

# Akram Jawdhari, MSc, PhD

Adjunct Faculty & Post-doctoral fellow

Department of Civil Engineering

Queen's University, Kingston, Ontario, Canada

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## EDUCATION

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| Ph.D. in Structural Engineering<br><b>University of Kentucky, USA</b><br>Honors, (4.0/4.0) GPA<br><u>Dissertation</u> : Behavior of RC beams strengthened in flexure with spliced CFRP rod panels. | 2011 –2016 |
| Graduate Certificate, College Teaching & Learning<br><b>University of Kentucky, USA</b><br>(4.0/4.0) GPA   | 2014 –2015 |
| MSc in Structural Engineering<br><b>University of Babylon, Iraq</b><br><u>Thesis</u> : Non-linear analysis of RC folded slabs by finite strip method.  | 2005 –2008 |
| BSc. in Civil Engineering<br><b>University of Babylon, Iraq</b><br>Highest Honors, (Rank = 1 <sup>st</sup> /500 students)  | 2000 –2005 |

## CURRENT & PAST POSITIONS

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| <b>Adjunct Faculty</b><br>Department of Civil Engineering<br>Queen's University, Canada                             | Jan. 2020 –present                             |
| <b>Post-doctoral Fellow</b><br>Department of Civil Engineering<br>Queen's University, Canada                        | Jul. 2017 – present                            |
| <b>Faculty (Asst. Lecturer, Lecturer)</b><br>Department of Construction and Projects<br>University of Babylon, Iraq | Jan. 2019 –Jun. 2019 &<br>May. 2008 –Aug. 2010 |
| <b>Post-doctoral Research Associate</b><br>Department of Civil Engineering<br>University of Kentucky, USA           | Jul. 2016 –Jun. 2017                           |
| <b>Graduate Teaching &amp; Research Assistant</b><br>Department of Civil Engineering<br>University of Kentucky, USA | Jan. 2012 – Jun. 2016                          |

## Civil Engineer

Department of Construction and Projects  
University of Babylon, Iraq

Nov. 2005 –Apr. 2008

### AWARDS & HONORS

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- Post-Doctoral Travel (2 times): School of Graduate Studies, Queen’s University 2018, 2020
- CESL Star: Center for English as a Second Language, University of Kentucky 2020
- Elevate Post-Doctoral Fellowship: Mitacs Canada 2020
- Accelerate Post-Doctoral Fellowship: Mitacs Canada 2018
- Outstanding Reviewer Award: Engineering Structures 2018
- Outstanding Graduate Student (2<sup>nd</sup> place): Dept. Civil Engineering, University of Kentucky 2016
- Appreciation Letters for Excellence in Service (25 Certificates): University of Babylon Multiple
- National Leadership Honor Society: Omicron Delta Kappa Organization 2014
- Civil Engineering Honor Society: Chi Epsilon Organization 2013
- Academic Honor Society: Delta Epsilon Iota Organization 2012
- Academic Excellence Award: University of Babylon & Ministry of Higher Education in Iraq for ranking 1<sup>st</sup> among all College of Engineering graduates 2005

### RESEARCH INTERESTES

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- Fiber Reinforced Polymer (FRP) Composites; Sustainable, Smart Materials and Systems; Ultra-High performance Concrete (UHPC); Infrastructure Evaluation and Rehabilitation; Bridge Engineering; Computational Modeling and Finite Element

### TEACHING EXPERIENCE

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- Prestress Concrete, Winter 2020, 2021, Queen’s University, Canada, Role= Instructor, total # of students ≈ 60 (4-5 graduates, rest are 4<sup>th</sup> year undergrads).
- Prestress Concrete, Spring 2015, University of Kentucky, USA, role= Guest Instructor.
- Advanced Concrete Design, Dynamics of Structures, Spring 2014, 2015, 2016, University of Kentucky, USA, role= Teaching Assistant, total # of students ≈ 15-20 (MSc, PhD students).
- Structural Analysis, Summer 2013, University of Kentucky, USA, role= Teaching Assistant.
- Introduction to Matrix Structural Analysis, Spring 2013, University of Kentucky, USA, role= Teaching Assistant.
- Elementary Structural Design, Summer 2012, University of Kentucky, USA, role= Teaching Assistant.
- Prestress Concrete, Intermediate Structural Analysis, Spring 2012, University of Kentucky, USA, role= Teaching Assistant.

### GRANT WRITING EXPERIENCE

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- 1- MITACS Elevate Post-Doctoral Fellowship. “Connections Design in New Double Wythe Insulated Wall Panel Containing Ultra-High Performance Concrete (UHPC).” Value=150,000 CAD, Duration= 2 yrs., status=approved.

- 2- MITACS Accelerate Post-Doctoral Fellowship. “Investigation of Thermal Bowing in UHPC Precast Double Wythe Wall Panels”. Value=45,000 CAD, Duration= 1 yrs., status=approved.
- 3- NSERC Post-Doctoral Scholarship. “Fatigue Life Prediction of Bridge Decks and Superstructures under the First Moving Load Simulator in Canada.” Value=90,000 CAD, Duration= 2 yrs., status= not selected.
- 4- Izaak Walton Killam Post-Doctoral Scholarship. “Novel Strengthening System for Slender Reinforced Concrete Columns using High-Modulus Longitudinal Composite Rod Panels” Value=90,000 CAD, Duration= 2 yrs., status=not selected.
- 5- NSERC VFG Scholarship. “Durability Study on High-Performance Hybrid Structural Members: Concrete-Filled FRP-Tube Beams.” Value=106,000 CAD, Duration= 2 yrs., status= declined because program ended.

## PUBLICATIONS

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### Peer Reviewed Journal Articles

- J1. **Jawdhari, A.**, Noël, M., and Fam, A. “Modeling of Damaged Concrete-Filled FRP Tubes in Flexure.” Accepted in *Engineering Structures*.
- J2. Kadhim, M. A., **Jawdhari, A.**, and Peiris, A. (2021). “Evaluation of Lap-Splices in NSM FRP Rods for Retrofitting RC Members.” *Structures*, vol 30, April 2021, 877-894.
- J3. Kadhim, M. A., **Jawdhari, A.**, and Peiris, A. (2021). “Development of Hybrid UHPC-NC Beams: A Numerical Study.” *Engineering Structures*, vol 23, 111893.
- J4. **Jawdhari, A.**, Hadhood, A., and Fam, A. (2021). “Confinement Model for FRP-Wrapped Circular Columns when the Wraps are subjected to Damage.” *Construction and Building Materials*, vol 275, 122101.
- J5. **Jawdhari, A.**, Peiris, A., and Harik, I. (2020). “Load Rating of Bridge-Size RC Culverts.” *Structure and Infrastructure Engineering*, <https://doi.org/10.1080/15732479.2020.1850803>.
- J6. Kadhim, M., **Jawdhari, A.**, Altaee, M., and Adheem, A. (2020). “Finite Element Modelling and Parametric Analysis of FRP Strengthened RC Beams under Impact Load.” *Building Engineering*, vol 32, 101526.
- J7. **Jawdhari, A.**, and Fam, A. (2020). “Thermal-Structural Analysis and Thermal Bowing of Double Wythe UHPC Insulated Walls.” *Energy and Buildings*, vol 223, 110012.
- J8. **Jawdhari, A.**, Adheem, A., and Kadhim, M. (2020). “Parametric 3D Finite Element Analysis of FRCM-Confined RC Columns under Eccentric Loading.” *Engineering Structures*, vol 212, 110504.
- J9. Dutta, D., **Jawdhari, A.**, and Fam, A. (2020). “A New Studded Precast Concrete Sandwich Wall with Embedded GFRP Channel Sections - Part I: Experimental Study.” *PCI Journal*, vol 65(3), 78-99.
- J10. **Jawdhari, A.**, and Fam, A. (2020). “A New Studded Precast Concrete Sandwich Wall with Embedded GFRP Channel Sections - Part II: Finite Element and Parametric Studies.” *PCI Journal*, vol 65(4), 51-70.
- J11. **Jawdhari, A.**, Fam, A., and Harik, I. (2020). “Bond between CFRP Rod Panels and Concrete using Cementitious Adhesive.” *Construction and Building Materials*, vol 235, 117503.

- J12. Muhaisin, M., **Jawdhari, A.**, and Ammash, H. (2019). "Revised Formula for Predicting the Long-Term Deflection Multiplier of Normal and High Strength Concrete." *IBRACON Structures and Materials Journal*, vol 12 (6), 1345-1352.
- J13. Kadhim, M., Adheem, A., and **Jawdhari, A.** (2019). "Nonlinear Finite Element Modelling and Parametric Analysis of Shear Strengthening RC T-Beams with NSM CFRP Technique." *International Journal of Civil Engineering*, vol 17, 1295-1306.
- J14. **Jawdhari, A.**, Semendary, A., Fam, A., Steinburg, E., and Khoury, I. (2019). "Bond Characteristics of CFRP Rod Panels Adhered to Concrete under Bending Effects." *ASCE J. of Composites for Construction*, vol 23 (1).
- J15. **Jawdhari, A.**, Harik, A., and Fam, A. (2018). "Behavior of Reinforced Concrete Beams Strengthened with CFRP Rod Panels CRP 195." *Structures*, vol 16, 239-253.
- J16. **Jawdhari, A.**, and Fam, A. (2018). "Numerical Study on Mechanical and Adhesive Splices for Ribbed GFRP Plates Used in Concrete Beams." *Engineering Structures*, vol 174, 478-494.
- J17. **Jawdhari, A.**, Peiris, A., and Harik, I. (2018). "Experimental Study on RC Beams Strengthened with CFRP Rod Panels." *Engineering Structures*, vol 173, 693-705.
- J18. **Jawdhari, A.**, Fam, A., and Harik, I. (2018). "Numerical Study on the Bond between CFRP Rod Panels (CRPs) and Concrete." *Construction and Building Materials*, vol 177, 522-534.
- J19. **Jawdhari, A.**, and Harik, I. (2018). "Finite Element Analysis of RC Beams Strengthened in Flexure with CFRP Rod Panels." *Construction and Building Materials*, vol 163, 751-766.
- J20. **Jawdhari, A.**, and Harik, I. (2018). "Simulation of Delamination Failures in RC Members Strengthened with CFRP Rod Panels and CFRP Laminates." *ACI Special Publication (ACI SP 327)*, 5.1-5.20.
- J21. **Jawdhari, A.**, Peiris, A., and Harik, I. (2017). "Bond Study on CFRP Rod Panels Externally Adhered to Concrete." *ASCE J. of Composites for Construction*, vol 21 (4).
- J22. Adheem, A., Kadhim, M. A., **Jawdhari, A.**, and Fam, A. "Confinement Model for Concrete Wrapped with Fiber Reinforced Cementitious Mortar." Submitted in June 2020 to *Engineering Structures*.
- J23. **Jawdhari, A.**, Fam, A., and Kadhim, M. "Thermal Bowing of Reinforced Concrete Sandwich Panels using Time-Domain Coupled-Field Finite Element Analysis." Submitted in September 2020 to *Building Engineering*.
- J24. Kadhim, M. A., **Jawdhari, A.**, Adheem, A. and Fam, A. "Analysis and Design of Two-Way Slabs Strengthened in Flexure with FRCM." Submitted in October 2020 to *Structures*.
- J25. Wootton, N., Fam, A., Green, M., **Jawdhari, A.**, and Sarhat, S. "Field Testing and Dynamic Response of Full-Scale GFRP-Reinforced Concrete Guideway under Monorail Train." Submitted in November 2020 to *ASCE J. of Bridge Engineering*.
- J26. Altaee, M., Altayee, S., Kadhim, M., and **Jawdhari, A.** "Evaluation of Existing Bond-Slip Relations for CFRP-Steel Joints and New Model for Linear and Nonlinear Adhesives." Submitted in Feb. 2021 to *Advances in Structural Engineering, Sage*.
- J27. **Jawdhari, A.** Fam, A., and Sadeghian, P. "Stress-strain model for angle-ply GFRP tubes in tension considering nonlinearity and concrete filling." Submitted in March. 2021 to *Composite Structures*.

## Papers in Conference Proceedings

- C1. Kadhim, M., Adheem, A., and **Jawdhari, A.** (2020). “Predictive Capability of Existing Confinement Models for FRCM Composites Confined Concrete.” 1<sup>st</sup> International Multi-Disciplinary Conference (IMDC-SDSP), 28-30 June, Antalya, Turkey.
- C2. Kadhim, M., Altaee, M., Adheem, A., and **Jawdhari, A.** (2019). “A robust 3D finite element model for concrete columns confined by FRCM system.” International Conference of Engineering Risk (INCER-2019), April 3-5, Beirut, Lebanon.
- C3. **Jawdhari, A.**, Fam, A., and Harik, I. (2018). “Experimental and Finite Element Study on RC Beams Strengthened with Full-Length and spliced CFRP Laminates.”, The 9<sup>th</sup> International Conference on Fiber-Reinforced Polymers in Civil Engineering (CICE), July 17-19, Paris, France.
- C4. **Jawdhari, A.**, and Adheem, A. (2018). “Finite Element Analysis of RC Beams Strengthened in Shear with NSM FRP Rods.” The 16<sup>th</sup> International Congress on Polymers in Concrete (ICPIC), April 29th to May 1st, Washington D.C., USA.
- C5. **Jawdhari, A.**, and Harik, I. (2017). “Retrofit of Concrete Members with CFRP Rod Panels”, The 39<sup>th</sup> Symposium of the International Association of Bridge and Structural Engineering (IABSE), September 19-23, Vancouver, Canada.
- C6. Semendary, A. and **Jawdhari, A.** (2017). “Evaluation of Moment Live Load Distribution Factors in NEXT D Beam Bridge using Finite Element Modeling”, The 39<sup>th</sup> Symposium of the International Association of Bridge and Structural Engineering (IABSE), September 19-23, Vancouver, Canada.
- C7. **Jawdhari, A.**, Semendary, A., and Hsaine, N. (2016). “Finite Element Prediction of Brittle Failure in RC Beams Strengthened with Externally Bonded FRP Material”. International Conference for Student in Applied Engineering, Newcastle, UK, 20-21 October, IEEE.
- C8. **Jawdhari, A.**, and Harik, I. (2016). “RC Beams Strengthened with Spliced CFRP Rod Panels”. The 7<sup>th</sup> International Conference on Advanced Composite Materials in Bridges and Structures, Vancouver, British Columbia, Canada, 24 – 26 August.
- C9. **Jawdhari, A.**, and Harik, I. (2016). “Evaluation of RC Beams Strengthened with Spliced CFRP Rod Panels”. Structural Faults and Repairs-2016, Edinburg, UK, 17-19 May.
- C10. **Jawdhari, A.**, and Alkafaji, H. (2016). “Guideline on Efficient, and Economic Design of Masonry units subjected to Lateral Loads”. 1<sup>st</sup> International Conference on Engineering and Innovative Technology, Salahaddin University-Erbil, Erbil, Kurdistan, April 12-14.
- C11. **Jawdhari, A.**, and Harik, I. (2015). “Development Length and Bond Strength of CFRP Rod Panels (CRP’S) Bonded to Concrete”. The 12<sup>th</sup> International Symposium on Fiber Reinforced Polymers for Reinforced Concrete Structures (FRPRCS-12) & APFIS-2015, 14-16 December, Nanjing, China.
- C12. **Jawdhari, A.**, Peiris, A., and Harik, I. (2021). “Evaluating the Bond Characteristics of Intermediate and Ultra-High Modulus CFRP Laminates Adhered to Steel.” 10<sup>th</sup> International Conference on FRP Composites in Civil Engineering (CICE 2021), 1-3 July, Istanbul, Turkey.
- C13. Philopateer, B., Aikaterini, G., **Jawdhari, A.**, and Fam, A. (2021). “Numerical Investigation of a New Floor System with GFRP Stay-in-Place Forms and Embedded I-Beams”, 10<sup>th</sup> International Conference on FRP Composites in Civil Engineering (CICE 2021), 1-3 July, Istanbul, Turkey.

- C14. Adheem, A., Kadhim, M., and **Jawdhari, A.** (2021). “Application of Drucker-Prager Plasticity Model for Concrete Confined with Fiber Reinforced Cementitious Mortar (FRCM)”, 10<sup>th</sup> International Conference on FRP Composites in Civil Engineering (CICE 2021), 1-3 July, Istanbul, Turkey.
- C15. Altaee, M., Kadhim, M., Altayee, S., and **Jawdhari, A.** (2021). “Evaluation of Existing Bond-Slip Models for FRP-Steel Joints”, 10<sup>th</sup> International Conference on FRP Composites in Civil Engineering (CICE 2021), 1-3 July, Istanbul, Turkey.
- C16. **Jawdhari, A.**, and Harik, I. (2021). “Analytical Study on the Bond Between CFRP Rod Panels and Concrete Substrate.” 8<sup>th</sup> International Conference on Advanced Composite Materials in Bridges and Structures (ACMBS), 5-7 August, Sherbrooke, Quebec, Canada.
- C17. **Jawdhari, A.**, Fam, A., and Sadeghian, P. (2021). “Modeling the Nonlinear Response of  $\pm 55$  Angle-Ply GFRP Tube used in CFFT Applications.” 8<sup>th</sup> International Conference on Advanced Composite Materials in Bridges and Structures (ACMBS), 5-7 August, Sherbrooke, Quebec, Canada.

## TECHNICAL REPORTS&ORAL PRESENTATIONS

- TR1. Fam, A., and **Jawdhari, A.** (2019). “Cyclic bend test on full-scale wind turbine blade.” Technical report prepared at Queen’s University; submitted to Biome Renewable Inc.
- TR2. Fam, A., and **Jawdhari, A.** (2018). “Investigation of Thermal Bowing in UHPC Precast Double Wythe Wall Panels.” Technical report prepared at Queen’s University; submitted to Canadian Precast and Prestressed Concrete Institute (CPCI).
- TR3. Harik, I., Peiris, A., and **Jawdhari, A.** (2015). “Load Rating of US 25 Bridge Over Roundstone Creek”. Technical report prepared at University of Kentucky; submitted to Bowie Refined Coal, LLC.
- OP1. Straube, J., Grin, A., Fam, A., **Jawdhari, A.**, and Burak, R. (2018). “Standardization of a new climate resilient building enclosure technology using ultra-high performance concrete”. Poster presentation, Proceedings on durability and Climate Change, CIB/NRC Symposium, Sep 21, 2018, Ottawa.
- OP2. **Jawdhari, A.**, Fam, A. (2020). “Thermal bowing of Double Wythe UHPC Insulated Wall Panels”. Oral presentation (online) in CPCI AGM and Fall Committee Meetings, October 21, 2020.
- OP3. Fam, A., **Jawdhari, A.**, and Hadhood, A. (2021). “Confinement when FRP Wraps are Subjected to Damage.” Oral presentation (online) presented to subcommittee 440D at the American Concrete Institute (ACI) Spring 2021 Convention, March 28, 2021.

## PROFESSIONAL ACTIVITIES

- Voting Member, Sub-committee 440-F (FRP for Repair), American Concrete Institute
- Associate Member, Sub-committee 447 (Finite Element), American Concrete Institute
- Associate Member, American Society of Civil Engineers
- Friend to Multiple Committees, Transportation Research Board

- Served as reviewer for:
  - Engineering Structures
  - Construction and Building Materials
  - Canadian Journal of Civil Engineering
  - Steel and Composite Structures
  - Structural Concrete
  - Precast Concrete Institute
  - Composite Materials
  - Structures
- Session chair: No. 35 “Composite Structures-3”, 9<sup>th</sup> International Conference on FRP Composite in Civil Engineering (CICE2018), Paris, France
- Committee chair: “Resident Engineer Office”, active 2008 to 2010, oversaw the construction of a three-story building to house the College of Veterinary Medicine at University of Babylon, Iraq
- Committee chair: “Evaluation and Rehabilitation”, active 2006 to 2007, oversaw all assessment and repair projects at University of Babylon, Iraq, and included four engineers: structural, mechanical, hydraulics, and electric.
- Cofounding member, Iraqi Student Organization (ISO) at University of Kentucky, USA.
- Cofounding member, House of Wisdom, Lexington, Kentucky, USA.

## SOFTWARE EXPERIENCE

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- Computer Programming: MATLAB, VISUAL BASIC, FORTRAN 90
- Nonlinear Finite Element: LS-DYNA, ANSYS, ABAQUS
- Structural Analysis: STAAD PRO, SAP 2000, AUTODESK ROBOT, ETABS, SAFE, RIZA
- CAD Software: AUTODESK INVENTOR, PTC CREO, AutoCAD 2019 (2D&3D)
- Other Software: Microsoft word, Excel, 3D Max

## STUDENT MENTORING EXPERIENCE

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- **Severus Gao**, PhD student at Queen’s University, thesis title “Cyclic and Fatigue Behavior of FRP-Reinforced Concrete Bridge Deck under Rolling and Pulsating Loads”, status= progressing.
- **Philopater Boules**, PhD student at Queen’s University, thesis title “New Floor System with GFRP Stay-in-Place Forms and Embedded I-Beams”, status= progressing.
- **Ali Haider**, MSc student at Queen’s University, thesis title “Axial behavior of steel tubes fully and partially filled with UHPC”, status= progressing.
- **Debrup Dutta**, MSc student at Queen’s University, thesis title “A new studded precast concrete sandwich wall with embedded glass-fiber-reinforced polymer channel sections”, status= graduated.