Prof. Dr. Mohammad Al-Shannag

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Department of Civil Engineering,
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EDUCATION:

PhD (1995), Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, USA. Major: Structures.

RESEARCH INTERESTS:

Fiber reinforced cementitious composites and ferrocement; structural repair and retrofit of reinforced concrete structures; normal, high performance and lightweight concretes; pozzolanic cements, durability of concrete, and concrete making materials.

LISTED BY STANFORD AMERICAN UNIVERSITY among the best 2% higly cited scientists in the world, (2020), based on **Scopus** international citation database.

ACADEMIC EXPERIENCE

YEARS	POSITION
2010- present	**Professor,** Department of Civil Engineering. King Saud University, Riyadh, Saudi Arabia.
2005 - 2010	**Associate Professor,** Department of Civil Engineering. King Saud University, Riyadh, Saudi Arabia.
2003 - 2005	**Associate Professor,** Department of Civil Engineering, Jordan University of Science & Technology, Irbid, Jordan.
1998 - 2003	**Assistant Professor,** Department of Civil Engineering, Jordan University of Science & Technology, Irbid, Jordan.
1995 - 1998	**Research Associate,** North Carolina State University, Department of Civil Engineering. Raleigh, USA.

1994 - 1995	**Post-Doctoral Research Fellow,** University of Michigan, Department of Civil and Environmental Engineering, Ann Arbor, Michigan.
1990 - 1994	**Research and Teaching Assistant,** University of Michigan, Department of Civil and Environmental Engineering, Michigan, USA.
1987 - 1989	**Instructor,** Prince Faisal Technical College, Amman, Jordan.
1984 - 1987	**Research and Teaching Assistant,** Department of Civil Engineering, (Jordan University of Science & Technology), formerly (Yarmouk University), Irbid, Jordan.

TEACHING EXPERIENCE

Courses taught include:

1. CE 370: Reinforced Concrete Design I.
2. CE 471: Reinforced Concrete Design I.
3. GE 105: Introduction to Engineering Design
4. GE 106: Introduction to Engineering Design
5. CE 306: Properties and Testing of Structural Materials.
6. CE 302: Mechanics of Materials.
7. GE 201: Statics.
8. GE 404: Engineering Management.
9. CE 304: Properties and Testing of Concrete.
10. CE 303: Properties of Engineering Materials.
11. CE 363: Basics of Concrete Structures for Surveying Students.
12. CE 498, CE 496: Graduation Project I.
13. CE 499, CE 497: Graduation Project II
14. CE 432, Reinforced Concrete Design. (Jordan University of Science & Technology)
15. CE 332, Structural Analysis.(Jordan University of Science & Technology)
16. CE 324, Construction Materials. (Jordan University of Science & Technology)
17. CE 231, Structural Analysis for architecture students. (Jordan University of Science & Technology)
18. CE 321, Materials Science. (Jordan University of Science & Technology)
19. CE 323, Materials Science Laboratory.(Jordan University of Science & Technology)
20. CE 326, Materials Construction Laboratory. (Jordan University of Science & Technology)
21. CE 200, Engineering Drawing.(Jordan University of Science & Technology)
22. CE 577: Concrete Technology. (Jordan University of Science & Technology)
23. CE 721, Advanced Concrete Technology. (Jordan University of Science & Technology)
24. CE 521, Advanced construction materials. (Jordan University of Science & Technology)

Master Thesis currently under my supervision:

1. Flexural behavior of lightweight high strength concrete reinforced with hybrid fibers, 2020-present.
2. Enhancing the structural performance of reinforced concrete columns using laminated composites, 2020-present.

Completed Master Thesis under my supervision and co-supervision Include:

1. Effect of natural lightweight aggregates on the early age behavior of high performance concrete, 2019
2. Effect of recycled plastic fibers on plastic shrinkage of concrete, 2012.

3. Structural behavior of reinforced concrete beams using local Lightweight Aggregates, 2015.
4. Behavior of high strength steel fiber reinforced concrete ground slabs, 2016.
5. PhD thesis on bond behavior of steel rebars in high strength concrete considering corrosion and Cyclic loading, 2018.
6. Strengthening of light weight reinforced concrete beams in flexure, 2010.
7. Shear-Retrofit of Lightweight Reinforced Concrete Beams, 2010.
8. Structural Seismic Behavior of Beam–Column Joints Using High Performance Concrete, 2003. (Jordan University of Science & Technology).
9. Structural behavior of repaired reinforced concrete beams undergoing reinforcement corrosion, 2003. (Jordan University)
10. Strengthening shear-deficient reinforced concrete beams using steel fiber reinforced concrete, 2002. (Jordan University of Science & Technology)
11. Improving the structural seismic behavior of non-seismically designed beam-column joints using fiber reinforced concrete, 2002. (Jordan University of Science & Technology)
12. Structural behavior of retrofitted shear-deficient reinforced concrete beams, 2000. (Jordan University of Science & Technology).
13. Structural seismic behavior of retrofitted reinforced concrete beam-column joints, 2000. (Jordan University of Science & Technology)
14. Repair of Reinforced Concrete Beams Damaged by Alkali-Silica Reaction, 2008. (Jordan University of Science & Technology).
15. Repair of heat-damaged reinforced concrete T-beams using FRC jackets, 2007. (Jordan University of Science & Technology).
16. Repair of heat-damaged RC shallow beams using advanced composites, 2007. ((Jordan University of Science & Technology).

PROFESSIONAL EXPERIENCE

● Saudi Building Code, Technical Committee of the Structural Code SBC 304, member, 2015-Present.

● Member of the scientific committee and department representative at Center of Excellence for Research in Engineering Materials (CEREM)-College of Engineering at King Saud University, 2008-2012.
● Chair of the Mentoring and Directing Unit (MDU)-Civil Engineering Department-KSU, 2013-2017.

● Chair of the Mentoring and Directing Unit (MDU)-College of Engineering-KSU, 2017-present.
● Reviewed many research proposals funded by different institutions.
● Reviewed many promotion applications at several universities.
● Participated and chaired sessions in many international conferences.
● Reviewed many research articles for International and local Journals.
● External Examiner for Master and PhD Students at other universities.
● Member of the Scientific Committee for the upcoming International Conference on sustainability: Development and Innovation, Prince Sultan University, Saudi Arabia, November 2021.
● Member in the committee of specifications and standards-Institution for Standards & Metrology in Amman-Jordan, (2001-2005).
● Participated in many consultations on inspection and evaluation of different buildings in Jordan (1998-2005).
● Designed several concrete mixes for use in different construction projects in Jordan, (1998-2005).
● Supervisor for Materials of Construction Laboratory at Jordan University of Science & Technology (JUST) for several years, from 1998-2005.
● Designed and built, a seismic test setup for testing large scale beam-column joint specimens, Structures laboratory, Jordan University of Science and Technology (JUST), 1999.
● Designed and built, a test setup for testing large scale beams in flexure, Structures laboratory, Jordan University of Science and Technology, 1999.
● Designed and built a test setup for inducing corrosion in reinforced concrete beams, Materials of Construction laboratory, Jordan University of Science and Technology, 2001.
● Lecturing in a short, intensive course on High Performance Cementitious Composites & Fiber Reinforced Concrete, in cooperation with The Consultative Center for Science & Technology, JUST, 2002.

● Member in the executive board of international association for concrete technology in developing countries, 2000-2005.
● Member of the Jordan Association of Civil Engineers (JSCE).
● Member of the American Concrete Institute (ACI).

FUNDED RESEARCH PROJECTS (SELECTED)

1. Shear Behavior of Reinforced Concrete Beams, Deanship of Scientific Research, King Saud University, 2019, (Principal Investigator).
2. Flexural behavior of heat damaged lightweight reinforced concrete beams strengthened using composite sheets (2017), College of Engineering Research Center, King Saud University.
3. Consulting Study to the structural committee of the Gulf Building Code (2015), Organization of Standards and Specifications in Riyadh (SASO), Kingdom of Saudi Arabia for 2015.
4. Design Standards of Structural Lightweight Concrete in the Kingdom (2012), National Plan for Science & Technology Unit, King Saud University.
5. Plastic Waste Fibers for Concrete Reinforcement (2011), Deanship of Scientific Research, King Saud University.
6. Bending Behavior of Ferrocement Plates in Sodium and Magnesium Sulfates Solutions (2010), College of Engineering Research Center, King Saud University.
7. Developing Structural Light Weight Concrete Using Locally Available Materials (2009), College of Engineering Research Center, King Saud University.
8. High Strength Ferrocement Laminates for Structural Repair (2008), College of Engineering Research Center, King Saud University.
9. Upgrading and Repairing Reinforced Concrete Columns using Ferrocement Jackets (2008), College of Engineering Research Center, King Saud University.
10. Durability of Steel Fiber Reinforced Concrete in Sulfate Environment (2006), College of Engineering Research Center, King Saud University.
11. Strengthening of light weight reinforced concrete beams in flexure (2010), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
12. Shear-Retrofit of Lightweight Reinforced Concrete Beams (2010), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
13. Repair of Durability Deteriorated or Damaged Reinforced Concrete Members Using Advanced Composite Materials (2005), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
14. Structural behavior of repaired reinforced concrete beams undergoing reinforcement corrosion (2001), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
15. Structural Seismic Behavior of Beam–Column Joints Using High Performance Concrete (2002), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
16. Improving the Structural Seismic Behavior of Non-Seismically Designed Beam-column Joints Using Fiber Reinforced Concrete (2001), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
17. Strengthening shear-deficient reinforced concrete beams using steel fiber reinforced concrete (2001), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
18. Developing high performance cementitious matrices for use in a new class of composite systems (1999), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
19. Structural seismic behavior of retrofitted reinforced concrete beam-column joints (1999), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).
20. Structural behavior of retrofitted shear-deficient reinforced concrete beams (1998), Deanship of Scientific Research, Jordan University of Science & Technology (JUST).

PUBLICATIONS

a) PATENTS

UNITED STATES PATENT NO: US 9,127,457 B2, Sep. 8, 2015, Machine for deforming and cutting plastic strips for enhancing concrete, **Mohammad J. M. Al-Shannag**, and Abdulrahman M. Alhozaimy, King Saud University.

b) SELECTED PUBLICATIONS:

[1] **Shannag, M.J.,** "High Strength Concrete Containing Natural Pozzolan and Silica Fume", *Journal of Cement and Concrete Composites, 22, 2000, pp. 399-406.*

[2] **Shannag, M.J.,** High Performance Cementitious Grouts for Structural Repair, *Journal of Cement and Concrete Research, 32, 2, 2002, pp. 803-808.*

[3] **Shannag, M.J.,** Bending Behavior of Ferrocement Plates in Sodium and Magnesium Sulfates Solutions, *Cement and Concrete Composites, 30, 2008, pp. 597-602.*

[4] **Shannag, M. J**,Characteristics of lightweight concrete containing mineral admixtures,*Construction and Building Materials, 25, 2011, pp. 658-662.*

[5] **Shannag, M.J.,** Alhassan, M. A., Seismic upgrade of interior beam-column subassemblages with high-performance fiber-reinforced concrete jackets, *ACI Structural Journal, 102, 1, 2005, pp. 131-138.*

[6] **Shannag, M.J.,** Shaia, H. A., "Sulfate resistance of high performance concrete," *Cement and Concrete Composites, 25 (2003) 363-369.*

[7] **Shannag, M. Jamal**, Bin Ziyyad, Tareq, Flexural response of ferrocement with fibrous cementitious matrices, *Construction and Building Materials, 21, 2007, pp. 1198-1205.*

[8] **Shannag, M. Jamal**, Haddad, Rami, Properties of metakaolin high-strength cementitious grouts, *Journal of ASTM International, 2, No. 7, 2005.*

[9] **Shannag,** and Yeginobali: "Properties of Cements, Mortars, and Concretes, containing Natural Pozzolan", *Journal of Cement and Concrete Research, 25, 3, 1995, pp. 647-65.*

[10] **Shannag, M.J**., Shehab, S.M., "Flowable High Strength Cementitious Matrices for Ferrocement Applications, *Construction and Building Materials Journal, 36, 2012, pp 933-939.*

[11] **Shannag, M. Jamal,** Al-Ateek, Suzan A., "Flexural behavior of strengthened concrete beams with corroding reinforcement", Construction and Building Materials, 20, 2006, pp. 834-840.

[12] **Shannag, M.,** and Hansen*, W.,* "Tensile Properties of Fiber-Reinforced Very High Strength DSP Mortar*" Magazine of Concrete Research, 52, 2, 2000, pp. 101-108.*

[13] **Shannag, M.,** Al-Rousan, R., "Shear strengthening of high strength reinforced concrete beams using fibrous composites, *Magazine of Concrete Research, 56, 7, 2004, pp. 419-428.*

[14] **Al-Shannag, M.J**., Charif, A., Bond behavior of steel bars embedded in concretes made with natural lightweight aggregates, Journal of King Saud University–Engineering Sciences 29 (2017) 365–372.

[15] **Alshannag**, M., Alshenawy, A., Effective strengthening schemes for heat damaged reinforced concrete beams, Journal of King Saud University-Engineering Sciences 32 (2020) 236-245.

[16] **Shannag, M. Jamal,** Abu-Dayya, Nabeela, Abu-Farsakh, Ghazi, Lateral load response of high performance fiber reinforced concrete beam-column joints, *Construction and Building Materials, 19, 2005, pp. 500-508.*

[17] **Shannag, M.,** Barakat, S., Abdul-Kareem, M., "Cyclic Behavior of HPFRC-Repaired Reinforced Interior Beam-Column Joints" *Journal of Materials and Structures,RILEM, 35, 2002, pp 348-356.*

[18] **Shannag, M. Jamal,** Abu-Farsakh, Ghazi, Abu-Dayya, Nabeela, Modeling the cyclic response of fiber reinforced concrete joints, *Engineering Structures, 29, 2007, 2960-2967.*

[19] **Shannag, M.,** Barakat, S., Jaber, F., "Structural Repair of Shear-Deficient Reinforced Concrete Beams Using SIFCON", *Magazine of Concrete Research, 53, No. 6, 2001, pp. 391-403.*

[20] **Shannag, M.,** Hansen, W., and Tjiptobroto, P.: "Interface Debonding in Fiber-Reinforced Cement-Matrix Composites"*, Journal of Composite Materials, 33, 2, 1999, pp. 158-175.*

[21] **Shannag, M.,** Brincker R., and Hansen, W., "Pullout behavior of steel fibers from cement-based composites", *Journal of Cement and Concrete Research, 27, 6, 1997, pp. 925-936.*

[22] **Shannag,** Brincker, and Hansen*:* "Interfacial (Fiber-Matrix) Properties of High Strength Mortar (150 MPa) From Fiber Pullout." *ACI Materials Journal, 93, 5 1996. pp. 480-486.*

[23] **Shannag, M.J.,** Al-Akhras, N.M., Mahdawi, S.F., Flexure strengtheninig of lightweight reinforced concrete beams using carbon fiber-reinforced polymers, *Journal of Structure and infrastructure Engineering*, 2013, doi.org/10.1080/15732479.2012.757790.

[24] **Shannag**, M., Charif, A., Aldghaither, S., Developing structural lightweight concrete using volcanic scoria available in Saudi Arabia, *Arabian Journal for Science and Engineering, 2014, 39: pp 3525-3534.*

[25] Alrshoudi, F., **Alshannag**, M., Suitability of Palm Frond Waste Ash as a Supplementary Cementitious Material, Arabian Journal for Science and Engineering, (2020), 45:7967-7974.

[26] Shehab, S.M., **Shannag, M.J**., "Repair and strengthening of reinforced concrete square columns using ferrocement jackets", *Journal of Cement and Concrete Composites*, 34, 2012, 288-294.

[27] Krstulovic, N., **Shannag, M.,** "Compressive Behavior of Slurry Infiltrated Mat Concrete", *ACI Materials Journal, 96, 3, 1999, pp. 367-377.*

[28] Krstulovic, N., **Shannag, M.,** "Slurry Infiltrated Mat Concrete (SIMCON)- Based Shear Retrofit of Reinforced Concrete Members", *ACI Structural Journal, 96, 1, 1999, pp. 105-114.*

[29] Alhozaimy, A.M., **Shannag, M.J**., Performance of Concretes Reinforced with Recycled Fibers, *Magazine of Concrete Research, 61, 4, 2009, pp. 293-298.*

[30] Haddad, R., **Shannag, M.J**., Performance of Jordanian Masonry Cement for Construction Purposes, *Jordan Journal of Civil Engineering*, 2, 1, 2008, pp. 20-31.

[31] Haddad, R. H., **Shannag, M. J**., Al-Hambouth, M. T., Repair of Reinforced Concrete Beams Damaged by Alkali-Silica Reaction, *ACI Structural Journal, 105, 2, 2008, pp. 145-153.*

[32] Haddad, Rami, H., **Shannag, M**. Jamal, Moh'd, A., Repair of heat-damaged RC shallow beams using advanced composites, *Materials and Structures Journal, RILEM, 41, 2007, pp. 287-299.*

[33] Al-Tulaian, B.S., **Al-Shannag, M.J.,** Al-Hozaimy, A.R., Recycled plastic waste fibers for reinforcing Portland cement mortar, *Construction and Building Materials*,127(2016) 102-110.

[34] Haddad, R. H., **Shannag, M. J.,** Hamad, R. J., Repair of heat-damaged reinforced concrete T-beams using FRC jackets, *Magazine of Concrete Research*, *59, No. 3, 2007, pp. 223-231.*

[35] Abdelhamid Charif, **M. Jamal Shannag** Saleh Dghaither, Ductility of reinforced lightweight concrete beams and columns, *Latin American Journal of Solids and Structures, 11, 2014, pp 1251-1274.*

[36] Al-Akhras, N.M., **Shannag, M.J.,** Malkawi, A.B., Evaluation of shear-deficient lightweight RC beams retrofitted with adhesively bonded CFRP sheets, *European Journal of Environmental and Civil Engineering,* 2015, doi.org/10.1080/19648189.2015.1084383.

[37] Shbeeb, N.I., Al-Akhras, N.M., **Shannag, M.J.,** Alfendi, H.R., Strengthening of Lightweight Reinforced Concrete Slabs Using Different Techniques, *The IES Journal Part A : Civil and Structural Engineering*, 5, 1, 2012.

[38] Aldossari, K.M., Elsaigh, W.A., **Alshannag, M.J.**, High-strength steel-fibre-reinforced concrete: potential use for ground slabs applications, *Proceedings of the Institution of Civil Engineers - Transport,* 2017, pp 1-10, doi.org/10.1680/jtran.15.00118.

[39] **Shannag, MJ,** Mehdawi, S., AlMasri, A., Structural Retrofit of a Reinforced Concrete School Building Subjected to Corrosion, International Civil Engineering and Architecture Conference, Trabzon-Turkey,(17-20)/4/2019.

[40] M Higazey, **M J Shannag**, and A Alaskar, Effect of Lightweight Aggregates on early-age behavior of High Performance Concrete, The 2nd Global Congress on Construction, Material and Structural Engineering, Materials Science and Engineering 713 (2020) 012005.

[41] **Shannag**, M., Aldghaither, S., Charif, A., Flexural Response of Concretes Containing Natural Lightweight Aggregates, *International Conference on Civil Engineering and Applied Mechanics,* Turkey, June 2013.

[42] **Shannag, M.J**. High Strength Ferrocement Laminates for Structural Repair, *Third international conference on concrete repair, Itally*, Vinice, 29th June to 2nd July, 2009.

[43] **Shannag, M.,** Al- Ateek, S. Repair of Reinforced Concrete Beams Undergoing Reinforcement Corrosion Using Fiber Composites International Conference on Advanced Materials for Construction of Bridges, *Buildings and other Structures III,* September 7-12, 2003, Davos, Switzerland.

[44] **Shannag, M.,** Barakat, S., Kareem, M., "Repair of Concrete Beam-Column Joints using Fibrous Composites", *International Congress on Challenges of Concrete Construction,* 5-9 September, 2002 Dundee, Scotland.

[45] **Shannag, M.,** Jaber, F., Barakat, S., "Strengthening of Reinforced Concrete Beams using High Performance Cementitious Composites", *7th International Conference on Inspection Appraisal , Repairs, & Maintenance of Buildings & Structures*, 11-13 september, 2001, Nottingham, U.K.

[46] **Shannag, M.,** Fibrous composites for improved durability of reinforced concrete beams, *7th International Conference on Concrete Technology in Developing Countries*, 5-8 October 2004, Kuala Lumpur, Malaysia.

[47] **Shannag, M.,** Barakat, S., Kareem, M., "The Use of High Performance Fiber Reinforced Cementitious Composites for Seismic Rehabilitation, *6th International Conference on Concrete Technology for Developing Countries*, Amman, Jordan, October, 2002.

[48] **Shannag, M.,** "The Effect of Steel Fibers and Main Reinforcement on Tensile Response of Densified Systems of Concrete (DSP)", *5th International Conference on Concrete Technology for Developing countries*, 17-19 November 1999, New Delhi, India.

[49] **Shannag, M.,** Charif, A., Naser, S., Faisal, F., Karim, A., Structural Behavior of Lightweight Concrete Made With Scoria Aggregates and Mineral Admixtures*, International Conference on Civil, Structural and Environmental Engineering*, Issue 85, pp 334-338, London, January **2014.**

[50] Mourad, S.M., **Shannag, M.J.,** Repairing reinforced concrete rectangular columns using ferrocement laminates*, Concrete Solutions 2011*, 26th to 28th September, 2011, Dresden, Germany.

[51] **Shannag, M. J**.: "Pullout Characteristics of Steel Fibers from very High Strength Cementitious Matrices", *Fourth International Conference on Concrete Technology in Developing Countries*, Gazimagusa, Turkey, November, 1996.

[52] AlNasser, S., **Shannag, M.,** Charif, A., Proceedings of the Second *International Conference on Advances in Civil, Structural, and Environmental Engineering,-ACSEE 2014*, Institue of research Engineers and Doctors, USA.

[53] Aldossari, K., Elsaigh, W., **Shannag, M.**, 'Effect of Steel Fibers on Flexural Behavior of Normal and High Strength Concrete', *International Conference on Civil, Architectural Science and Engineering*, 8(1), 21 – 26, Zurich, January 2014.

NATIONALITY: Jordanian.
LANGUAGES: Arabic (native language), Fluent in English.
COMPUTER SKILLS: Systems: IBM and Macintosh.
Working Experience with Matlab and Design Softwares.

PROFESSIONAL AFFILIATIONS:

- American Concrete Institute (ACI), member, 1996-2005.
- Jordan Association of Civil Engineers (JSCE), member, 1984-Present.

AWARDS:

2020	Listed by Stanford American University among the best 2% higly cited scientists in the world, based on **Scopus** international citation database.
2019	Supervising a distinguished Project on Engineering Design, College of Engineering and Saudi BAE Systems Company,Engineering Design.
2018	An Award from Saudi Organization of standards and Metrology (SASO) for reviewing the Saudi Building Code For Structural Concrete, SBC 304.
2018	An Award from the College of Engineering at King Sauid university for reviewing the maximum number of papers for King Saud University Journal of Engineering Sciences.
2017	Supervising best capstone design project award, College of Engineering at King Saud University.
2014	Certificate of Outstanding Contribution in Reviewing Papers for Construction and Building Materials Journal (ELSEVIER).
2012	Four awards for ISI publications from the quality of publications award committee at King Saud University.