

Mohammad R. Irshidat, PhD

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Jordan University of Science and Technology
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Personal Information

- Nationality: Jordanian
- Date of birth: December 24th, 1981
- Marital status: Married
- Number of children: Three (Nada: 5 years, Hashem: 2 years, and Nour: 1 year)

Research Interests

Sustainable construction materials, Nanocementitious materials, polymer nanocomposites, rehabilitation and repair of concrete structures; geopolymers concrete, finite element analysis of concrete structures, composite materials behavior and design, blast and impact resistant of composite structures, blast load simulation and design models.

Taught Courses

Statics, Strength of Materials, Structural Analysis I, Structural Analysis II, Numerical Methods, Applied Engineering Practices, Special Topics in Structural Engineering (Introduction to Finite Element), Finite Element Methods, Seminar in Civil Engineering.

Education

- Ph.D. (2007-2010)
 - ✓ University of Mississippi, Oxford, Mississippi, USA
 - ✓ Civil Engineering-Structural Division
 - ✓ 4.0 GPA
 - ✓ Dissertation: *"Physics-Based Simulation and Experiment on Blast Protection of Infill Walls and Sandwich Composites Using New Generation of Nano Particle Reinforced Materials"*
- M.S. (2004-2006)
 - ✓ Jordan University of Science and Technology (JUST), Irbid, Jordan
 - ✓ Civil Engineering-Structural Division
 - ✓ Ranked 1st
 - ✓ Thesis: *"Vibration Analysis and Modeling of RCC Dams Using Finite Element Method"*

- B.S. (1999-2004)
 - ✓ Jordan University of Science and Technology (JUST), Irbid, Jordan
 - ✓ Civil Engineering-Structural Division
 - ✓ Ranked 1st
 - ✓ Project: “Structural Design for Proposed Project of Irbid Mall”

Professional Experiences

- **September 2016-present:** Associate Professor, Civil Engineering Department, Jordan University of Science and Technology, Irbid, Jordan.
- **September 2014- September 2017:** Assistant Dean of Scientific Research, Jordan University of Science and Technology, Irbid, Jordan.
- **September 2014-September 2016:** Technology Transfer Officer, Deanship of Scientific Research, Jordan University of Science and Technology, Irbid, Jordan.
- **September 2011- September 2016:** Assistant Professor, Civil Engineering Department, Jordan University of Science and Technology, Irbid, Jordan.
- **August 2010 to August 2011:** Postdoctoral Research Associate, Nano Infrastructure Research Group, Department of Civil Engineering, University of Mississippi, USA:
 - ✓ Department of Home Land Security Project: “Nano-Enhanced and Bio-Inspired Composite Materials for Mitigation and Protection of TIH Railcars and Stationary Tanks against High Power Impact”.
 - ✓ Department of Home Land Security Project: “Structural, Material and Geotechnical Solutions to Levee & Floodwall Construction & Retrofitting”.
- **January 2007 to July 2010:** Research Assistant, Composite Structures and Nano Engineering Research Group, Department of Civil Engineering, University of Mississippi, USA:
 - ✓ Department of Home Land Security Project: “Nano Particle Reinforced Composites for Critical Infrastructure Protection”:
 - ❖ Established new design tools for using nano-composites to protect panels against blast loading.
 - ❖ Developed a computationally-efficient model to replicate the behavior of CMU wall subjected to blast loads using finite element software.
 - ❖ Developed an analytically-efficient model (SDOF) to replicate the behavior of CMU wall subjected to blast loads.
 - ❖ Performed static testing using Material Testing and Simulation (MTS) machine for various nano-composites.
 - ❖ Studied the strain rate sensitivity of nano-composites and nano-reinforced polymers.
 - ✓ Office of Naval Research Project: “Blast and Impact Resistant of Composite Structures for Navy Ships”:
 - ❖ Developed a computationally-efficient model to replicate the behavior of sandwich composites structures subjected to blast loads using finite element software.
 - ✓ Mississippi Department of Transportation Project: “Inputs of Portland Cement Concrete; Effect of Moisture on Thermal Coefficient of Expansion”
 - ❖ Tested and evaluated concrete properties and CTE of concrete used by MDOT
 - ❖ Prepared final report.
- **2006 to 2007:** Trainee Project Engineer, Ministry of Public Works and Housing, Jordan
 - ✓ Studying many engineering designs and plans

- ✓ Visiting many construction sites
- **2004 to 2006:** Research Assistant, Department of Civil Engineering, Jordan University of Science and Technology, Irbid, Jordan:
 - ✓ Performing structural analysis for AL-Wehdah Dam, Jordan using finite element software for both dynamic and static case.
 - ✓ Monitoring of the stability of AL-ADASIYA western landslide on Amman-Na'ur-Dead sea highway using inclinometer instruments.

Publications

✓ Referred journal papers:

1. **Mohammad R. Irshidat**, Ammar Al-Shannaq. "Using textile reinforced mortar modified with carbon nano tubes to improve flexural performance of RC beams". *Composite Structures* 200 (2018) 127–134.
2. **Mohammad R. Irshidat**, Yahia A. Abdel-Jawad, Rami Al-Sughayer. "Feasibility of producing sustainable geopolymer composites made of locally available natural pozzolan". *Journal of Material Cycles and Waste Management*. (2018) DOI: 10.1007/s10163-018-0742-5
3. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh. "Influence of nanoclay on the mechanical properties and morphology of cement mortar". *KSCE Journal of Civil Engineering* (2018). DOI: 10.1007/s12205-018-1642-x
4. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh. "Thermal Performance and Fire Resistance of Nanoclay Modified Cementitious Materials". *Construction and Building Materials* 159, 213-219, 2018
5. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh. "Repair of heat-damaged RC columns using carbon nanotubes modified CFRP". *Materials and Structures* 50(2), 2017.
6. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh. "Flexural strength recovery of heat-damaged RC beams using carbon nanotubes modified CFRP". *Construction and Building Materials* 145: 474–482, 2017.
7. Nisrin R. Abdelal, Mohammed H. Al-Saleh, **Mohammad R. Irshidat**. "Utilizing vacuum bagging process to prepare carbon fiber/CNT-modified-epoxy composites with improved mechanical properties". *Polymer-Plastics Technology and Engineering*, April 2017, doi: [10.1080/03602559.2017.1315644](https://doi.org/10.1080/03602559.2017.1315644)
8. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh. "Effect of using carbon nanotube modified epoxy on bond-slip behavior between concrete and FRP sheets", *Construction and Building Materials*, 105 (2016) 511–518.
9. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh, Hashem Almashagbeh. "Effect of carbon nanotubes on strengthening of RC beams retrofitted with carbon fiber/epoxy composites", *Materials and Design* 89 (2016) 225-234.
10. Mohammed H. Al-Saleh, **Mohammad R. Irshidat**. "Effect of viscosity reducing agent on the properties of CNT/epoxy nanocomposites", *Journal of Polymer Engineering*, Vol. 36, No. 4 (2016) 407-412.
11. K.A. Bani-Hani, **M.R. Irshidat**, R.K.A. Al-Rub, N.A. Al-Nuaimi, A.T. Talleh, "Strength optimization of mortar with CNTs and nanoclays", *Proc. Inst. Civ. Eng. - Struct. Build.* Vol.169, No.5, (2016) 340-356.

12. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh, Sura Sanad. "Effect of nanoclay on the expansive potential of cement mortar due to alkali silica reaction", *ACI Materials Journal* 112 (2015) 801–808.
13. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh, Mahmoud Al-Shoubaki. "Using carbon nanotubes to improve strengthening efficiency of carbon fiber/epoxy composites confined RC columns", *Composite Structures* 134 (2015) 523–532.
14. **Mohammad R. Irshidat**, Rami H. Haddad and Hanadi Almahmoud. "Post-heating behavior of concrete beams reinforced with fiber reinforced polymer bars", *Structural Engineering and Mechanics*, Vol. 53, No. 6 (2015) 1253-1269.
15. **M. Irshidat**, A. Al-Ostaz, and A.H.-D. Cheng, "Correlating Micro/Nano Structure Morphology to High-Strain Rate Performance of Nano-Particle Reinforced Polymeric Materials", *ASCE Journal of Nanomechanics and Micromechanics*. (2012) 2:4 (55-64).
16. **M. Irshidat**, A. Al-Ostaz, A.H.-D. Cheng, and C. Mullen, "Nano-Particle Reinforced Polymer for Blast Protection of Unreinforced Masonry Wall: Laboratory Blast Load Simulation and Design Models", *ASCE Journal of Structural Engineering*. (2011) 137:10 (1193-1204).
17. A. Al-Ostaz, **M. Irshidat**, B. Tenkhoff and P. Ponnappalli, "Deterioration of Bond Integrity between Repair Material and Concrete due to Thermal and Mechanical Incompatibilities", *ASCE Journal of Materials in Civil Engineering*. (2010) 22:2 (136).

✓ **Submitted journal papers:**

1. **Mohammad R. Irshidat**. "Experimental study and modeling of bond behavior between steel rebars and concrete with carbon nanotubes".
2. **Mohammad R. Irshidat**, Ammar Al-Shannaq. "Bond behavior between carbon nanotubes modified textile reinforced mortar and concrete substrate".
3. Nisrin R. Abdelal, **Mohammad R. Irshidat**. "Utilizing vacuum bagging process to enhance bond behavior between fibers reinforced polymer composites and concrete".
4. Munther Kandah, Awni Y. Al-Otoom, Mohammad Al-Harabsheh, **Mohammad R. Irshidat**, Mohannad T. Aljarah. "Production of Hydrophobic Nano-solutions for Concrete Water repellent".

✓ **In press. journal papers:**

1. **Mohammad R. Irshidat**. "Bond behavior between FRP rebars and CNT modified concrete".

✓ **Referred conference papers:**

1. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh. "Effect of elevated temperatures on mechanical performance of cement mortar with nanoclay". *MATEC Web of Conferences* 120:02005 · January 2017. DOI: 10.1051/mateconf/201712002005.
2. **Mohammad R. Irshidat**, Mohammed H. Al-Saleh, Mahmoud Al-Shoubaki. "Strengthening of RC columns Using carbon fiber reinforced epoxy composites modified with carbon nanotubes", *International Journal of Civil, Structural, Construction, and Architectural Engineering*. Dubai, UAE. January, 2015.
3. **Mohammad R. Irshidat**, Rami H. Haddad, Hanadi Almahmoud. "Flexural Behavior of Heat-Damaged Concrete Beams Reinforced with Fiber Reinforced Polymer (FRP) Bars", *Proceeding of the International Conference on Composite Materials*. Dubai, UAE. January, 2014.

4. **M.R. Irshidat** and M.H. Al-Saleh, "Effect of Nanoclay Addition on Mechanical Properties of Portland Cement Mortars". Proceeding of the International Conference on Nanoscience and Nanotechnology. Istanbul, Turkey. June 20-21, 2013.
5. **M. Irshidat**, A. Al-Ostaz, A. Cheng, and C. Mullen, "Blast Vulnerability Evaluation of Concrete Masonry Unit Infill Walls Retrofitted With Nano Particle Reinforced Polyurea: Modelling and Parametric Evaluation". Proceeding of the 2011 Structures Congress. Las Vegas, Nevada. April 14-16, 2011.
6. **M. Irshidat**, A. Al-Ostaz, A. Cheng, and C. Mullen, "Nano-Particle Reinforced Polymer for Blast Protection of Unreinforced Masonry Wall: Laboratory Blast Load Simulation and Design Models". Proceeding of the 2010 Engineering Mechanics Institute Conference. Los Angeles, California. August 8-11, 2010.
7. **M. Irshidat**, A. Al-Ostaz, C. Mullen and A. Cheng, "Blast Resistance of Unreinforced Masonry (URM) Walls Retrofitted With Nano Reinforced Elastomeric Materials". Proceeding of the Structures Congress 09. Austin, Texas. April 29- May 2, 2009.

Conferences and Workshops

✓ **Conference Presentations:**

- ✓ The International Conference on Advances in Sustainable Construction Materials & Civil Engineering Systems (ASCMCES-17). Al-Sharjah, UAE. April 18-20, 2017.
- ✓ 17th International Conference on Composite Materials "ICCM 2015". Dubai, UAE. January 30-31, 2015
- ✓ 16th International Conference on Composite Materials "ICCM 2014". Dubai, UAE. January 30-31, 2014
- ✓ International Conference on Nanoscience and Nanotechnology "ICNN 2013". Istanbul, Turkey. June 20-21, 2013.
- ✓ Mid-South Annual Engineering and Sciences Conference "MAESC 2011". Memphis, TN, USA. May 3, 2011.
- ✓ Structures Congress 2011. Las Vegas, Nevada, USA. April 14-16, 2011.
- ✓ 2010 Engineering Mechanics Institute Conference "EMI 2011". Los Angeles, California, USA. August 8-11, 2010.
- ✓ 2009 Joint ASCE-ASME-SES Conference on Mechanics and Materials. Blacksburg, Virginia, USA. June 24-27, 2009.
- ✓ Structures Congress 2009. Austin, Texas, USA. April 29- May 2, 2009.
- ✓ First American Academy of Mechanics Conference. New Orleans, Louisiana, USA. June 17-20, 2008.
- ✓ American Society for Composites 23rd Technical Conference, Memphis, Tennessee, USA. September 9-11, 2008.
- ✓ Inaugural International Conference of the Engineering Mechanics Institute. Minnesota, USA. May 18-21, 2008.
- ✓ Mid-South Area Engineering and Sciences Conference. Oxford, Mississippi, USA. May 17-18, 2008.

✓ **Workshops and Training:**

- ✓ MED-SPRING Training on Innovation. Naples, Italy. November 25-27, 2015.
- ✓ WIPO Seminar on the PCT: The system for worldwide filing of Patent Applications, Amman, Jordan. May 27-28, 2015.

- ✓ Workshop on: Statistical Package for Social Sciences. Jordan University of Science and Technology, Irbid, Jordan. January 14-15, 2014.
- ✓ Workshop on: Modern University Instructional Methods. Jordan University of Science and Technology, Irbid, Jordan. January 6-7, 2013.
- ✓ Scientific Day of Faculty of Engineering. Jordan University of Science and Technology. Irbid, Jordan. April 30th 2013.
- ✓ Second International Workshop in Civil engineering. Jordan University of Science and Technology. Irbid, Jordan. June 20-21, 2012.
- ✓ Third Annual Department of Homeland Security (DHS) University Network Summit and Student Day. Washington D.C. March 17th – 19th, 2009.
- ✓ FLAC3D Training Course given by Itasca Consulting Group, Inc. Oxford, MS, USA. January 23-24, 2009.
- ✓ ANSYS AUTODYN Training Course. San Francisco, California, USA. August 20–25, 2007.
- ✓ Workshop on: Roller Compacted Concrete Dams. Munich, Germany. July 1- August 1, 2005.
- ✓ Workshop on: Development of Scientific Research in Jordan, Hashemite University, Zarqa, Jordan. March 16, 2004.

Editorial Board Membership

- ✓ **Member of the editorial board for the following Journal:**
 - ✓ Computations and Materials in Civil Engineering, Spiral Publishing, January 2016-now

Review Process

- ✓ **Reviewer for the following journals**
 - ✓ ASCE Journal of Materials in Civil Engineering
 - ✓ Composite Structures
 - ✓ Construction and Building Materials
 - ✓ Structures
 - ✓ Smart Structures and Systems
 - ✓ Journal of Traffic and Transportation Engineering
 - ✓ Computations and Materials in Civil Engineering
 - ✓ International Journal of Concrete Structures and Materials
 - ✓ Jordan Journal of Civil Engineering

Research Grants

1. **Project Title:** Strengthening, repair, and rehabilitation of new and existing reinforced concrete structures using nano composites.
Funding Agency: Scientific Research Support Fund, Amman, Jordan
Amount of Fund: 60,000 JD = 90,000 USD
2. **Project Title:** Performance evaluation of asphalt mixtures modified using nano-materials
Funding Agency: Scientific Research Support Fund, Amman, Jordan
Amount of Fund: 97,700 JD = 140,000 USD

3. **Project Title:** Flexural strengthening of RC beams using fiber reinforced nano cementitious materials.
Funding Agency: Deanship of Scientific Research – JUST
Amount of Fund: 10,000 JD = 15,000 USD
4. **Project Title:** Influence of nanofilaments on the mechanical properties, workability, and durability of cement-based materials.
Funding Agency: Deanship of Scientific Research – JUST
Amount of Fund: 6,000 JD = 9,000 USD
5. **Project Title:** Structural behavior investigation and durability study of concrete elements reinforced with fiber reinforced polymer (FRP) bars
Funding Agency: Deanship of Scientific Research – JUST
Amount of Fund: 9,000 JD = 13,500 USD
6. **Project Title:** The use of nano particles in production of concrete waterproofing and strengthening materials
Funding Agency: Deanship of Scientific Research – JUST
Amount of Fund: 19,700 JD = 28,000 USD
7. **Project Title:** Bond strength between steel rebars and geopolymer concrete
Funding Agency: Deanship of Scientific Research – JUST
Amount of Fund: 9,900 JD = 14,000 USD
8. **Project Title:** Epoxy/Thermoplastic Blends Reinforced with Carbon Nanotubes
Funding Agency: Deanship of Scientific Research – JUST
Amount of Fund: 5,950 JD = 8,500 USD

Supervised Graduate Students

1. Hanadi Almahmoud (2012-2013)
Thesis Title: Flexural Behavior of Heat Damaged Concrete Beams Reinforced with Fiber Reinforced Polymer (FRP) Bars
2. Feda Al-Amarat (2012-2014)
Thesis Title: Post-Heating behavior of Concrete Columns Reinforced with Fiber Reinforced Polymer Bars
3. Mahammad Obadi (2012-2014)
Thesis Title: Flexural behaviour of Heat Damaged One-Way Concrete Slabs Reinforced with Fiber Reinforced Polymer (FRP) Bars
4. Sura Sanad (2013-2014)
Thesis Title: Expansive potential of hydrophilic nanoclay reinforced cement mortar due to sulfate attack and alkali-silica reaction
5. Mahmoud Al-Shoubaki (2013-2015)
Thesis Title: Strengthening of Reinforced Concrete Columns Using Nanocomposites-CFRP Hybrid Sheets
6. Hashem Mashagbeh (2013-2015)

Thesis Title: Strengthening of Reinforced Concrete beams Using Nanocomposites-CFRP Hybrid Sheets

7. Alaa Talleh (2012-2014)

Thesis Title: Modeling and Optimization for Compressive and Tensile Strength of Concrete Mixtures Containing Carbon Nanotubes and Nanoclays Using Neural Networks and Genetic Algorithm Techniques

8. Ammar Al-Shannaq (2015-2016)

Thesis Title: Flexural strengthening of reinforced concrete beams using Fiber Reinforced Nano Modified Cementitious Materials

9. Rami Sughayer (2015-present)

Thesis Title: Strength optimization and microstructure investigation of geopolymer concrete made of natural Jordanian pozzolan

10. Rami Husban (2015-present)

Thesis Title: Effect of bond enhancement using carbon nanotube on flexural behavior of concrete beams strengthened with fibrous composites.

Honors and Awards

- 2010 Member of the honor society of Phi Kappa Phi, USA.
- Selected to present a poster at the Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit. Washington D.C. march 17th – 19th, 2009.
- University Honor Award for Outstanding Performance Students, Department of Civil Engineering, Jordan University of Science and Technology, 1999-2004.
- College of Engineering Honor Award for Outstanding Performance Students, Department of Civil Engineering, Jordan University of Science and Technology, 1999-2004.
- Ministry of Higher Education Scholarship, Bachelor Degree, Jordan 1999-2004.
- Ministry of Higher Education Scholarship, Master Degree, Jordan 2004-2006.
- PhD scholarship, University of Mississippi, USA, 2007-2010.

Professional Affiliations

- Phi Kappa Phi Honor Society (2010).
- Jordan Engineers Association (JEA).

Technical Skills

✓ **Computer skills:**

- ✓ Finite Element Software (AUTODYN, ANSYS, ABAQUS, SAP2000).
- ✓ Tools (Microsoft office professional).
- ✓ Computer literacy and Internet.
- ✓ MATLAB.

✓ **Communication skills:**

Excellent communication skills (oral & written) and very good in teamwork environment

Services

- ✓ Member of the scientific committee of the 14th Arab Structural Engineering Conference. Irbid, Jordan. April 12th – 15th, 2018.
- ✓ Member of the advisory committee for the project of Enhancing Institutional Capacities to Reduce Disaster Risk and to Integrate Climate Change in Jordan. UNDP, Jordan. 2012-now.
- ✓ Member of the organization committee of the Scientific Day of Faculty of Engineering. Jordan University of Science and Technology. Irbid, Jordan. April 30th 2013.
- ✓ Member of the organization committee of the International Workshop “Water – A crucial Object in the Middle East and North Africa”. Jordan University of Science and Technology. Irbid, Jordan. November 28th – 30th, 2006.
- ✓ Member of the organization committee of the International Conference on Geotechnical Engineering with emphasis on Dams, Highway Material, and Soil Improvement, Geo Jordan 2004. Jordan University of Science and Technology. Irbid, Jordan. July 11th – 13th, 2004.