correlation*, 2019
10. **Kenneth James Tam**, *Characterising the Texture and Temperature Effects on the Deformation Mechanism of Magnesium Alloy AZ31: A Simulation Study of the Interplay between Slip, Twinning, and Dynamic Recrystallisation,* 2020 (as co-supervisor)
11. **Muhammad Basit Ehsan Khan**, *Self-healing performance of bacteria-based mortar in marine environment*, 2021
12. **Dengyiding Jin,** *Performance of demountable tubular connections formed by composite chord and hollow braces*, 2021
13. **Jiahao Peng,** Performance and Design of Steel-Concrete Composite Systems for Multi-Storey Modular Buildings, 2021
14. **Zipeng Chen**, *A smoothed particle hydrodynamics-based approach for modelling fluid-fracture interaction at meso-scale,* 2022
15. **Gen Li,** *Performance and countermeasures of concrete-filled steel tubular columns in corrosive environments*, 2022
16. **Ruoyu Wang***, Microstructure and Dynamic Behaviour of Polymeric Foams with Application to Multilayered Protective Structures,* 2022 (as co-supervisor)
17. **Lei Yang,** *Fracture behaviour of layered rocks with alternating stiff and soft layers,* 2022
18. **Baixi Chen,** *Gaussian process regression-based data-driven material models for stochastic structural analysis,* 2022
19. **Jian Wu**, *Multiscale modelling of CO_2-CH_4 displacement in shale gas reservoirs,* 2024

Current PhD students

1. **Runda Wang**, *Prediction of rock bursts using machine learning based method*
2. **Xiaodong Hu**, *A Numerical Study of Proppant Transport in Hydraulic Fractures with Rough Surfaces*
3. **Zifeng Cheng**, Compressed air energy storage (thesis title to be finalised)
4. **Tingxuan Yao**, Bacteria-based self-healing bio-concrete (thesis title to be finalised)
5. **Yiqun Ma,** Underground hydrogen storage (thesis title to be finalised)
6. **Oluwatosin Balogun**, Experimental study of bacteria-based self-healing concrete (thesis title to be finalised)
7. **Jiangshuai Meng**, Energy dissipation in dynamic brittle fracture (thesis title to be finalised)
8. **Daihong Li,** Numerical modelling of bacteria-based self-healing concrete (thesis title to be finalised)
9. **Xuening Zhang,** Numerical modelling of dynamic fracture in brittle materials (thesis title to be finalised)
10. **Dex Chang,** AI-assisted design of reusable steel-timber composite connections (as co-supervisor, thesis title to be finalised)
11. **Ziv Chen,** Vision based machine learning for crack detection (as co-supervisor, thesis title to be finalised)
12. **Stephani Soro,** Machine learning assisted disaster assessment (as co-supervisor, thesis title to be finalised).
13. **Chenxin Wang,** Machine learning based infrastructure damage detection (as co-supervisor, thesis title to be finalised).

14. **Teng Tu,** Experimental study of bacteria-based self-healing concrete (as co-supervisor, thesis title to be finalised)

MPhil completions

1. **Chongda Wu**, *Numerical Investigation of the Behaviour of Concrete under High Strain-Rate Loading*, 2012
2. **Dongxin Liu**, *Numerical Investigation on Dynamic Responses of Granular Materials under Impact Loading Using the Material Point Method*, 2016
3. **Shengzhe Wang**, *On the high strain rate response of partially saturated porous media*, 2017
4. **Tingyi Miao**, *Nacre-like aluminium alloy composite plates for ballistic impact applications*, 2019

Other Research Supervision (all as main supervisor unless otherwise specified)

- Post-Doctoral Research Fellows: 7 completion, 1 current
- Visiting Scholars (12 months or longer): 3 completion
- Occupational Trainees (6 months or longer): 3 completion
- Honours Students: 80+ completion
- Civil Engineering Summer Scholars: 3 completion

Research Publications

- Google Scholar Citations: https://scholar.google.com.au/citations?user=LPO6dwsAAAAJ&hl=en
- Scopus Author ID 7401704319: http://www.scopus.com/authid/detail.url?authorId=7401704319
- Web of Science ResearcherID: https://publons.com/researcher/2839010/luming-shen/

Book Chapters

1. Ma, M., **Shen, L.**, Wang, L. and Zheng, Q. Molecular Mechanics and Continuum Mechanics Study of Buckling of Pre-Stressed Multi-Walled Carbon Nanotubes. *Advances in Heterogeneous Material Mechanics*, Editors J. Fan, J. Zhang, H. Chen and Z. Jin. pp. 373–376, DEStech Publications, May 2011 (ISBN: 978-1-60595-054-9).
2. Kong, Y., **Shen, L.**, Proust, G. and Ranzi, G. Interface structure and mechanical properties of the nanolayered Al/Pd thin films. *Advances in Heterogeneous Material Mechanics*, Editors J. Fan, J. Zhang, H. Chen and Z. Jin. pp. 84–87, DEStech Publications, May 2011 (ISBN: 978-1-60595-054-9).
3. Chen, Z., **Shen, L.**, Kanel, G.I. and Razorenov, S.V. A Numerical Investigation of Microcracking Diffusion in Sandwiched Glass Plates, *Ceramic Armor Materials by Design*, Edited by McCauley JW et al., Published by The American Ceramic Society, pp. 329–336, 2001.

Refereed Journal Articles

1. Chianeh, S.M., **Shen, L.** and Dias-da-Costa, D. A creep damage model for cracked concrete accounting for the rate of crack opening in a discrete strong discontinuity framework. *Engineering Fracture Mechanics* **315**, 110801, 2025.
2. Wu, J., Huang, P., **Shen, L**. Microscale modeling of CO_2 injection techniques for enhanced methane recovery and carbon storage. *Separation and Purification Technology* **360**, 131208, 2025.
3. Fan, Y., Feng, C., Hang, Z., **Shen, L.**, Li, W. Optimal design of electrical conductivity of hybrid multi-dimensional carbon fillers reinforced porous cement-based Composites: Experiment and modelling. *Composite Structures* **352**, 118714, 2025.
4. Wu, J., Gan, Y., Huang, P., **Shen, L**. A coarse-grained approach to modeling gas transport in swelling porous media. *International Journal of Rock Mechanics and Mining Sciences* **183**, 105918, 2024.
5. Sharafisafa, M., Aliabadian, Z., Sato, A., **Shen, L.** Effect of strain rate on the failure of bimrocks using the combined finite-discrete element method. *Computers and Geotechnics* **176**, 106712, 2024.
6. Sharafisafa, M., Aliabadian, Z., Sato, A., Sainoki, A., Bahaaddini, M., Kargar, A., Nejati, H.R., **Shen, L.** Finite-discrete element modelling of fracture development in bimrocks. *Engineering Fracture Mechanics* **308**, 110346, 2024.
7. Wu, J., Gan, Y., Huang, P., **Shen, L**. CO_2 transport through swelling organic-rich nanoporous media: Insights on gas permeability from coarse-grained pore-scale simulations. *Journal of Cleaner Production* **469**, 143253, 2024.
8. Hang, Z., Feng, C., Fan, Y., **Shen, L.**, Unluer, C., Wang, S. Improved quasi-static and dynamic mechanical performance of functionally graded graphene nanoplatelet reinforced cement composites. *Construction and Building Materials* **452**, 138903, 2024.
9. Hang, Z., Feng, C., **Shen, L.**, Unluer, C., Wang, S. Experimental and Theoretical Analysis on the Thermomechanical Properties of Functionally Graded Graphene Nanoplatelet Reinforced Cement Composites. *Cement and Concrete Composites* **153**, 105740, 2024.
10. Chen, Z., Shamsabadi, E.A., Jiang, S., **Shen, L.** and Dias-da-Costa, D. An average pooling designed Transformer for robust crack segmentation. *Automation in Construction* **162**, 105367, 2024.
11. Chen, Y., Tong, J., Li, Q., Xu, S., **Shen, L.** Application of high-performance cementitious composites in steel–concrete composite bridge deck systems: A review. *Journal of Intelligent Construction* **2**, 9180012, 2024.

12. Ehsan Khan, M.B., Dias-da-Costa, D., **Shen, L.** Effect of crack orientation on bacterial self-healing of bio-mortar in marine environment. *Materials Today Sustainability* **24**, 100608, 2023.
13. Sharafisafa, M., Aliabadian, Z., Sato, A., Nejati, H.R., **Shen, L.** Combined finite-discrete element modelling of hydraulic fracturing in reservoirs with filled joints. *Geoenergy Science and Engineering* **228**, 212025, 2023.
14. Chan-Colli, D.G., Agaliotis, E.M., Frias-Bastar, D., **Shen, L.**, Carrillo, J.G., Herrera-Franco, P.J., Flores-Johnson, E.A. Ballistic Behavior of Bioinspired Nacre-like Composites. *Biomimetics* **8**, 341, 2023.
15. Hou, C., Zhou, X.-G. and **Shen, L.** Intelligent prediction methods for *N–M* interaction of CFST under eccentric compression. *Archives of Civil and Mechanical Engineering* **23**, 197, 2023.
16. Wu, J., Gan, Y., Shi, Z, Huang, P., **Shen, L**., Pore-scale lattice Boltzmann simulation of CO2-CH4 displacement in shale matrix. *Energy* **278**, 127991, 2023.
17. Sharafisafa, M., Sato, A., Sainoki, A., **Shen, L.,** Aliabadian, Z. Combined finite-discrete element modelling of hydraulic fracturing in deep geologically complex reservoirs. *International Journal of Rock Mechanics and Mining Sciences* **167**, 105406, 2023
18. Ehsan Khan, M.B., Dias-da-Costa, D., **Shen, L.** Factors affecting the self-healing performance of bacteria-based cementitious composites: A review. *Construction and Building Materials* **384**, 131271, 2023.
19. Li, Y.-M., Zhao, G.-F., Jiao, Y., Yan, C., Wang, X., **Shen, L.**, Yang, L., Liang, Z., Li, W., Zhou, X., Li, X., Liu, F., Zhang, K., Li, X., Pan, C., Le, T. A benchmark study of different numerical methods for predicting rock failure. *International Journal of Rock Mechanics and Mining Sciences* **166**, 105381, 2023.
20. Wu, J., **Shen, L**., Huang, P., Gan, Y. Selective adsorption and transport of CO2-CH4 mixture under nano-confinement. *Energy* **273**, 127224, 2023.
21. Sharafisafa, M., Aliabadian, Z., Sato, A., **Shen, L.** Coupled thermo-hydro-mechanical simulation of hydraulic fracturing in deep reservoirs using finite-discrete element method. *Rock Mechanics and Rock Engineering* **56**, 5039-5075, 2023.
22. Chen, B., **Shen, L.** and Zhang, H. A hybrid proper orthogonal decomposition-heteroscedastic sparse Gaussian process regression model for evaluating structural reliability with correlated stochastic material properties. *Structural Safety* **100**, 102289, 2023.
23. Jiang, S., Cheng, Z., Yang, L., **Shen, L.** An auto-tuned hybrid deep learning approach for predicting fracture evolution. *Engineering with Computers* **39**, 3353-3370, 2023.
24. Cheng, Z., Dias-da-Costa, D., Gan, Y. and **Shen, L.** A Modified Phase-field Model for Predicting Mixed-mode Fracture in Rock-like Materials. *Journal of Micromechanics and Molecular Physics* **7**, 213-224, 2022.
25. Wu, J., Huang, P., Maggi, F., **Shen, L**. Effect of sorption-induced deformation on methane flow in kerogen slit pores. *Fuel* **325**, 124886, 2022.
26. Yang, L., Wu, S., Gao, K. and **Shen, L.** Simultaneous propagation of hydraulic fractures from multiple perforation clusters in layered tight reservoirs: non-planar three-dimensional modelling. *Energy* **254**, 124483, 2022.
27. Huang, P., **Shen, L.**, Maggi, F., Chen, Z., and Pan, Z. Influence of Surface Roughness on Methane Flow in Shale Kerogen Nano-slits. *Journal of Natural Gas Science and Engineering* **103**(1), 104650, 2022.
28. Jiang, S. and **Shen, L.** Aggregate shape effect on fracture and breakage of cementitious granular materials. *International Journal of Mechanical Sciences* **220**, 107161, 2022.
29. Ehsan Khan, M.B., **Shen, L.**, Dias-da-Costa, D. Characterisation of autogenous healing in cracked mortars under marine water exposure. *Magazine of Concrete Research* **74**(2), 91-106, 2022.
30. Wang, M., Zhang, H., Dai, H. and **Shen, L.** A deep learning-aided seismic fragility analysis method for bridges. *Structures* **40**, 1056-1064, 2022.
31. Chen, Z. and **Shen, L.** A modified smoothed particle hydrodynamics for modelling fluid-fracture interaction at mesoscale. *Computational Particle Mechanics* **9**, 277-297, 2022.
32. Chen, B., **Shen, L.** and Zhang, H. Heteroscedastic sparse Gaussian process regression-based stochastic material model for plastic structural analysis. *Scientific Reports* **12**, 3017, 2022.
33. Wu, J., Huang, P., Maggi, F., **Shen, L**. Molecular investigation on CO_2-CH_4 displacement and kerogen deformation in enhanced shale gas recovery. *Fuel* **315**, 123208, 2022.
34. Peng, J., Hou, C., **Shen, L.** Progressive collapse analysis of corner-supported composite modular buildings. *Journal of Building Engineering* **48**, 103977, 2022.
35. Li, G., Hou, C., **Shen, L.** Combined compression-bending performance and design of CFST with localised pitting corrosion. *Journal of Constructional Steel Research* **192**, 107247, 2022.
36. Li, G., Hou, C., **Shen, L.,** Yao, G.-H. Performance and strength calculation of CFST columns with localized pitting corrosion damage. *Journal of Constructional Steel Research* **188,** 107011, 2022.
37. Yang, L., Sharafisafa, M., **Shen, L.** On the fracture mechanism of rock-like materials with interbedded hard-soft layers under Brazilian tests. *Theoretical and Applied Fracture Mechanics* **116**, 103102, 2021.
38. Jiang, S., **Shen, L.** and Li, W. An Experimental Study of Aggregate Shape Effect on Dynamic Compressive Behaviours of Cementitious Mortar. *Construction and Building Materials* **303**, 123333, 2021.
39. Jiang, S., **Shen, L.**, Guillard, F. and Einav, I. Characterisation of fracture evolution of a single cemented brittle grain using in-situ X-ray computed tomography. *International Journal of Rock Mechanics and Mining Sciences* **145**, 104835, 2021.
40. Peng, J., Hou, C., **Shen, L.** Numerical analysis of corner-supported composite modular buildings under wind actions. *Journal of Constructional Steel Research* **187**, 106942, 2021.
41. Li, G., Hou, C., **Shen, L.** Life-cycle analysis of FRP-strengthened offshore CFST columns suffering from steel corrosion. *Composite Structures* **277**, 114607 2021.

42. Li, H., Chen, T., Li, W., Zhang, H., Han, S., Zhou, C, Chen, Z, Flores-Johnson, E.A., **Shen, L.**, Lian, J, Beyerlein, I.J., Liao, X. Grain size dependent microstructure and texture evolutions during dynamic deformation of nanocrystalline face-centered cubic materials. *Acta Materialia* **216**, 117088, 2021.
43. Jin, D., Hou, C., **Shen, L.** Effect of welding residual stress on the performance of CFST tubular joints. *Journal of Constructional Steel Research* **184**, 106827, 2021.
44. Wang, J., Cui, D., Kong, Y. and **Shen, L.** Unusual force constants guided distortion-triggered loss of long-range order in phase change materials. *Materials* **14**(13), 3514, 2021.
45. Li, P., Li, W., Sun, Z., **Shen, L.** Sheng, D. Development of sustainable concrete incorporating seawater: A critical review on hydration, microstructure and mechanical strength. *Cement and Concrete Composites* **121**, 104100, 2021.
46. Huang, P., **Shen, L.,** Gan, Y., Shen, Y., Du, D., Yu, B., Maggi, F., El-Zein, A. Measurements of the Relative Permeability to CO2-and-Brine Multiphase Fluid of Paaratte Formation at Near-reservoir Conditions. *Greenhouse Gases: Science and Technology* **11**, 697-711, 2021.
47. Tam, K.J., Vaughan, M.W., **Shen, L.**, Knezevic, M., Karaman, I., Proust, G. Modelling Dynamic Recrystallisation in Magnesium Alloy AZ31. *International Journal of Plasticity* **142**, 102995, 2021.
48. Ehsan Khan, M.B., **Shen, L.**, Dias-da-Costa, D. Crack healing performance of bacteria-based mortar under sustained tensile loading in marine environment. *Cement and Concrete Composites* **120**, 104055, 2021.
49. Jiang, S., **Shen, L.**, Guillard, F. and Einav, I. Three-dimensional fabric orientation visualisation technique for distributed fractures using X-ray computed tomography. *International Journal of Rock Mechanics and Mining Sciences* **142**, 104756, 2021.
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2. Huang, P., **Shen, L.**, Gan, Y., Maggi, F., El-Zein, A., Nguyen, G. (2019). A Coarse-Grained Model for Microscale Multiphase Interactions and Its Applications in Dynamic Wetting. *International Conference on Computational Methods (10th ICCM)*, USA: Scientech Publisher llc.
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2. Ma, M., **Shen, L.**, Wang, L. and Zheng, Q., Molecular Mechanics and Continuum Mechanics Study of Buckling of Pre-Stressed Multi-Walled Carbon Nanotubes. Keynote speech in *the 3rd International Conference for Heterogeneous Materials Mechanics (ICHMM)*, Shanghai, China, 22-25 May 2011.
3. **Shen, L.** Numerical Simulation of Glass Fragmentation under Impact using a Coupled Damage/Decohesion Model with the Material Point Method, *the 22nd International Congress of Theoretical and Applied Mechanics* (ICTAM2008), Adelaide Australia, 24-30 August, 2008.
4. Chen, Z., **Shen, L.**, and Gan, Y., Recent Advances in Developing a Unified Multiscale Simulation Procedure for Single Crystal Materials, *the 8th World Congress on Computational Mechanics*, Venice, Italy, 2008.
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15. **Shen, L.** and Chen, Z., A Silent Boundary Method with the MPM for Simulating Film Delamination, *The 7th US National Congress on Computational Mechanics*, Albuquerque, New Mexico, July 28-30, 2003.
16. Chen, Z., Hu, W. and **Shen, L.**, The Development of the MPM for Simulating the Evolution of Failure Involving Multi-Degrees of Discontinuity, *The 7th US National Congress on Computational Mechanics*, Albuquerque, New Mexico, July 28-30, 2003.
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Teaching Grants

- **Shen, L.** and Jabbarzadeh, A. *Implementation of student-focused online practice and assessment tool for first year engineering students*, Civil Engineering Education Development Scheme, University of Sydney, 2012 ($14,300).
- Ranzi, G. and **Shen, L.** *Implementation of student-centred videogames in civil engineering education,* TIES: Teaching Improvement and Equipment Scheme, University of Sydney, 2009 ($10,000).