Mohammad Raoufi, Ph.D., P.Eng.

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An assistant professor at the University of Northern British Columbia, a professional engineer of APEGA, a researcher, and an industry professional whose work focuses on construction engineering and management as well as structural engineering especially in the area of ***productivity and performance***, ***health***, ***energy***, ***artificial intelligence***, ***automation and technology***, ***digitalization***, ***simulation modeling***, ***decision support systems,*** and ***data analytics***. He has a demonstrated history of research in industrial construction and structural engineering, as well as working experience in the design and construction of industrial plants and infrastructures (e.g., oil and gas, petrochemical plants, power plants, steel and aluminum, mining airports, hospitals, fire stations, water treatment plants, and governmental and residential buildings). His research focusses on **promoting academia-industry collaborations** in North America especially in the province of British Columbia.

Introduction

Sex: Male
Date of birth: 18/11/77
Citizenship: Canada & Iran (dual citizenship)
Engineering License: Professional Engineer (P.Eng.), APEGA, AB

Education

Ph.D. in Construction Engineering and Management, Univ. of Alberta, Canada **2012-2017**
Thesis Title: Fuzzy agent-based modeling of construction crew motivation and performance
GPA: 4.0/4
Supervisor: Dr. Aminah Robinson Fayek

M.Sc. in Structural Engineering, Sharif Univ. of Technology, Tehran, Iran **2000-2002**
Thesis Title: Active control of sound and its methods
GPA: 17.9/20, Class rank: 2 out of 16
Supervisor: Dr. Abdolreza Joghataie

B.Sc. in Civil Engineering, Sharif Univ. of Technology, Tehran, Iran **1996-2000**
GPA: 17.2/20, Class rank: 3 out of 90

Employment

Assistant Professor **2022-current**
University of Northern British Columbia, BC, Canada
Assistant professor in the School of Engineering
Current courses: ENGR 380 Engineering Economics, ENGR 411 Project Management, ENGR 410 professional Practice and Law, and ENGR 798 Advanced Project Management

Postdoctoral Fellow **2018-2022**
University of Alberta, AB, Canada
Postdoctoral fellow working on projects through the Natural Sciences and Engineering Research Council of Canada (NSERC)

Graduate Research Assistant **2012-2017**
University of Alberta, Alberta, Canada
Research assistant working on NSERC projects as a part of a PhD program in construction engineering and management

Head of Civil Engineering Design Team **2010-2012**
ITOK Engineering, Procurement, & General Contracting, Tehran, Iran
Head of the civil design team in engineering department at the main office
Project engineer for the construction of two gas turbo-compressor stations (EPCC)
Project engineer for a mining project extending a stacker-reclaimer track in iron ore mines in Golgohar

Project Engineer **2006-2010**
FATA (Italy) S.p.A. Iran Branch, Tehran, Iran
Project engineer for the construction of an aluminum smelter project (EPCC) in Bandar Abbas, Iran; total contract value: US$1 billion
Project engineer for the construction of a 440 MW combined-cycle power plant (EPC) in Ahwaz, Iran; total contract value: EUR220 million

Field Engineer and Supervisor **2003-2006**
Sazeh Consultants, Assaluyeh & Khark, Iran
Field engineer for the construction of a high-density polyethylene (HDPE) plant
Field engineer and supervisor for oil export terminal projects, including crude oil reservoirs, wastewater treatment plant, offshore piling, offshore platforms, an airport runway, a hospital, a firefighting station, warehouses, administration buildings, and other facilities

Awards

Certificate of recognition as Expert Peer-Reviewer for outstanding contribution to ASCE construction research congress 2020, ASCE CRC 2020 Conference Chair, Arizona State University, Tempe, Arizona, USA **2020**

People's Choice award, COAA Best Practices Conference, Alberta, Canada **2018**

Ledcor Graduate Scholarship in CEM, U. of A., Alberta, Canada **2017**

Glen Warren Graduate Scholarship, COAA, Alberta, Canada **2015**

Recruitment Scholarship Award, U. of A., Alberta, Canada	**2012**
Ranked third among graduate students, SUT, Tehran, Iran	**2000**
Acknowledgement for Educational Achievements, Deputy of the President, Iran	**1996**
Bronze medal in the Nationwide Physics Olympiad Contest, and a certificate of recognition for this achievement from the Minister of Education, Iran	**1995**

Grant Activities

Assisted in developing the grant proposal for *Biosensors for Safety and Productivity grant* as part of my postdoctoral work–supervised and led by Dr. Robinson	**2020-2021**
Assisted in developing the grant proposal for *COVID-19 grant* as part of my postdoctoral work–supervised and led by Dr. Robinson	**2020**
Assisted in developing the grant proposal for *digitalization implementation* grant for Alberta Ministry of Economic Development and Construction Owners' Association of Alberta as part of my postdoctoral work–supervised and led by Dr. Robinson	**2019**
Assisted in developing the 36-month report for *NSERC IRC SCMD* as part of my postdoctoral work–supervised and led by Dr. Robinson	**2019**
Assisted in developing the grant proposal for *Community and Regional Economic Support (CARES) program* lunched by Alberta government as part of my postdoctoral work–supervised and led by Dr. Robinson	**2018-2019**
Assisted in developing the 18-month report for *NSERC IRC SCMD* as part of my postdoctoral work–supervised and led by Dr. Robinson	**2018**
Assisted in developing part of the grant proposal for renewing the Senior IRC application program for *NSERC IRC SCMD* as part of my research assistantship–supervised and led by Dr. Robinson	**2017**
Assisted in developing the grant proposal for *Canada Research Chair (CRC) in Fuzzy Hybrid Decision Support Systems for Construction* as part of my research assistantship–supervised and led by Dr. Robinson	**2016**

Research Activities & Industry Collaborations

Development of decision support systems for improved construction and maintenance of wind farm non-electrical infrastructure	**2020-2021**
Development of a response plan to control and mitigate the effects of COVID-19 pandemic on construction industry in US and Canada	**2020-2021**
Development of a digitalization implementation assessment tool for construction industry	**2018-2020**
Hybridization of agent-based simulation with fuzzy logic and Monte Carlo simulation to allow the simultaneous simulation of deterministic, random/probabilistic, and subjective/fuzzy variables in the same simulation model	**2019-2020**

Hybrid multi-criteria decision making in construction crew productivity and performance	**2019-2020**
Integrative simulation modelling of construction crew motivation and performance	**2014-2020**
Productivity improvement in power plant turnarounds	**2013-2014**
Labour productivity improvement in construction of institutional buildings	**2013-2014**
Labour productivity improvement in construction of high-rise buildings	**2013-2014**
Identification of the best practices for planning and management of power plant turnarounds	**2013**

Teaching Activities & Professional Development

Teaching ENGR 798 advanced project management	**2024-current**
Teaching ENGR 380 engineering economics	**2023-current**
Teaching ENGR 410 professional practice and law	**2023-current –2024**
Teaching ENGR 411 project management	**2022-current**
Guest Lecturer, Risk Analysis in Construction Projects using Fuzzy Risk Analyzer, University of Alberta, Canada	**2022**
Workplace Violence and Harassment Prevention Certificate, Including the Supervisor Module, University of Alberta, Canada	**2022**
Unconscious Bias training, Bias in Peer Review module, Canadian Institute of Health Research (CIHR), NSERC, Canada	**2022**
Diversity and Inclusion Webinar, by Canadian Centre for Diversity and Inclusion (CCDI), Canada	**2022**
The Gender-Based Analysis Plus (GBA+), Government of Canada, Canada	**2022**
Ethical Principles in Teaching Workshop, Graduate Teaching and Learning (GTL) program, FGSR, University of Alberta, Canada	**2020**
Dealing with Difficult Students and Situations Workshop, Graduate Teaching and Learning (GTL) program, FGSR, University of Alberta, Canada	**2020**
Circular Communication in the Classroom Workshop, Graduate Teaching and Learning (GTL) program, FGSR, University of Alberta, Canada	**2020**
Facilitating Student Motivation Workshop, Graduate Teaching and Learning (GTL) program, FGSR, University of Alberta, Canada	**2020**
The Policy and Practices of Classroom Inclusion Workshop, Graduate Teaching and Learning (GTL) program, FGSR, University of Alberta, Canada	**2020**
Teaching Assistant, CII Best Practices, University of Alberta, Canada	**2018**
Lecturer, Preparation Course of Fluid Mechanics, Sharif University of Technology, Iran	**2001-2002**

Lecturer, Preparation Course of Fluid Mechanics, Iran University of Science and Technology, Iran **2002**

Teaching Assistant, Design of Concrete Structures, Sharif University of Technology, Iran **2000-2002**

Teaching Assistant, Dynamics, Sharif University of Technology, Iran **1998-1999**

Service Activities & Memberships

Committee member, UNBC CFI JELF Adjudication Committee, University of Northern British Columbia **2022-2023**

Workshop Organizer, Digitalization Implementation Tool Workshop – Industry Feedback on Prototype, Construction Owners Association of Alberta (COAA), Online Workshop, Edmonton, Alberta **2021**

Reviewer, Applied Sciences **2021**

Reviewer, IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2021) **2021**

Reviewer, IEEE Access **2020-2021**

Team member, Healthy and Productive Construction and Turnaround Sites: Managing COVID-19 Risks in the New Normal, Construction Owners Association of Alberta (COAA) Task Group **2020-2021**

Committee Member, safety committee, Construction Owners Association of Alberta (COAA) **2020-2021**

Guest Editor, Special Issue "Fuzzy Hybrid Systems for Construction Engineering and Management", *Algorithms* (an international peer-reviewed open access monthly journal published by MDPI), https://www.mdpi.com/journal/algorithms/special_issues/Fuzzy_Hybrid **2020**

Reviewer, Journal of Fuzzy Logic and Modeling in Engineering **2020**

Reviewer, Canadian Journal of Civil Engineering (CJCE) **2020-2021**

Panelist and Workshop Co-organizer, Development of a Road Mapping Tool for Digitalization Implementation, In partnership with the Construction Owners Association of Alberta (COAA) & the Alberta Ministry of Economic Development, Trade and Tourism, Edmonton, Alberta **2019**

Committee member, Fundamental Leaders of Industrial Construction, Construction Owners Association of Alberta (COAA) **2019-current**

Reviewer, ACSE CRC 2020 and 2022 Conferences **2019-2021**

Workshop Co-organizer, Decision Support Tool for Digitalization Implementation, Construction Owners Association of Alberta (COAA) 2019 Best Practices Conference, Edmonton, Alberta **2019**

Quarterly Franklin Membership, London Journal Press **2019**

Reviewer, Structural Engineering and Mechanics, An International Journal **2019**

Reviewer, IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2019)	**2019**
Reviewer, ACSE Journal of Construction Engineering and Management	**2018-2022**
Reviewer, ACSE Journal of Computing in Civil Engineering	**2018-2020**
Committee Member, Construction Performance committee, Construction Owners Association of Alberta (COAA)	**2018-2019**
Committee Member, Advanced Work Packaging (AWP) committee, Construction Owners Association of Alberta (COAA)	**2015-2016**
Workshop Co-organizer, Connecting Real World Challenges with R&D Solutions, Construction Owners Association of Alberta (COAA) 2015 Best Practices Conference, Edmonton, Alberta	**2015**
Reviewer, The Annual Conference of the North American Fuzzy Information Processing Society (NAFIPS 2015) and 5th World Conference on Soft Computing	**2015**
Member, American Society of Civil Engineers (ASCE)	**2014-current**
Member, Canadian Society for Civil Engineering (CSCE)	**2013-current**

Publications (Book Chapters)

[B01]: Raoufi, M., Gerami Seresht, N., and Fayek, A. R. (2018). “Fuzzy Simulation Techniques in Construction Engineering and Management,” In Fayek, A. R. (2018). *Fuzzy Hybrid Computing in Construction Engineering and Management*, Emerald Publishing, pp. 149-178, Bingley, UK: Emerald Publishing.

Publications (Journal Papers)

[J13]: Raoufi, M., and Fayek, A. R. (2022). " New Modes of Operating for Construction Organizations during the COVID-19 Pandemic: Challenges, Actions, and Future Best Practices." ***ASCE*** *Journal of Management in Engineering*, 30 (2), 04021091: 1-12.

[J12]: Fayek, A. R., Raoufi, M., and Gerami Seresht, N., (2022). " Definitions and Measurement of Activity-Level Construction Productivity." *International Journal of Productivity and Performance Management*, accepted on 12 Jan. 2022, In press.

[J11]: Gebreteke, Y., Kamau, D., Raoufi, M., and Fayek, A. R. (2022). "A Road Mapping Tool for Digitalization Implementation in Construction." *Canadian Journal of Civil Engineering*, 49(2), 171-182, https://doi.org/10.1139/cjce-2020-0762.

[J10]: Raoufi, M., and Fayek, A. R. (2021). "How to Improve Crew Motivation and Performance on Construction Sites." ***ASCE*** *Journal of Construction Engineering and Management*, 147 (9), 02521001: 1-5.

[J09]: Raoufi, M., and Fayek, A. R. (2021). "Hybrid Fuzzy Monte Carlo Agent-Based Modeling of Workforce Motivation and Performance in Construction."

Construction Innovation: Information, Process, Management, published on 21 May 2021, https://doi.org/10.1108/CI-03-2020-0045.

[J08]: Raoufi, M., and Fayek, A. R. (2020). "Identifying actions to control and mitigate the effects of the COVID-19 pandemic on construction organizations: Preliminary findings." *Public Works Management & Policy (PWMP),* 1-9, https://doi.org/10.1177/1087724X20969164.

[J07]: Kedir, N. S., Raoufi, M., and Fayek, A. R. (2020). "Fuzzy Agent-Based Multi-Criteria Decision-Making Model for Analyzing Construction Crew Performance." ***ASCE*** *Journal of Management in Engineering*, 36(5), 04020053: 1-13.

[J06]: Raoufi, M., and Fayek, A. R. (2020). "Fuzzy Monte Carlo Agent-based Simulation of Construction Crew Performance." ***ASCE*** *Journal of Construction Engineering and Management*, 146(5), 04020041: 1-13.

[J05]: Raoufi, M., and Fayek, A. R. (2018). "Fuzzy Agent-based Modeling of Construction Crew Motivation and Performance." ***ASCE*** *Journal of Computing in Civil Engineering*, 32(5), 04018035: 1-16.

[J04]: Raoufi, M., and Fayek, A. R. (2018). "Key Moderators of the Relationship Between Construction Crew Motivation and Performance." ***ASCE*** *Journal of Construction Engineering and Management*, 144(6), 04018047: 1-13.

[J03]: Raoufi, M., and Fayek, A. R. (2018). "Framework for Identification of Factors Affecting Construction Crew Motivation and Performance." ***ASCE*** *Journal of Construction Engineering and Management*, 144(9), 04018080: 1-14.

[J02]: Raoufi, M. and Fayek, A. R. (2014). "Process Improvement for Power Plant Turnaround Planning and Management." *International Journal of Architecture, Engineering, and Construction*, 3(3): 168-181.

[J01]: Joghataie, A. and Raoufi, M. (2012). "Assessment of a Practical Technique for Active Control of Sound Using Microphone and Speaker." *Scientia Iranica*, 19(4): 1005-1012.

Publications (Conference Papers)

[C09]: Kedir, N. S., Raoufi, M., & Fayek, A. Robinson (2022). "Tracking the Effect of Crew Motivation on Productivity Improvement – A Hybrid Modeling Approach." *Construction Research Congress 2022: Next Generation Construction*, Accepted on 24 Sep. 2021.

[C08]: Ebrahimi, S., Raoufi, M., & Fayek, A. Robinson (2020, November). "Framework for Integrating an Artificial Neural Network and a Genetic Algorithm to Develop a Predictive Model for Construction Labor Productivity." In *Proc., Construction Research Congress 2020: Computer Applications* (pp. 58-66). Reston, VA: ACSE.

[C07]: Kazerooni, M., Raoufi, M., & Fayek, A. R. (2020, November). "Framework to Analyze Construction Labor Productivity Using Fuzzy Data Clustering and Multi-Criteria Decision-Making." In *Proc., Construction*

Research Congress 2020: Computer Applications (pp. 48-57). Reston, VA: American Society of Civil Engineers. ASCE.

[C06]: Kedir N. S., Taghaddos M., Raoufi, M., and Fayek, A. Robinson (2019). “Application of Fuzzy Analytic Hierarchy Process in Front-End Planning.” In *Proc., The Canadian Society for Civil Engineering’s 7th International Construction Specialty Conference*, Laval, Quebec, June 12-15. CSCE.

[C05]: Kedir, N. S., Raoufi, M., and Fayek, A. Robinson (2019). "Integrating Fuzzy Agent-Based Modeling and Multi-Criteria Decision-Making for Analyzing Construction Crew Performance." In *Proc., Computing in Civil Engineering 2019: Visualization, Information Modeling, and Simulation*, Reston, VA, 569-576. ASCE.

[C04]: Raoufi, M., Gerami Seresht, N., and Fayek, A. Robinson (2016). “Overview of Fuzzy Simulation Techniques in Construction Engineering and Management.” In *Proc., 2016 Annual Conference of the North American Fuzzy Information Processing Society (NAFIPS)*, 1-6, New York: IEEE.

[C03]: Raoufi, M., Fayek, A. Robinson, and Gellatly, I. R. (2016). “A Fuzzy Aggregation Method for Measuring Construction Crew Motivation.” In *Proc.*, *Construction Research Congress 2016*, 1782-1792, ASCE.

[C02]: Raoufi, M. and Fayek, A. Robinson (2015). “Identifying Factors Affecting Motivation of Construction Crew Workers.” In *Proc., The Canadian Society for Civil Engineering’s 5th International/11th Construction Specialty Conference*. Vancouver, British Columbia, June 8-10, CSCE.

[C01]: Raoufi, M. and Fayek, A. Robinson (2015). “Integrating Fuzzy Logic and Agent-Based Modeling for Assessing Construction Crew Behavior.” In P*roc.*, *2015 Annual Conference of the North American Fuzzy Information Processing Society (NAFIPS), held jointly with 2015 5th World Conference on Soft Computing (WConSC)*, 1-6, New York: IEEE.

Publications (Industry Reports)

[R05]: Kzerooni, M., Ebrahimi, S., Kedir, N.S., Raoufi, M., and Fayek, A. Robinson (2021, April). “Interview Survey Design and Analysis of Existing Data: Productivity Analysis and Modeling.” *NSERC IRC SCMD*.

[R04]: Raoufi, M., Gerami Seresht, N., and Fayek, A. Robinson (2017, September). “Data Collection Protocol and Forms: Construction Crew Motivation and Performance and Construction Productivity.” *NSERC IRC SCMD*.

[R03]: Raoufi, M. and Fayek, A. Robinson (2017, February). “Survey Analysis Results of Factors Influencing Construction Crew Motivation and Performance,” *NSERC IRC SCMD*.

[R02]: Raoufi, M. and Fayek, A. Robinson (2013, September). “Survey Analysis Results of Factors and Practices Influencing Labour Productivity.” *NSERC IRC SCMD*.

[R01]: Raoufi, M. and Fayek, A. Robinson (2013, August). “Comparison of TransAlta’s Project-Management Process (TPP) Guidebook with Best Practices for Power Plant Turnaround Planning and Management.” *NSERC IRC SCMD*.

Industry/Engineering Licenses & Certifications

Professional Engineer (P.Eng.), APEGA, Alberta, Canada	**2020**
Pipeline Construction Safety Training, Alberta, Canada	**2016**
Necessary Competencies in Confined Space Entry, Alberta, Canada	**2014**
Necessary Competencies in MX6 Air Monitor, Alberta, Canada	**2014**
Fall Protection Program Competency Certificate, Alberta, Canada	**2013**
Construction Safety Training (CSTS-09), including WHMIS, Alberta, Canada	**2013**
Welding Inspection Certificate, Tehran, Iran	**2006**
Professional Engineer (P.E.), Mashhad, Iran	**2003**

Developed Tools

Digitalization Opportunities Road Mapping Tool (DORMT©) for Government of Alberta and Construction Owners Association of Alberta, AB, Canada	**2021**

Computer Skills

Programming Language: Python, Java, Visual Basic, Fortran

Data Analysis and Modeling: MATLAB, WEKA, AnyLogic, IBM SPSS Statistics, IBM SPSS Amos, MS Office

Engineering Software: Primavera, MS Project, RS Means CostWorks, Timberline Estimating, AutoCAD, Sap, Safe, Etabs

Languages

English (fluent), Persian (fluent),
Italian (intermediate), Arabic (basic)

Interests

Outdoor activities, running, reading, football, ski, tennis