AMR GHANEM

Advanced Structural Designer and Analyst at Martin, Chock & Carden, Inc.
1001 Bishop St, Suite 2950, Honolulu, Hawaii 96813, USA
Email: aghanem@martinchockcarden.com | Phone: +1 (808) 940-6862

EDUCATION

Ph.D. in Civil Engineering *May 2023*

***University of Hawai'i at Mānoa**, Honolulu, HI, USA*
Major in Structural Engineering, GPA 3.98/4.0
Dissertation Title: "Integrated Multi-hazard Resilience Assessment of Infrastructures"
Dissertation Advisor: DoSoo Moon

M.Sc. in Structural Engineering *June 2019*

***Cairo University**, Giza, Egypt*
Major in Structural Engineering, GPA 3.9/4.0
Thesis Title: "The Effect of the Height of the Structure on the Seismic Reduction Factor of an Eccentric Braced Steel Frames"
Thesis Advisor: Sherif A. Mourad and Maha M. Hassan

B.Sc. in Civil Engineering *May 2016*

***Cairo University**, Giza, Egypt*
Graduated with Honors (Cum Laude), GPA: 4.0/4.0
Graduation Project: "Design and Calculation for Earthquake Steel Structures"

RESEARCH INTERESTS

- Multi-hazard assessment, datasets preparation, and risk mitigation
- Analytical and experimental evaluations of structural performance under extreme loading
- Structural health monitoring and smart sensors
- Assessment of innovative materials in construction
- Development of graphical information systems for hazard assessment
- Artificial intelligence (AI) and deep learning (DL) techniques
- Building information modeling (BIM)

RESEARCH EXPERIENCE

Research Assistant *August 2019 - May 2023*

***Structures Lab,** University of Hawai'i at Mānoa, Honolulu, HI*
Advisor: DoSoo Moon

- Hazard vulnerability assessment, modeling, and risk mitigation.
  Funded by The Pacific Southwest Region University Transportation Center (PSR)
  - Development of fragility analysis software to calculate the structure probability of failure due to natural hazards such as earthquakes and tsunamis using nonlinear dynamic analysis.
  - Analysis of different case studies such as skewed reinforced concrete (RC) bridges and mass irregular structures.
  - Derivation of an index for the fragility curves to quantify and compare the structure vulnerability curves.
  - Preparation of different geographic information systems for the hazards properties such as locations, damage quantifications, and casualties.
- Structure health monitoring, damage sensing, and risk identification.
  Funded by the Hawaii Department of Transportation (HDOT)
  - Using smart sensors for detecting concrete behavior and deformations through laboratory experimentation, data collection, and analysis.
  - Evaluating aging bridge deterioration and surrounding building damages due to overweight vehicles using long-term structural health monitoring by smart sensors for (Static and dynamic loading).
  - Preparing big datasets as a tool for maintenance decision-making.
- Environmental sustainability using Advanced technologies
  - Using sand savers to reduce the erosion rate (shoreline stabilization in Hawaii; site surveying and modeling were conducted to reduce the wave energy through wave reflection and energy dissipation). *Funded by the Hawaii Department of Transportation (HDOT)*
  - Assessing the use of sustainable green lightweight concrete in construction projects. *Funded by project number (RSP-2021/264), King Saud University, Riyadh, Saudi Arabia*
- Statistical and probabilistic damage detection using deep learning techniques
  - Estimating the structure damage by designing software using image processing and deep learning techniques to detect and classify cracks in the reinforced concrete structure.
  - Programming required algorithms using python, MATLAB, and Simulink coding applications.

Research Assistant *August 2017 - May 2019*

Structures Lab, *Cairo University, Giza, Egypt*
Advisor: Sherif A. Mourad and Maha M. Hassan

- Assessment of seismic behavior of eccentrically braced steel frames
  - Conduct a parametric study to calculate the seismic reduction factor for eccentrically braced steel frames using nonlinear static pushover and time history analyses.

Research Mentor *October 2019 - May 2023*

Structures Lab, *University of Hawai'i at Mānoa, Honolulu, HI*

- Structural laboratory research and analytical experiments
  - Leading a group of graduate and undergraduate students in a laboratory research project, discussing issues in the test, and providing guidance and support.
  - Assisting students in engineering concepts, problem-solving, and necessary coding skills.

Structure Seminar Coordinator *January 2020 - May 2023*

Structures Lab, *University of Hawai'i at Mānoa, Honolulu, HI*

- Structural research seminars and international research presentations
  - Act on behalf of the department chair regarding coordinating seminar meetings and academic presentations.
  - Compose and draft documents and correspondence for presentations, conferences, seminars, and reports.
  - Plan and schedule calendar(s) and resolve calendaring conflicts in compliance with department requirements.

TEACHING EXPERIENCE

Instructor *January 2022 – May 2022*

Civil and Environmental Engineering*, University of Hawai'i at Mānoa, Honolulu, HI*

- Developing a clear syllabus, stated objective for each lecture.
- Preparing teaching material and communicating complex concepts to students.
- Assigning reading and homework assignments.
- Constructing team projects with good guidance.
- Preparing proper review sessions, fair and proper evaluation of student achievement.

- CEE 370, Mechanics of Solids, Spring 2022 (95 student enrollment)
- CEE 370L, Mechanics of Materials Lab, Spring 2022 (60 student enrollment)

Teaching Assistant *January 2020 - May 2023*

Graduate Courses, *University of Hawai'i at Mānoa, Honolulu, HI*

- CEE 696, Earthquake Engineering, Fall 2022
- CEE 675, Structural Dynamics, Spring 2022

Undergraduate Courses, *University of Hawai'i at Mānoa, Honolulu, HI*

- CEE 484, Structural Loads, Spring 2021
- CEE 381, Structural Analysis, Spring 2020

Guest Lecturer

University of Hawai'i at Mānoa, *Honolulu, HI* *January 2022*
Nara Institute of Science and Technology (NAIST), Fall 2022

- Multi-hazard fragility assessment of reinforced concrete infrastructures.

University of Hawai'i at Mānoa, *Honolulu, HI* *April 2021*
Structural Loads, CEE484, Spring 2021

- Design code lecture using International Building Code (IBC) seismic provisions.

Cairo University*, Giza, Egypt* *September 2018*
BIM Standards and Applications, IEDM 601, Fall 2018

- Building information modeling (BIM) implementation and how to create and manage information on a construction project across the project lifecycle

RESEARCH PUBLICATIONS

- **Ghanem, A**., and Moon, D. "Effect of Bridge Skewed Piers on The Seismic Fragility of The Infrastructures", Journal of Bridge Engineering, (under review).

- **Ghanem, A.**, Lee, Y. J., & Moon, D. S. (2024). Seismic Vulnerability of Reinforced Concrete Frame Structures: Obtaining Plan or Vertical Mass Irregularity from Structure Use Change. Journal of Structural Engineering, 150(3), 04023243.

- **Ghanem, A.** (2023). Integrated Framework for Multi-Hazard Resilience Assessment of Infrastructures (Doctoral Dissertation, University of Hawai'i At Mānoa).

- Alqahtani, F.K., Sherif, M.A., **Ghanem, A.** "Assessment of Sustainable Green Lightweight Concrete Incorporated in New Construction Technologies. KSCE J Civ Eng (2022). https://doi.org/10.1007/s12205-022-2353-x

- Alqahtani, F.K., Sherif, M.A., **Ghanem, A.** "Green lightweight concrete utilizing sustainable processed recycled plastic aggregates: Technical, economic and environmental assessment" Construction and Building Materials (2023), https://doi.org/10.1016/j.conbuildmat.2023.132027.

- Abdelhafeez, M., **Ghanem, A.,** & Sherif, M. “Probabilistic Fragility Analysis of Reinforced Concrete Structures under Tsunami Hydrodynamic Loads of the ASCE 7 Standard”. In Ports 2022 (pp. 488-497).

- **Ghanem, A.**, Sherif, M., Abdelhafeez, M., Lee, Y., and Moon, D. “Relationship between Seismic Redundancy and Failure Likelihood for Mass-eccentric Reinforced Concrete Frame Structures” 12th National Conference on Earthquake Engineering (12NCEE), Salt Lake City, Utah, USA, 2022.

- Abdelhafeez, M., **Ghanem, A.**, Sherif, M., Park, J., and Moon, D. “Non-destructive Structural Condition Assessment Method Using Multi-sensor Fusion” 12th National Conference on Earthquake Engineering (12NCEE), Salt Lake City, Utah, USA, 2022.

- Sherif, M., **Ghanem, A.**, Abdelhafeez, M., and Moon, D. “Indexing Seismic Fragility Curves of Skewed Reinforced Concrete Bridges” 12th National Conference on Earthquake Engineering (12NCEE), Salt Lake City, Utah, USA, 2022.

- **Ghanem, A**., Moon, D., and Lee, Y. “Seismic Vulnerability Assessment of Skewed Reinforced Concrete Bridges”, engrxiv, 2021, https://doi.org/10.31224/osf.io/cy5pj.

- **Ghanem, A**., and Moon, D. “Seismic Fragility Analysis of 3D Vertical Irregular Reinforced Concrete Structures”, engrxiv, 2021, https://doi.org/10.31224/osf.io/zn9uh.

- **Ghanem, A**., Moon, D., and Lee, Y. “Seismic Fragility Surface of Irregular Reinforced Concrete Frame Structures” 17th World Conference on Earthquake Engineering (17WCEE), Sendai, Japan - September 2021.

- **Ghanem, A**., and Moon, D. “Seismic Fragility Assessment of Skewed Reinforced Concrete Bridges” 17th World Conference on Earthquake Engineering (17WCEE), Sendai, Japan - September 2021.

- **Ghanem, A**., Hassan, M., and Mourad, S. “Assessment of Seismic Behavior of Eccentric Braced Steel Frames” International Conference on Advances in Structural and Geotechnical Engineering (ICASGE’19), March 2019

- **Ghanem, A**. “Effect of The Height of Structures on The Force Reduction Factor of Eccentric Braced Frames”, Structural Department Seminar, University of Hawai‘i at Mānoa, September 2019.

- **Ghanem, A.,** Moon, D., and Park, J. “Non-Destructive Structural Condition Assessment Method using multi-Sensor Fusion”. (In progress)

- Abdelhafeez, M., **Ghanem, A.**, Sherif, M., and Moon, D. "Numerical Assessment of a Reinforced Concrete structure under tsunami event via Nonlinear static and dynamic time histories based on ASCE 7 Standard". (In progress)

- Sherif, M., **Ghanem, A.**, Abdelhafeez, M., and Moon, D. "Quantitative Index for Measuring Vulnerability Fragility Curves of different structure systems". (In progress)

PROFESSIONAL EXPERIENCE

Advanced Structural Designer and Analyst *May 2023 – Present*

Martin, Chock & Carden, Inc.:

- Design and develop advanced structural systems, including buildings, bridges, and other infrastructure projects.
- Analyze and evaluate the structural behavior and performance of existing and proposed designs.
- Conduct comprehensive structural analyses, including static, dynamic, and finite element analyses, to determine load capacities, stresses, deflections, and other critical parameters.
- Prepare detailed design drawings, specifications, and reports, adhering to standards, and regulations.

Structural BIM Coordinator/ Specialist *June 2018 – July 2019*

Cosmos-E Engineers & Consultants:

- Preparing project datasets for integrating different disciplines of the projects' parties, such as design office, change management, and risk analysis.
- Coordinating work with different parties and datasets through the project's life cycle to integrate complex relationships and use big data functions within a significant project's delivery and control functions.
- Providing professional BIM training for different engineering disciplines and technical support.

Conducted projects:

- Adhesives manufacturing factory - H.B. Fuller.
  Develop the model required for structural design discipline. Collaborate and coordinate with other disciplines for design and model changes.

- International Congress Center - Jolie Ville.
  Work with Project Coordinators in developing a BIM Management Plan for the international congress center project. Develop accurate modeling and extract construction drawings from the BIM platform.

- Automobiles manufacturer factory - Ghabbour Auto.
  Build accurate and detailed Revit models. Coordinate drawings and models from various trades. Use BIM to identify and resolve construction conflicts.

Structural Design Engineer *August 2016 – June 2018*

Cosmos-E Engineers & Consultants:

- Design steel structures according to different codes such as the American Code of practice (AISC) and European code of practice.
- Application of value engineering concept for reducing the quantities of construction materials while sustaining the required safety of the structure.
- Preparation of different calculation sheets, project specifications, and documentation.

Conducted projects:

- Beet Sugar Plant and Refinery - Al Nouran
  Detailed design of the beet extraction factory and sugar refinery project for all the steel structures and coordination with other disciplines. Site supervising of the project construction.
- Steel Melt Shop & Rolling Mill - Suez Steel
  Perform 3D static and dynamic analysis. Design of the steel rolling mill factory and the melt shop. Prepare the calculation notes according to the American code specifications.
- Boulevard and Stanley buildings - Porto October
  Review the technical submission and redesign for elevations and plans. Coordinate all civil, steel, and architectural work.
- Cement Plant -El-Sewedy
  Prepare the construction drawings for all structural elements, including preheater and packing. Issue the bill of quantities and specifications of projects.

SELECTED HONORS, AWARDS, AND CERTIFICATES

- **Professional Engineer (PE)** *Dec 2024 (Scheduled)*
  National Council of Examiners for Engineering and Surveying, NCEES
- **Collage on Engineering Outstanding Graduate Student Award** *May 2022*
  College of Engineering, University of Hawai'i at Mānoa
- **National Conference on Earthquake Engineering Grant (NCEE)** *December 2021*
  Earthquake Engineering Research Institute
- **Hawaii Asphalt Paving Industry Scholarship (HAPI)** *January 2021 & 2022*

Hawaii Asphalt Paving Industry

- **Structural Engineers Association of Hawaii Scholarship (SEAOH)** *October 2020*
  Structural Engineers Association of Hawaii
- **Everett E. Black Scholarship (EEBS)** *February 2020 & 2021*
  College of Engineering, University of Hawai'i at Mānoa
- **Engineer in Training (EIT)** *January 2020*
  National Council of Examiners for Engineering and Surveying, NCEES
- **Research/Teaching Assistantship and Tuition Scholarship** *August 2019- May 2025*
  University of Hawai'i at Mānoa
- **German Academic Exchange Service Research Fellowship** *February 2016*
  College of Engineering, Universität Stuttgart

RELEVANT COURSEWORK IN GRADUATE STUDIES

Earthquake Engineering and Reliability

- Structural Dynamics
- Earthquake Engineering
- Fire Protection of Structures
- Inspection, Maintenance, and Repair of Steel Structures

Smart health monitoring of structures

- Sensors modeling and signal processing
- Structure period analysis and dynamic response

Image processing and artificial intelligence

- Deep Learning in Civil and Environmental Engineering and Earth Science
- Computational and Numerical Analysis

Structural Analysis and Mechanics

- Finite Elements in Structures
- Modern Structural Analysis
- Plastic Analysis
- Seismic Behavior of Steel Structures

Structural Design

- Reinforced Concrete Design
- Prestressed Concrete
- Design of Steel Structures

PROFESSIONAL SKILLS

- Programming in MATLAB and Python
- Research software including Zeus-NL, SAP2000, Autodesk Revit (Certified Professional), Advance Steel, Navisworks, and AutoCAD

ENTREPRENEURIAL COMPETITIONS

- **UH Venture Competition (2nd place)** *May 2022*

  The Shidler College of Business, the Pacific Asian Center for Entrepreneurship (PACE)
  - **Resesio** is a company that offers an automated optimization model for the construction design process, resulting in significant material and cost savings.

- **UH Breakthrough Innovation Challenge (1st place)** *November 2021*

  The Shidler College of Business, the Pacific Asian Center for Entrepreneurship (PACE)
  - **Model-C** is an infrastructure simulation and optimization technology company.

PATENTS

- **"Automation and Optimization of the Construction Design" –** *(in progress)*
  - Develop a software model to automate and optimize the construction design process
  - Provide a safe and optimized design through machine learning.
  - Improve the environmental impact by introducing the recycled plastic concrete

OUTREACH ACTIVITIES AND AFFILIATION

- Member, Earthquake Engineering Research Institute (EERI)
- Member, American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI)
- Member, American Concrete Institute (ACI)
- Member, Egyptian Engineers Syndicate
- Member, EZBET Integrated Community Development Project
- Invited Member, Construction and Building Materials Workshop that is held at Universität Stuttgart in Germany
- Founder/President (Student Chapter): ASAS for Integrated Engineering Services

Internships *May 2014 – July 2016*

- Zuhair Fayez Partnership Consultants (ZFP)
- Rowad Modern Engineering (RME)
- Engineering Consultants Group (ECG)
- Dar for Trading and Construction (DETAC)