Curriculum Vitae

MA, Hongyan Ph.D.

Assistant Professor
Dept. of Civil, Architectural and Environmental Engineering
Missouri University of Science and Technology

Address: 323 Butler-Carlton Hall, 1401 N. Pine St., Rolla, MO 65409-0030
E-mails: mahon@mst.edu
Phone: 1-(573)341-6250
Personal webpage:
https://care.mst.edu/people/faculty/profiles/ma/

Education Background:

2008/09~2013/02 **Ph.D.** in Civil Engineering

Department of Civil and Environmental Engineering, the Hong Kong University of Science and Technology, Hong Kong.

2005/09~2008/06 **M.Eng.** in Structural Engineering

Department of Civil Engineering, Shenzhen University, Shenzhen, China.

2003/09~2005/06 **B.Law**

Law School, Chongqing University, Chongqing, China.

2001/09~2005/06 **B.Eng.** in Inorganic Non-metallic Materials Engineering

Department of Building Materials, Chongqing University, Chongqing.

Work Experience:

2015/10~Present Assistant Professor, Department of Civil, Architectural and Environmental Engineering, Missouri S&T.

2013/03~2015/10 Post-doctoral Fellow, Department of Civil and Environmental Engineering, HKUST.

2012/09~2013/03 Part-time Research Assistant, Department of Civil and Environmental Engineering, HKUST.

2008/09~2012/08 Teaching Assistant, Department of Civil and Environmental Engineering, HKUST.

Research interests:

- Nano- and biological technologies in construction;
- Phase change materials in concrete;
- Magnesia-phosphate cement (MPC) and MPC-based functional materials;
- Acoustics- and optics-based NDTs and sensing;

- Hydration kinetics of (blended) cementitious materials;
- Microstructural characterization and modeling of cement paste, interfacial transition zone and mortar/concrete;
- Measuring and multi-scale modeling of transport properties of concrete;
- Mechanisms and properties of novel construction/rehabilitation materials;
- Deterioration mechanisms of concrete structures;
- Molecular simulation of C-S-H.

Publications:

Refereed Journal Articles *(* denotes that I am corresponding author)*

[60] Liao, W., Sun, X., Kumar, A., Sun, H., **Ma, H.*** (2019). Hydration of binary portland cement blends containing silica fume: a decoupling method to estimate degrees of hydration and pozzolanic reaction. Accepted by *Frontiers in Materials* ("Rising Stars" article collection).

[59] Banala, A., **Ma, H.**, Kumar, A. (2019). Influence of particulate geometry on permeability of porous materials. *Powder Technology, 345*, 704-716. doi: 10.1016/j.powtec.2019.01.064

[58] Cook, R., **Ma, H.**, Kumar, A. (2019). Mechanism of tricalcium silicate hydration in the presence of polycarboxylate polymers. *SN Applied Sciences, 1* (2), 145 (17 pages). doi: 10.1007/s42452-018-0153-1

[57] He, R., Ye, H., **Ma, H.**, Fu, C., Jin, X., Li, Z. (2019). Correlating the chloride diffusion coefficient and pore structure of cement-based materials using modified non-contact electrical resistivity measurement. ASCE *Journal of Materials in Civil Engineering*, *31* (3), 04019006. doi: 10.1061/(ASCE)MT.1943-5533.0002616

[56] Long, W., Gu, Y., **Ma, H.**, Li, H., Xing, F. (2019). Mitigating the electromagnetic radiation by coupling use of waste cathode-ray tube glass and graphene oxide on cement composites. *Composites Part B: Engineering*, *168*, 25-33. doi: 10.1016/j.compositesb.2018.12.050

[55] Hao, W., **Ma, H.***, Sun, G., Li, Z. (2019). Magnesia phosphate cement composite bipolar plates for passive type direct methanol fuel cells. *Energy, 168*, 80-87. doi: 10.1016/j.energy.2018.11.094

[54] Li, Y., Liao, W., Taghvaee, T., Wu, C., **Ma, H.***, Leventis, N. (2019). Bioinspired strong nanocellular composite prepared with magnesium phosphate cement and polyurea aerogel. *Materials Letters*, *237*, 274-277. doi: 10.1016/j.matlet.2018.11.121

[53] Zarnaghi, V., Fouroghi-Asl, A., Nourani, V., **Ma, H.*** (2018). On the pore structures of lightweight self-compacting concrete containing silica fume. *Construction and Building Materials, 193*, 557-564. doi: 10.1016/j.conbuildmat.2018.09.080

[52] Xu, W., Wen, X., Wei, J., Xu, P., Zhang, B., Yu, Q., **Ma, H.** (2018). Feasibility of kaolin tailing sand to be as an environmentally friendly alternative to river sand in construction applications. *Journal of Cleaner Production*, *205*, 1114-1126. doi: 10.1016/j.jclepro.2018.09.119

[51] Zhang, J., Hou, D., Hafiz, R. B., Han, Q., **Ma, H.*** (2018). Effects of internally introduced sulfate on early age concrete properties: active acoustic monitoring and molecular dynamics simulation. *Construction and Building Materials, 188*, 1014-1024. doi: 10.1016/j.conbuildmat.2018.08.187

[50] He, R., **Ma, H.**, Hafiz, R. B., Fu, C., Jin, X., He, J. (2018). Determining porosity and pore network connectivity of cement-based materials by a modified non-contact electrical resistivity measurement: Experiment and theory. *Materials and Design, 156*, 82–92. doi: 10.1016/j.matdes.2018.06.045

[49] Xu, B., Lothenbach, B., **Ma, H.** (2018). Properties of Fly Ash Blended Magnesium Potassium Phosphate Mortars: Effect of the Ratio between Fly Ash and Magnesia. *Cement & Concrete Composites, 90*, 169-177. doi: 10.1016/j.cemconcomp.2018.04.002

[48] **Ma, H.***, Li, Y. (2018). Discussion of the paper "Characterisation of magnesium potassium phosphate cement blended with fly ash and ground granulated blast furnace slag" by L.J. Gardner et al. *Cement and Concrete Research, 103*, 245-248. doi: 10.1016/j.cemconres.2017.07.013

[47] Zhang, B., Zhang, Y., Liao, W., **Ma, H.*** (2018). A new-type locally resonant composite unit for sound-proof purpose: analytical model and experiment. *Construction and Building Materials, 164*, 792-798. doi: 10.1016/j.conbuildmat.2018.01.022

[46] Long, W., Wei, J., **Ma, H.**, Xing, F. (2017). Dynamic mechanical properties and microstructure of graphene oxide nanosheets reinforced cement composites. *Nanomaterials, 7*(12), 407 (19 pages). doi:10.3390/nano7120407

[45] Li, X., Bao, Y., Wu, L., Yan, Q., **Ma, H.**, Chen, G., Zhang, H. (2017). Thermal and mechanical properties of high-performance fiber-reinforced cementitious composites after exposure to high temperatures. *Construction and Building Materials, 157*, 829-838. doi: 10.1016/j.conbuildmat.2017.09.125

[44] Liao, W., **Ma, H.***, Sun, H., Huang, Y., Wang, Y. (2017). Potential large-volume beneficial use of low-grade fly ash in magnesia-phosphate cement based materials. *Fuel, 209*, 490-497. doi: 10.1016/j.fuel.2017.08.028

[43] Zhang, L., Yamauchi, K., Li, Z., Zhang, X., **Ma, H.**, Ge, S. (2017). Novel understanding of calcium silicate hydrate from dilute hydration. *Cement and Concrete Research, 99*, 95-105. doi: 10.1016/j.cemconres.2017.04.016

[42] Xu, B., **Ma, H.**, Shao, H., Li, Z., Lothenbach, B. (2017). Influence of fly ash on compressive strength and micro-characteristics of magnesium potassium phosphate cement mortars. *Cement and Concrete Research, 99*, 86-94. doi: 10.1016/j.cemconres.2017.05.008

[41] Hanif, A., Parthasarathy, P., **Ma, H.**, Fan, T., Li, Z. (2017). Properties improvement of fly ash cenosphere modified cement pastes using nano silica. *Cement & Concrete Composites, 81*, 35-48. doi: 10.1016/j.cemconcomp.2017.04.008

[40] **Ma, H.***, & Xu, B. (2017). Potential to design magnesium potassium phosphate cement paste based on an optimal magnesia-to-phosphate ratio. *Materials and Design, 118*, 81-88. doi: 10.1016/j.matdes.2017.01.012

[39] Hou, D., Lu, Z., Li, X., **Ma, H.**, & Li, Z. (2017). Reactive molecular dynamics and experimental study of graphene-cement composites: Structure, dynamics and reinforcement mechanisms. *Carbon, 115*, 188-208. doi: 10.1016/j.carbon.2017.01.013

[38] Zhang, J., **Ma, H.***, Pei, H., & Li, Z. (2017). Steel corrosion in magnesia-phosphate cement concrete beams. *Magazine of Concrete Research, 69*(1), 35-45. doi: 10.1680/jmacr.15.00496

[37] Hu, C., & **Ma, H.*** (2016). Statistical analysis of backscattered electron image of hydrated cement paste. *Advances in Cement Research, 28*(7), 469-474. doi: 10.1680/jadcr.16.00002

[36] Hao, W., **Ma, H.***, Lu, Z., Sun, G., & Li, Z. (2016). Design of magnesium phosphate cement based composite for high performance bipolar plate of fuel cells. *RSC Advances, 6*(61), 56711-56720. doi: 10.1039/C6RA11573J

[35] Lu, Z., Hou, D., **Ma, H.**, Fan, T., & Li, Z. (2016). Effects of graphene oxide on the properties and microstructures of the magnesium potassium phosphate cement paste. Construction and Building Materials, *119*, 107-112. doi: 10.1016/j.conbuildmat.2016.05.060

[34] Xu, B., **Ma, H.**, Hu, C., & Li, Z. (2016). Influence of cenospheres on properties of magnesium oxychloride cement-based composites. *Materials and Structures, 49*(4), 1319-1326. doi: 10.1617/s11527-015-0578-6

[33] Hu, C., Xu, B., **Ma, H.**, Chen, B., & Li, Z. (2016). Micromechanical investigation of magnesium oxychloride cement paste. *Construction and Building Materials, 105*, 496-502. doi: 10.1016/j.conbuildmat.2015.12.182

[32] Zhang, J., **Ma, H.***, Yan, W., & Li, Z. (2016). Defect detection and location in switch rails by acoustic emission and Lamb wave analysis: A feasibility study. *Applied Acoustics, 105*, 67-74. doi: 10.1016/apacoust.2015.11.018

[31] Xu, B., **Ma, H.**, Hu, C., Yang, S., & Li, Z. (2016). Influence of curing regimes on mechanical properties of magnesium oxychloride cement-based composites. *Construction and Building Materials, 102*, 613-619. doi: 10.1016/j.conbuildmat.2015.10.205

[30] Xu, B., **Ma, H.**, Lu, Z., & Li, Z. (2015). Paraffin/expanded vermiculite composite phase change material as aggregate for developing lightweight thermal energy storage cement-based composites. *Applied Energy, 160*, 358-367. doi: 10.1016/j.apenergy.2015.09.069

[29] **Ma, H.***, Hou, D., & Li, Z. (2015). Two-scale modeling of transport properties of cement paste: Formation factor, electrical conductivity and chloride diffusivity. *Computational Materials Science, 110*, 270-280. doi: 10.1016/j.commatsci.2015.08.048

[28] Zhang, J., Fan, T., **Ma, H.***, & Li, Z. (2015). Monitoring setting and hardening of concrete by active acoustic method: effects of water-to-cement ratio and pozzolanic materials. *Construction and Building Materials, 88*, 118-125. doi: 10.1016/j.conbuildmat.2015.04.010

[27] Hou, D., **Ma, H.**, & Li, Z. (2015). Morphology of calcium silicate hydrate (C-S-H) gel: a molecular dynamic study. *Advances in Cement Research, 27*(3), 135-146. doi: 10.1680/adcr.13.00079

[26] Hou, D., Zhao, T., Jin, Z., **Ma, H.**, & Li, Z. (2015). Molecular simulation of calcium silicate composites: structure, dynamics, and mechanical properties. *Journal of the American Ceramic Society, 98*(3), 758–769. doi: 10.1111/jace.13368

[25] Pei, H., Zhang, B., Li, Z., **Ma, H.**, & Zhang, J. (2015). Measurement of early-age strains in mortar specimens subjected to cyclic temperature. *Materials Letters*, *142*, 150-152. doi: 10.1016/j.matlet.2014.11.071

[24] **Ma, H.**, Tang, S., & Li, Z. (2015). New pore structure assessment methods for cement paste. *Journal of Materials in Civil Engineering*, *27*(2), A4014002 (10 pages). doi: 10.1061/(ASCE)MT.1943-5533.0000982

[23] Lu, Y., **Ma, H.***, & Li., Z. (2015). Ultrasonic monitoring of the early age hydration of mineral admixtures incorporated concrete using cement-based piezoelectric composite sensors. *Journal of Intelligent Material Systems and Structures*, *26*(3), 280-291. doi: 10.1177/1045389X14525488

[22] Xu, B., **Ma, H.***, & Li, Z. (2015). Influence of magnesia-to-phosphate molar ratio on microstructures, mechanical properties and thermal conductivity of magnesium potassium phosphate cement paste with large water-to-solid ratio. *Cement and Concrete Research*, *68*, 1-9. doi: 10.1016/j.cemconres.2014.10.019

[21] Hou, D., Zhao, T., **Ma, H.**, & Li, Z. (2015). Reactive molecular simulation on water confined in the nano-pores of the C-S-H gel: structure, reactivity and mechanical Property. *The Journal of Physical Chemistry C, 119*(3), 1346−1358. doi: 10.1021/jp509292q

[20] **Ma, H.**, Xu, B., Liu, J., Pei, H., & Li, Z. (2014). Effects of water content, magnesia-to-phosphate molar ratio and age on pore structure, strength and permeability of magnesium potassium phosphate cement paste. *Materials & Design*, *64*, 497-502. doi: 10.1016/j.matdes.2014.07.073

[19] **Ma, H.**, Hou, D., Liu, J., & Li, Z. (2014). Estimate the relative electrical conductivity of C-S-H gel from experimental results. *Construction and Building Materials, 71*, 392-396. doi: 10.1016/j.conbuildmat.2014.08.036

[18] **Ma, H.**, Xu, B., & Li, Z. (2014). Magnesium potassium phosphate cement paste: degree of reaction, porosity and pore structure. *Cement and Concrete Research*, 65, 96-104. doi: 10.1016/j.cemconres.2014.07.012

[17] Hou, D., **Ma, H.***, Li, Z., & Jin, Z. (2014). Molecular simulation of "hydrolytic weakening": A case study on silica. *Acta Materialia*, 80, 264-277. doi: 10.1016/j.actamat.2014.07.059

[16] Liu, J., Xing, F.*, Dong, B., **Ma, H.***, Pan, D. (2014). Study on water sorptivity of the surface layer of concrete. *Materials and Structures*, *47*(11), 1941–1951. doi: 10.1617/s11527-013-0162-x

[15] Pei, H., Li, Z., Zhang, B., & **Ma, H.** (2014). Multipoint measurement of early age shrinkage in low w/c ratio mortars by using fiber Bragg gratings. *Materials Letters, 131*, 370-372. doi: 10.1016/j.matlet.2014.05.202

[14] **Ma, H.**, Hou, D., Lu, Y., & Li, Z. (2014). Two-scale modeling of the capillary network in hydrated cement paste. *Construction and Building Materials*, 64, 11-21. doi: 10.1016/j.conbuildmat.2014.04.005

[13] **Ma, H.**, Xu, B., Lu, Y., & Li, Z. (2014). Modelling magnesia-phosphate cement

paste at the micro-scale. *Materials Letters, 125*, 15-18. doi: 10.1016/j.matlet.2014.03.143

[12] Liu, J., Xing, F., Dong, B., **Ma, H.**, Pan, D. (2014). New equation for description of chloride ions diffusion in concrete under shallow immersion condition. *Materials Research Innovations*, *18*(s2), 265-269. doi: 10.1179/1432891714Z.000000000413

[11] Hou, D., **Ma, H.***, Zhu, Y., & Li, Z.* (2014). Calcium silicate hydrate from dry to saturated state: structure, dynamics and mechanical properties. *Acta Materialia, 67*, 81-94. doi: 10.1016/j.actamat.2013.12.016

[10] Lu, Y., **Ma, H.***, & Li, Z. (2014). Civil Infrastructures Connected Internet of Things. *Current Advances in Civil Engineering, 2*(1): 16-19. URL: http://www.ykingpub.com/UploadFiles/2014-06/373/201406231114455513.pdf

[9] **Ma, H.*** (2014). Mercury intrusion porosimetry in concrete technology: Tips of measurement, pore structure parameter acquisition and application. *Journal of Porous Materials, 21*(2), 207-215. doi: 10.1007/s10934-013-9765-4

[8] **Ma, H.**, & Li, Z. (2014). Multi-aggregate approach for modeling interfacial transition zone in concrete. *ACI Materials Journal*, *111*(2), 189-200. doi: 10.14359/51686501

[7] Liu, J., Xing, F.*, Dong, B., **Ma, H.***, & Pan, D. (2014). Study on surface permeability of concrete under immersion. *Materials, 7*(2), 876-886. doi: 10.3390/ma7020876

[6] Tian, Y., Jin, X., Jin, N., Zhao, R., Li, Z., & **Ma, H.** (2013). Research on the microstructure formation of polyacrylate latex modified mortars. *Construction and Building Materials*, 47, 1381-1394. doi: 10.1016/j.conbuildmat.2013.06.016

[5] **Ma, H.**, & Li, Z. (2013). Microstructures and mechanical properties of polymer modified mortars under distinct mechanisms. *Construction and Building Materials, 47*, 579-587. doi: 10.1016/j.conbuildmat.2013.05.048

[4] **Ma, H.**, & Li, Z. (2013). Realistic pore structure of Portland cement paste: experimental study and numerical simulation. *Computers and Concrete, 11*(4), 317-336. doi: 10.12989/cac.2013.11.4.317

[3] Tian, Y., **Ma, H.**, Li, Z., Jin, X., & Jin, N. (2012). Organic and inorganic reactions in polyacrylate modified cement mortars. *Rare Metal Materials and Engineering, 41*(S3), 208-214.

[2] Tian, Y., Li, Z., **Ma, H.**, Jin, X., & Jin, N. (2011). Physical and chemical influence of polyacrylate latex on cement mortars. *Advanced Materials Research, 261-263*, 807-811. doi: 10.4028/www.scientific.net/AMR.261-263.807

[1] **Ma, H.**, Tian, Y., & Li, Z. (2011). Interactions between organic and inorganic phases in PA- and PU/PA-modified cement-based materials. *Journal of Materials in Civil Engineering, 23* (10), 1412-1421. doi: 10.1061/(asce)mt.1943-5533.0000302

Conference Papers

[10] Liao, W., & **Ma, H.*** (2018). A passive construction solution for building energy efficiency using PCM in concrete. American Concrete Institute Fall 2018 Convention - Dream Big, Build Bigger, October 14-18, 2018, Las Vegas, U.S.

[9] Hao, W., **Ma, H.***, Sun, G., & Li, Z. (2018). Developing high performance magnesium phosphate cement composite bipolar plates for fuel cells. The 10th International Conference on Applied Energy (ICAE2018), August 22-25, 2018, Hong Kong.

[8] **Ma, H.***, & Huang, Y. (2016). Strength and water resistance of low-grade fly ash incorporated magnesia-phosphate cement based materials. *Proceedings of the 4th International Conference on Sustainable Construction Materials and Technologies (SCMT4, S291)*. August 7-11, 2016, Las Vegas, U.S.

[7] Lu, Z., Li, Z., & **Ma, H.** (2016). The perspective applications of graphene oxide in construction and building materials. In Advanced Materials – TechConnect Briefs 2016 (pp. 197-200), 10th Annual TechConnect World Innovation Conference and Expo, held jointly with the 19th Annual Nanotech Conference and Expo, and the 2016 National SBIR/STTR Conference, May 22-25, 2016, Washington DC, U.S.

[6] Li, Z.*, **Ma, H.**, & Tang, S. (2012). The assessment of porosity in concrete and its influence to service life design of concrete. In J. Teng, & J. Dai (Ed.), *Proceedings of the 1st International Conference on Performance-based and Life-cycle Structural Engineering*. December 5-7, 2012, Hong Kong.

[5] Li, Z.*, **Ma, H.**, & Tang, S. (2012). From pore structure assessment to service life design of concrete structures (Keynote). In G. Ye, K. van Breugel, W. Sun, & C. Miao (Ed.), *Proceedings of the 2nd International Conference on Microstructural-related Durability of Cementitious Composites (RILEM Pro 083)* (pp. 76-87). Bagneux, France: RILEM Publications SARL. URL: http://www.rilem.org/gene/main.php?base=500218&id_publication=413&id_papier=7891

[4] **Ma, H.***, & Li, Z. (2011). Multi-scale modeling of the microstructure of concrete. *Proceedings of t*he Twenty-Fourth KKCNN Symposium on Civil Engineering (pp. 531-534). December 14-16, 2011, Hyogo, Japan. doi: 10.13140/2.1.1682.7841

[3] **Ma, H.***, & Li, Z. (2011). Modeling cement paste at micro-scale. *Proceedings of the 2011 World Congress on Advances in Structural Engineering and Mechanics* (pp. 992-1004). Seoul, Korea: Techno-Press.

[2] Tian, Y.*, Li, Z., **Ma, H.**, Jin, X., & Jin, N. (2011). An investigation on the microstructure formation of polymer modified mortars in the presence of polyacrylate latex. In C. Leung, & K. Wan (Ed.), *Proceedings of the International RILEM Conference on Advances in Construction Materials Through Science and Engineering (RILEM Pro 079)* (pp. 71-77). Bagneux, France: RILEM Publications SARL. URL: http://www.rilem.org/gene/main.php?base=500218&id_publication=407&id_papier=7525

[1] Liu, W.*, Dong, B., **Ma, H.**, & Xing, F. (2009). Influence of sea sand on the hydration behavior of cement based materials. In X. Zhou, G. He, H. Xiao, & B. Yan (Ed.), *Proceedings of the 4th International Symposium on Lifetime Engineering of Civil Infrastructure* (pp. 1009-1013). October 26-28, 2009, Changsha, China.

Poster Presentations

[2] **Ma, H.** Microstructure and Transport Properties of Concrete: Multi-scale Models. Gordon Research Conference: Advanced Materials for Sustainable Infrastructure Development, Aug 3-8, 2014, Hong Kong.

[1] **Ma, H.** Microstructure of Cement Paste at the Micro-scale. SBT-SEU-RILEM Doctoral Course: Cement and Concrete, Aug 25-Sep 1, 2011, Nanjing, China.

Patents

[1] Li, Z., **Ma, H.**, & Hao, W. (2017) Magnesium phosphate cement based bipolar plate composite material. US Patent, US9774043B2, granted on September 26, 2017.

Invited Lectures:

[12] **Ma, H.** "Magnesium phosphate cements: from fundamentals to applications", January 17, 2019, Department of Civil Engineering and Engineering Mechanics, Columbia University, New York.

[11] **Ma, H.** "Advances in alternative cements development", January 16, 2019, Department of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology, Hoboken, New Jersey.

[10] **Ma, H.** "Studies on advanced materials for sustainable infrastructure", June 11, 2018, School of Materials Science Engineering, Southeast University, Nanjing, China.

[9] **Ma, H.** "From materials to structures: characterization, modeling, monitoring, and rehabilitation", June 11, 2018, School of Civil and Transportation Engineering, Hohai University, Nanjing, China.

[8] **Ma, H.** "Studies on advanced materials for sustainable infrastructure", June 04, 2018, Institute of Applied Physics and Materials Engineering, University of Macau, Macau.

[7] **Ma, H.** "Advances in novel binding mechanisms and binder materials", May 29, 2018, School of Civil Engineering, Qingdao University of Technology, Qingdao, China.

[6] **Ma, H.** "Frontiers in durability study of concrete", January 4, 2018, College of Civil Engineering, Shenzhen University, Shenzhen, China.

[5] **Ma, H.** "Modeling hydration kinetics, microstructure, and transport properties of contemporary concrete", December 25, 2017, School of Civil Engineering, Central South University, Changsha, China.

[4] **Ma, H.** "Improving Impermeability of Concrete – Roles of Silica Fume, Fly Ash, and GGBS", November 27, 2015, China Academy of Railway Sciences, Beijing, China.

[3] **Ma, H.** "Multi-scale Modeling of Transport Properties of Contemporary Concrete", May 20, 2015, Shenzhen University, Shenzhen, China.

[2] **Ma, H.** "Microstructural Modeling of Traditional and Novel Cement-Based Materials", April 30, 2015, Chongqing University, Chongqing, China.

[1] **Ma, H.** "Characterization and Modeling of the Microstructure of Concrete: Gel, Paste and ITZ", April 22, 2015, Shenzhen University, Shenzhen, China.

Grants & Contracts:

[12] Preparing Interdisciplinary Professionals for Rebuilding/Engineering Resilient Infrastructure of the Nation, funded by US Department of Educations on 09/29/2018, Co-PI, 5% (Total: $597,000; Shared credit: $29,850).

[11] Collaborative Research: In-situ Production of Calcium Carbonate Nanoparticles in Fresh Concrete (08/15/2018-07/31/2021), funded by National Science Foundation (#1761697), PI, 100% ($ 167,422).

[10] Off-Specification Fly Ash Incorporated Magnesium Phosphate Cement as a Sustainable Binder (01/01/2018-12/31/2018), funded by the Advanced Materials for Sustainable Infrastructure Signature Area at Missouri S&T. PI, 50% (Total: $15,676; Shared credit: $7,838).

[9] Comprehend Sulfate Attack in Concrete using In-Situ Fiber-Optic Sensors (01/01/2018-12/31/2018), funded by the Advanced Materials for Sustainable Infrastructure Signature Area at Missouri S&T. Co-PI, 50% (Total: $15,676; Shared credit: $7,838).

[8] A Multi-Physics Approach to Characterize Freeze-Thaw Damage of Concrete (01/01/2018-12/31/2018), funded by the Advanced Materials for Sustainable Infrastructure Signature Area at Missouri S&T. Co-PI, 50% (Total: $15,676; Shared credit: $7,838).

[7] A Thermo-Kinetic Approach to Enhance the Use of Clays in Concrete (07/01/2017-06/30/2020), funded by National Science Foundation (#1661609), Co-PI, 45% (Total: $409,948; Shared credit: $184,477).

[6] INSPIRE: Hyperspectral Image Analysis for Mechanical and Chemical Properties of Concrete and Steel Surfaces (11/30/2016~11/30/2018), funded by US Department of Transportation under the Auspices of INSPIRE University Transportation Center at Missouri S&T, Co-PI (50%) (Years 1-2: $124,402; Shared credit: $62,201).

[5] Inspecting and Preserving Infrastructure through Robotic Exploration (INSPIRE) – a Tier 1 University Transportation Center (11/30/2016~09/30/2022), funded by US Department of Transportation, Co-PI, 2% (Years 1-2: $2,819,099; Shared credit: $56,382).

[4] Mitigating Thermal Cracking of Concrete using Phase Change Materials (06/01/2017-05/31/2018), funded by the Advanced Materials for Sustainable Infrastructure Signature Area at Missouri S&T. PI, 50% (Total: $15,732; Shared credit: $7,866).

[3] Development of Flexible Nanostructured Cementitious Composite using Polymer Aerogels (06/01/2017-05/31/2018), funded by the Advanced Materials for Sustainable Infrastructure Signature Area at Missouri S&T. Co-PI, 33% (Total: $15,732; Shared credit: $5,192).

[2] Blended cementitious materials for concrete: quantitative characterization of the

hydration kinetics and computer simulation of the microstructure (2015/01~2017/12), funded by National Natural Science Foundation of China under grant no. 51408365. PI, 100% (Total: CNY 250,000).

[1] High performance magnesium phosphate cement based bipolar plate for fuel cell (2013/03~2015/08), funded by Hong Kong Innovation and Technology Fund under grant no. ITP/033/12NP. Deputy PI, 35% (Total: HKD 4,100,000).

Awards, Honors and Recognitions:

[13] NSF Traveling Support Award Recipient, to attend NSF Workshop on Additive Manufacturing for Civil Infrastructure Design and Construction, July 2017.
[12] ExCEEd Fellow, American Society of Civil Engineers, June 2017.
[11] Outstanding Reviewer, *Cement & Concrete Composites*, 2016, 2018.
[10] Outstanding Reviewer, *Cement and Concrete Research*, 2017.
[9] Outstanding Reviewer, *Materials Letters*, 2017.
[8] Outstanding Reviewer, Construction and Building Materials, 2014-2016.
[7] Highly Cited Paper recognition [Steel corrosion in magnesium-phosphate cement concrete. *Magazine of Concrete Research, 69*(1), 35-45, 2017], Web of Science, 2017.
[6] Highly Cited Paper recognition [Realistic pore structure of Portland cement paste: experimental study and numerical simulation. *Computers and Concrete, 11*(4), 317-336, 2013], Web of Science, 2015-2019.
[5] Bronze Prize, poster competition, SBT-SEU-RILEM Doctoral Workshop, 2011.
[4] Outstanding Graduate, Shenzhen University, 2008.
[3] Excellent Master Thesis, CNKI, China, 2008.
[2] Namtai Scholarship, Shenzhen University, 2007.
[1] Outstanding Student Leader, Chongqing University, 2003, 2004.

Teaching:

At Missouri S&T

- Construction Materials: Properties and Testing, 2016~present.
- Composition and Properties of Concrete, 2018~present.

At Hong Kong University of Science and Technology

- Advanced Concrete Technology, 2014~2015, as a Substitute Teaching Staff;
- Construction Materials, 2013~2014, as a Substitute Teaching Staff;
- Surveying and Surveying Camp, Civil Engineering Drawing, Structural Analysis, Construction Materials Lab, 2008~2012, as a Teaching Assistant.

Professional Service Activities:

Editorial Board Member

Frontiers in Materials (Structural Materials specialty, 2015 –)
International Journal of Distributed Sensor Networks (Guest Editor, 2018)

Petroleum & Petrochemical Engineering Journal (2016 –)

Grant Reviewer

Engineer Research and Development Center of U.S. Army Corps of Engineers (2018)

Natural Sciences and Engineering Research Council of Canada (2016, 2017)

Research Foundation - Flanders (FWO), Belgium (2018)

Journal Reviewer

ACS Sustainable Chemistry & Engineering
Advances in Cement Research
Applied Energy
Applied Thermal Engineering
Cement & Concrete Composites
Cement and Concrete Research
Ceramics International
Composites Part B: Engineering
Computational Materials Science
Computers & Structures
Construction and Building Materials
Current Advances in Civil Engineering
Environmental Earth Sciences
European Journal of Environmental and Civil Engineering
ES Materials and Manufacturing
Frontiers of Structural and Civil Engineering
Indian Journal of Engineering and Materials Sciences
Journal of Civil Engineering and Construction Technology
Journal of Cleaner Production
Journal of Composite Materials
Journal of Composites
Journal of Materials in Civil Engineering, ASCE
Journal of Materials Science
Journal of Physics and Chemistry of Solids
Journal of Vibration and Control
Materials, MDPI
Materials & Design
Materials and Structures, RILEM
Materials Characterization
Materials Letters
Materials Research Bulletin
Materials Research Innovations
Mathematical and Computational Applications, MDPI
Measurement
Nanomaterials, MDPI
Physical Chemistry and Chemical Physics

Plos One
Powder Technology
Solar Energy
The Journal of Physical Chemistry C

Professional Society Member

American Concrete Institute (ACI, 2008~present), involved committees:
122 Energy Efficiency of Concrete and Masonry Systems
236 Material Science
241 Nanotechnology
546E Corrosion Studies
American Society of Civil Engineers (ASCE, 2017~present)
International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM, 2009-2012)

Conference Service

[9] Organizing Committee member, 9th International Conference on Structural Health Monitoring of Intelligent Infrastructure (SHMII-9), St. Louis, MO, U.S., August 4-7, 2019.
[8] Moderator, technical session: *Phase Change Materials in Concrete*, ACI Spring Convention 2019, Québec City, Québec, Canada, March 24-28, 2019.
[7] Moderator, Mini Session: New Developments in Energy Code Compliance for Concrete and Masonry Structures, ACI Fall Convention 2018, Las Vegas, NV, U.S., October 14-18, 2018.
[6] Scientific Committee member, 6th International Conference on Durability of Concrete Structures (ICDCS2018), Leeds, U.K., July 18-20, 2018.
[5] Invited reviewer, ASCE Congress on Technical Advancement 2017, Duluth, M.N., U.S., September 10-13, 2017.
[4] Technical Program Committee member, TRB ADC 60 2016 Summer Workshop, Asheville, N.C., U.S., July 26-29, 2016.
[3] Chair of technical session *Emerging Binder Materials*, 5th International Conference on Durability of Concrete Structures, Shenzhen, China, June 30-July 2, 2016.
[2] Invited reviewer, the 4th Global Conference on Materials Science and Engineering (CMSE2015), Macau, August 3-6, 2015.
[1] Invited reviewer, the 3rd Global Conference on Materials Science and Engineering (CMSE2014), Shanghai, China, October 20-23, 2014.