Aladdin Alwisy, PhD

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Smart IDC Lab: https://sites.google.com/view/smart-idc-lab/home

Research Interests

- Modular/off-site construction.
- Building information modelling (BIM).
- Construction automation.
- Virtual reality and augmented reality.
- Artificial intelligence and machine learning algorithms.
- Energy simulation and analysis.
- Green building and sustainable design.

Academic Experience

Assistant Professor **August 2019 - Present**

University of Florida, Gainesville, Florida

- Leading a team of graduate students to support the industrialization of the construction industry.
- Developing an energy-based generative design framework for modular construction.
- Establishing and Directing the "Smart Industrialized Design and Construction Lab".
- Teaching BCN 2405C "Construction Mechanics"and BCN 1210 "Construction Materials" Courses.
- Mentoring graduate and undergraduate students.

Postdoctoral Fellow (PDF) **Oct 2016 – August 2019**

University of Alberta, Edmonton, Alberta

- Led a team of graduate students to develop a BIM-based decision support system that supports the automation of energy analysis for residential projects.
- Investigated the key factors in green building design.
- Explored different guidelines and standards to implement BIM.
- Mentored graduate and undergraduate students.
- Taught lectures in graduate-level and undergraduate-level courses.

Construction Research and Teaching Assistant **Sep 2008 – Sep 2016**

University of Alberta, Edmonton, Alberta

- Teaching assistant of CIV E608 *Construction Engineering*, CIV E409 *Construction Methods*, and CIV E303 *Project Management*.
- Wrote a grant proposal to *the Natural Sciences and Engineering Research Council of Canada* (NSERC) – *Engage Grant Program* to automate the drafting process of precast concrete panels.
- Conducted life cycle cost analysis for a modular/offsite workforce camp project incorporating energy models and sensitivity analysis.

Lecturer/Teaching Assistant **Aug 2007 – Aug 2008**

University of Aleppo, Aleppo, Syria

- Instructor of *Construction Management course*; Faculty of Technical Engineering, Department of Environmental Studies, the 5th year undergraduate level.
- Instructor of *System Analysis*; Technical Engineering, the 4th year undergraduate level.
- Instructor of *International Computer Driving License (ICDL)*; Faculty of Technical Engineering, Department of Environmental Studies, the 1st year undergraduate level.
- Instructor and developer of *Information Technology 1, 2*; Faculty of Civil Engineering, the 2nd year undergraduate level.

Industrial Experience

Director of Research & Development (R&D) **Oct 2016 – Sep 2019**

Cormode & Dickson, Edmonton, Alberta

- Exploring different construction systems for modular/off-site construction projects.
- Performing energy analysis on building envelopes and mechanical systems.
- Integrating BIM practices into the company's designing, estimating, and scheduling processes.
- Visualizing and optimizing construction activities.
- Developing financial proforma as part of the feasibility study to potential projects.

Pre-construction Project Manager **Mar 2012 – Sep 2016**

Cormode & Dickson, Edmonton, Alberta

- Tracked and controlled on-site project activities (manpower, equipment and material), reported project progress to the VP of Operations, and developed a productivity analysis system for two modular/off-site camps, 1,772 units (Noralta Camps, Fort McMurry).
- Managed the design process and developed 3D simulation and rendering.
- Prepared development & building permits packages (DP, BP).
- Prepared engineering, procurement, and construction (EPC) contacting agreements using the Canadian construction documents committee (CCDC) forms, namely stipulated price (CCDC 2), design-build stipulated price (CCDC 14) and construction management Contracts (CCDC 5B).

Project Coordinator **May 2008 – Sep 2010**

Landmark Homes, Edmonton, Alberta

- Performed design, drafting and estimating duties for high-rise buildings and single-family homes using AutoCAD and BIM tools.
- Prepared BIM-based estimate and schedules
- Worked with other project managers to monitor project performance, equipment, and manpower.
- Interfaced with project team, clients, architects and subcontractors.

Project Coordinator **July 2006– Aug 2008**

Private Engineering Office, Aleppo, Syria

- Developed estimates and construction schedules.
- Assisted in the preparation of bid proposals and contracts.

Summer Internship **July 2005– Aug 2005**

University of Oviedo, Oviedo, Spain

- Worked in labs on concrete crushing experiment, soil and rock strength tests, and data analysis.

Editorship

Specialty Editor, International Journal of Industrialized Construction **April 2019 – Present**

Edmonton, Alberta, Canada

Federal Research Grants

Collaborative Research & Development (CRD) **Oct 2016 – Sep 2019**

University of Alberta, Edmonton, Alberta

- Played a key role in the development and submission of a CRD titled "*Framework for Energy-Based Decision Support System (DSS) for Residential Construction Projects*", which funds my postdoctoral fellowship.
- The application targets three objectives:
  - Developing energy functions to link design inputs with energy performance outputs.
  - Developing an energy-based target costing (eTC) tool.
- CRD budget of $404,500 allocated over three years.

Collaborative Research & Development (CRD) **July 2014 – Aug 2016**

University of Alberta, Edmonton, Alberta

- Played a key role in the development and submission of a CRD titled "*A General Contractors Based Automated 3D CAD Model-Based Decision Support System (DSS) for Off-Site Building Construction Projects*", which funded my PhD research.
- The application followed a two-step process:
  - Developing a target costing model to efficiently explore the best solution from available options based on a desired cost and a conceptual design.
  - Performing an on-site assembly management and productivity analysis of modular projects to improve the project delivery.
- CRD budget of $424,400 allocated over two years.

Honors and Awards

Provost Doctoral Entrance Award **Sep 2010 – June 2012**

University of Alberta, Edmonton Alberta

- University of Alberta provost doctoral entrance award for two academic years.

Academic Achievement Award **Sep 2002 – June 2006**

University of Aleppo, Aleppo Syria

- El Basel Award for four years for the first top student in the 2nd, 3rd, 4th and 5th academic years.

Journal Articles

1. **Alwisy, A**., Bu Hamdan, S., Barkokebas, B., Bouferguene, A., & Al-Hussein, M. (2018). "A BIM-based automation of design and drafting for manufacturing of wood panels for modular residential buildings." *International Journal of Construction Management*, 1-19. DOI: 10.1080/15623599.2017.1411458.

2. **Alwisy, A.,** Bouferguene, A., & Al-Hussein, M. (2018). "Factor-based target cost modelling for construction projects." *Canadian Journal of Civil Engineering*, 45(5), 393-406. DOI: 10.1139/cjce-2017-0289.

3. **Alwisy, A**., Bouferguene, A., & Al-Hussein, M. (2018). "Framework for Target Cost Modelling in Construction Projects." *International Journal of Construction Management*, 1-16. DOI: 10.1080/15623599.2018.1462446.

4. **Alwisy, A**., S., Barkokebas, Bu Hamdan, B., Gül, M., and Al-Hussein, M. (2018). "Energy-based Target Cost Modelling for Construction Projects", *Journal of Building Engineering, Elsevier*. Vol. 20, pp. 387-399. DOI: doi.org/10.1016/j.jobe.2018.06.010

5. **Alwisy, A.**, Bu Hamdan, S., and Gül, M. (2018). "Criteria-based Ranking of Green Building Design Factors According to Leading Rating Systems", *Journal of Energy and Buildings, Elsevier*. Vol. 178, pp. 347-359. DOI: doi.org/10.1016/j.enbuild.2018.08.043

6. BuHamdan, S., **Alwisy, A.**, Barkokebas, B., Bouferguene, A. and Al-Hussein, M. (2019), "A Multi-Criteria Lifecycle Assessment Framework for Evaluating Building Systems Design", *Journal of Building Engineering*, Elsevier, Vol. 23, pp. 388–402. DOI: doi.org/10.1016/j.jobe.2019.02.010

7. BuHamdan, S., **Alwisy, A**., and Bouferguene, A (2019). "The application of multi-attribute utility theory for a market share-based design evaluation". *International Journal of Housing Markets and Analysis, Emerald Insight*. DOI: doi/full/10.1108/IJHMA-11-2018-0087.

8. **Alwisy, A.**, BuHamdan, S., & Gül, M. (2019). "Evidence-based Ranking of Green Building Design Factors According to Leading Energy Modelling Tools". *Journal of Sustainable Cities and Society, Elsevier*. DOI: doi.org/10.1016/j.scs.2019.101491

9. BuHamdan, S., **Alwisy, A**., Bouferguene, A., & Al-Hussein, M. (2019). "Novel approach to overcoming discontinuity in knowledge: application in value-adding frameworks in construction industry". *Journal of Construction Engineering and Management*, 145(8), 04019045.

10. BuHamdan, S., Alwisy, A., Bouferguene, A., & Al-Hussein, M. (2019). "A framework for value visualization in the construction industry to support value-oriented design". *Canadian Journal of Civil Engineering*, (999), 1-13.

11. BuHamdan, S., **Alwisy, A.**, & Bouferguene, A. (2020). "Drivers of housing purchasing decisions: a data-driven analysis*". International Journal of Housing Markets and Analysis, Emerald*.

12. BuHamdan, S., **Alwisy, A.,** & Bouferguene, A. (2020). "Generative systems in the architecture, engineering and construction industry: A systematic review and analysis". *International Journal of Architectural Computing*. https://doi.org/10.1177/1478077120934126

13. BuHamdan, S., Duncheva, M., **Alwisy, A**., Al-Hussein, M. (2020). "Developing a BIM and simulation-based hazard assessment and visualization framework for CLT construction design", *Submitted to the Journal of Construction Engineering and Management.*

14. **Alwisy, A.**, BuHamdan, S., & Gül, M. (2020). "Energy-Based Generative Space Layout Design Utilizing Two-Dimensional Genetic Algorithm", Submitted to *the Journal of Automation in Construction*.

Conference Publications

1. BuHamdan, S., Alwisy, A., & Bouferguene, A. (2020). "Explore the application of reinforced learning to support decision making during the design phase in the construction industry". Proceedings, the International Conference on Industry 4.0 and Smart Manufacturing, Rende, Cosenza, Italy, Nov. 20-22, 42, 181-187.

2. Barkokebas, B., Bu Hamdan, S., **Alwisy, A.**, Bouferguene, A., and Al-Hussein M. (2018). "BIM guideline review for public post-secondary institutions." Proceedings, International Symposium on Automation and Robotics in Construction, Berlin, Germany, Jul. 20–25.

3. Bu Hamdan, S., Barkokebas, B., **Alwisy, A.**, Bouferguene, A., and Al-Hussein, M. (2018). "Improved target-value design approach through the integration of environmental performance with building systems performance." Proceedings, Construction Research Congress, New Orleans, LA, USA, Apr. 2-5.

4. Bu Hamdan, S., **Alwisy, A.**, Barkokebas, B., Bouferguene, A., and Al-Hussein, M. (2017). "Visual-based value assessment application in the construction industry." Accepted (Feb., 2017) for publication in Proceedings, International Association for Bridge and Structural Engineering (IABSE) Conference, Bath, UK, Apr. 19-20.

5. **Alwisy, A**., Bu Hamdan, S., Ajweh, Z., and Al-Hussein, M. (2015). "Productivity-Based Management System (PBMS) for industrialization construction." Proceedings, 2015 Modular and Offsite Construction (MOC) Summit and 1st International Conference on the Industrialization of Construction (ICIC), Edmonton, AB, Canada, May 19-21, pp. 439-447.

6. Bu Hamdan, S., **Alwisy, A.**, Ajweh, Z., Al-Hussein, M., and AbouRizk, S. (2015). "Simulation based multi-objective cost-time trade-off for multi-family residential off-site construction." Proceedings, Winter Simulation Conference, Huntington Beach, CA, USA, Dec. 6-9, pp. 3391-3401.

7. Barkokebas, B., Bu Hamdan, S., **Alwisy, A.**, and Al-Hussein, M. (2015). "Evaluation of the impact of dynamic work stations versus static work stations in wood framing prefabrication using hybrid simulation." Proceedings, 2015 Modular and Offsite Construction (MOC) Summit and 1st

International Conference on the Industrialization of Construction (ICIC), Edmonton, AB, Canada, May 19-21, pp. 495-501.

8. **Alwisy, A.**, Al-Hussein, M., and Al-Jibouri, S. H. (2012). "BIM approach for automated drafting and design for modular construction manufacturing." Proceedings, International Workshop on Computing in Civil Engineering, Clearwater Beach, FL, USA, Jun. 17-20, pp. 221-228.

9. Moghadam, M., **Alwisy, A.**, and Al-Hussein, M. (2012). "Integrated BIM/Lean base production line schedule model for modular construction manufacturing." Proceedings, Construction Research Congress, West Lafayette, IN, USA, May 21-23, pp. 1271-1280.

10. **Alwisy, A.** and Al-Hussein, M. (2010). "Automation in drafting and design for modular construction manufacturing utilizing 2D CAD and parametric Modelling." Proceedings, International Workshop on Computing in Civil and Building Engineering, Nottingham, UK, Jun. 30-Jul. 2, Paper 167.

Technical Reports

1. **Alwisy, A.** (2013). "Onsite assembly report for a 1,772 suites modular workforce camp – Lynx & Wolverine lodges, Noralta, Fort McMurry", *Final Report to Cormode & Dickson*, pp. 1-14.

2. **Alwisy, A.** and Al-Hussein, M. (2011). "Energy-based alternative evaluation of mechanical systems for workforce camps – A lifecycle cost analysis report", *Final Report to Cormode & Dickson and Devon Accommodations*, pp. 1-27.

Outreach & Services

Organizing Co-Chair, (ISARC 2019)

- The 36th International Symposium on Automation and Robotics in Construction (ISARC 2019). May 21-24, 2019, Banff, AB, Canada.

Organizing Co-Chair, (MOC 2019)

- Modular and Offsite Construction Summit (MOC 2019). May 21-24, 2019, Banff, AB, Canada.

Scientific Committee Member, (CIAC 2019)

- The 1st Conference on Automation Innovation in Construction (CIAC2019) during November 7-8, 2019 in Leiria, Portugal.

Reviewer, (ECAM 2019)

- Engineering, Construction and Architectural Management, Emerald Insight Group.

Reviewer, (IJHMA 2019)

- International Journal of Housing Markets and Analysis, Emerald Insight Group.

Reviewer, (TJCM 2018)

- The International Journal of Construction Management, Taylor and Francis Group.

Reviewer, (MOC 2018)

- Modular and Offsite Construction Summit (MOC 2018). March 22-25, 2018, Hollywood, FL, United States.

Computer Skills

- **BIM:** Autodesk Revit, Vico Office Suite, Autodesk Navisworks.
- **Visual Programming:** Autodesk Dynamo.
- **Programming:** C#, Python**,** Visual Basic.net, Visual Basic Application.
- **Energy Analysis:** Autodesk Green Building Studio, eQuest, HOT2000.
- **Drafting and Design:** AutoCAD, 3D Max, SketchUp, Photoshop.
- **Project Estimating & Scheduling:** MS Project, Primavera6.
- **Structural Design:** STAAD.Pro, SAP2000.

Education

Doctor of Philosophy (PhD), Construction Engineering and Management
University of Alberta, Canada *October 2016*

- GPA: 3.9/4.0

Master of Science (MSc), Construction Engineering and Management
University of Alberta, Canada *November 2010*

- GPA: 3.8/4.0

Bachelor of Science (BSc), Civil Engineering
University of Aleppo, Syria *June 2006*

- Top first student