Hadi Ali

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Professional preparation

Arizona State University

• Ph.D., Engineering Education Systems and Design December 2021
Dissertation title:
"Attitude Toward Context and Self-efficacy in and Willingness for Adaptability of Engineering Faculty in Two Divergent Curricular Change Contexts: A Quantitative and Qualitative Analysis"
Advisor: Dr. Ann McKenna
Committee members: Dr. Jennifer Bekki and Dr. Rod Roscoe

Purdue University

• M.S., Engineering Education 2017
Primary area: Design thinking; working in multi-, inter-, and transdisciplinary ways
Secondary area: Human communication inquiry

• M.S.E., Electrical and Computer Engineering 2013
Major: Artificial intelligence
Minor: Fields and optics

• M.S., Aeronautics and Astronautics 2008
Major: Aerospace systems
Minor: Astrodynamics and space applications

• B.S., Aeronautics and Astronautics 2006
Major: Propulsion
Minor: Design

University of Jordan

• B.Sc., Mecahnical Engineering 2004
Design

• **Passed Fundamentals of Engineering (FE) Exam** 2007
Active Engineer Intern License to be a registered Professional Engineer (PE) in the State of Indiana.

• **Applied Management Principles Program** Summer 2012
'Mini-MBA': Condensed management program at Purdue's Krannert School of Management.
Coursework in Accounting, Business Law, Change Management, Economics, Finance, Human Resources, Marketing, Operations, Strategic Management, and Leadership

Research interests

Adaptability, risk-taking and value making
Curricular innovation
Organization theory
Knowledge enterprise design
Data, systems and society
Work of the future
Engineering and societal outcomes
Innovation ecosystems
Technology management

Awards and recognition

• **2020 Wellness Committee Member of the Year Award** for my work with the Graduate and Professional Students Association at ASU.

• **2018 First-place in ASEE Annual Conference Division of Engineering Education and Design Student Essay Competition** for essay entitled: *Educated Human Judgement: Design and Analysis: Where to Probe and Where to Pass-by?*, Salt Lake City, UT—$500

• **2016 Amman Design Week Certificate of Appreciation** for effort and support during Amman Design Week, 2016, Amman, Jordan.

• **2014 Minority Engineering Program Award of Outstanding Achievement** for teaching with the Academic Boot Camp, Purdue University (Summer 2014).

• **2013 Magoon Award for Excellence in Teaching:** Estus H. and Vashti L. Magoon Award for Excellence in Teaching. College of Engineering, Purdue University—$2,000

• **2007 Hawkins Hall Certificate of Excellence** in recognition of being an essential piece of the Hawkins Hall at Purdue Student Employee Team.

• **2004 Prize of appreciation from the Higher Council for Sciences and Technology in Jordan** for senior design project: "Design, Control and Implementation of a Robotic Cart."

Publications

Conference papers
C19. Ali, H. (2021) Re-examining engineering curricular coupling between technology, society and the future. *Frontiers in Education (FIE)*, Lincoln, Nebraska.

C18. Ali, H. (2021) Design the Future Activities (DFA): Framework to develop case studies to incorporate deep understanding of the coupling between technology, society and the future. *International Mechanical Engineering Congress Exposition, ASME 2021*, Virtual Conference: November 1–5, 2021.

C17. **Ali, H.**, McKenna, A., Bekki, J., & Roscoe, R. (2021) Conceptualizing faculty adaptability in enacting curricular change. *The Annual Conferences of the American Society for Engineering Education (ASEE)*, Virtual Conference: July 26-29, 2021.

C16. **Ali, H.**, & Maynard, A. (2021) Design the Future Activities (DFA): A Pedagogical Content Knowledge Framework in Engineering Design Education. *The Annual Conferences of the American Society for Engineering Education (ASEE)*, Virtual Conference: July 26-29, 2021.

C15. **Ali, H.**, & McKenna, A. (2020) Representations, between engineering design and engineering analysis. *Proceedings of the 2020 American Society for Engineering Education (ASEE) Virtual Annual Conference*.

C14. **Ali, H.** (2020) The role of prototyping in design and policy making: Visual stimuli, selective attention and decision making. *Proceedings of the 2020 American Society for Engineering Education (ASEE) Virtual Annual Conference*.

C13. **Ali, H.**, Abhyankar, R., Bekki, J., Brunhaver, S., Jordan, S., & Lande, M. (2020) An additive innovation-based faculty development program: Methods for case study research. *Proceedings of the 2020 American Society for Engineering Education (ASEE) Virtual Annual Conference*.

C12. **Ali, H.**, & Lande, M. Data-driven decisions in prototyping and product development: A framework for uncertainty and decision-making. *International Mechanical Engineering Congress Exposition, ASME 2019*, Salt Lake City, Utah.

C11. **Ali, H.**, Kinach, B., & Lande, M. Innovating scaffolded prototyping for design education: Toward a conceptual framework derived from mathematics pedagogy. *41st Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA)*, St. Louis, Missouri.

C10. **Ali, H.**, Bekki, J., Brunhaver, S., Jordan, S., & Lande, M. (2019) Pedagogical Ninjas: Using an additive innovation cycle for faculty development of teaching-focused faculty *Proceedings of the Annual Conference of the American Society for Engineering Education (ASEE)*, Tampa, Florida.

C9. **Ali, H.**, & Lande, M. (2019) WIP: Design educators' conceptions of prototyping in engineering design courses. *Proceedings of the Annual Conference of the American Society for Engineering Education (ASEE)*, Tampa, Florida.

C8. **Ali, H.**, & Lande, M. (2019) Understanding practical ingenuity through the roles of low-fidelity prototyping in engineering design activity. *Proceedings of the Annual Conference of the American Society for Engineering Education (ASEE)*, Tampa, Florida.

C7. **Ali, H.**, Kinach, B., & Lande, M. (2019) Learning through stuff: Scaffolded prototyping with manipulatives as a means to effectively learn by navigating from the concrete to the abstract. Extended abstract: *Clive L. Dym Mudd Design Workshop XI*; Harvey Mudd College, Claremont, California.

C6. **Ali, H.** & Lande, M. (2018) In and out of class: Differences among undergraduate students' conceptions of prototyping approaches at academic makerspaces. Extended abstract: *Proceedings of the 3rd International Symposium on Academic Makerspaces, ISAM 2018*, Stanford University; Stanford, California.

C5. **Ali, H.**, & Lande, M. (2018) Why make it? Understanding undergraduate engineering students' conceptions for the purpose of prototyping in engineering design activities *Frontiers in Education (FIE)*, San Jose, California.

C4. **Ali, H.**, & Adams, R. (2014) Big picture thinkers in industry-Who are they? *Annual Conference of the American Society for Engineering Education (ASEE)*, Indianapolis, Indiana.

C3. Jordan, S., Lande, M., Cardella, M., & **Ali, H.** (2013). Out of their world: Using alien-centered design for teaching empathy in undergraduate design courses. *The 43rd Annual Frontiers in Education (FIE) Conference*, Oklahoma City, Oklahoma.

C2. **Ali, H. W.**, & Adams, R. (2012). Configuration control board activities during the development of the Apollo lunar module: Insight into the "art" of systems engineering. *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA)*, Pasadena, California.

C1. **Ali, H.**, & Adams, R. (2011). Towards more effective teaching strategies of iteration and systems management in spacecraft design. *Proceedings of the American Society for Engineering Education (ASEE)*, Vancouver, B.C.

Journal articles

J3'. **Ali, H.**, Roscoe, R., Bekki, J., & McKenna, A. (2021, being revised) Context-driven adaptability of engineering faculty in two divergent curricular change contexts. *Journal of Engineering Education.*

J2'. **Ali, H.** (Manuscript ready for submission) Prototyping self-efficacy and perceived importance in the engineering design process: A cross-sectional study in varying academic contexts. *ASME Journal of Mechanical Design.*

J1'. **Ali, H.** (Manuscript ready for submission). Soft or hard?: The nature of practice of systems engineering during the development of the Apollo Lunar Module. *Systems Engineering.*

Journal articles, in preparation: Publications from my PhD dissertation

J3'(in preparation). **Ali, H.**, Roscoe, R., Bekki, J., & McKenna, A. (in preparation) Characterizing faculty adaptability in integrating the entrepreneurial mindset into the engineering curriculum. *Journal of Entrepreneurship Education.* (This paper will report the findings related to the EM portion of my completed dissertation; expected to be submitted in January 2022.)

J2'(in preparation). **Ali, H.**, Roscoe, R., Bekki, J., & McKenna, A. (in preparation) Self-efficacy in and willingness for adaptability of engineering faculty: A quantitative and qualitative Analysis. *Journal of Engineering Education.* (This paper will report the findings related to the mixed methods portion of my completed dissertation; expected to be submitted in February 2022.)

J1'(in preparation). **Ali, H.**, Roscoe, R., Bekki, J., & McKenna, A. (in preparation) Context matters: Faculty views of contexts during curricular change. *Teaching in Higher Education.* (This paper will report new findings after new analysis related to reexamining the data from my dissertation, addressing faculty views of a context; expected to be submitted in March 2022.)

Book chapters
B1. **Ali, H.**, & McKenna, A. (2021) Reopening campuses: Visualizing the structure of a system problem. In *Global Perspectives on Educational Innovations for Emergency Situations.* Springer.

Technical and research reports
T2. Adams, R., **Ali, H.**, Schimpf, C. Indicators for Big Picture Thinkers. Report to the funding company. West Lafayette, IN: School of Engineering Education, Purdue University.

T1. **Ali, H.** (2013) Ontic Start-up Guide. West Lafayette, IN: School of Electrical and Computer Engineering, Purdue University.

Experience

• **Embry-Riddle Aeronautical University**
Prescott, AZ
- ◦ Assistant Professor of Aerospace Engineering — Fall 2021–Current

• **Arizona State University**
The Polytechnic School
- ◦ Graduate Research Associate — Fall 2018–Summer 2021
- ◦ Faculty Associate — Summer 2018
- ◦ Graduate Teaching Associate — Spring 2018

Decision Center for Educational Excellence
- ◦ Big Data Research and Analysis Intern — Fall 2019–Spring 2020

Applying systems thinking and data-driven design to an educational system. Investigating how attention to certain features in a data visualization affect decision making related to educational policy in a social setting.

• **Purdue University**
School of Engineering Education
- ◦ Future Faculty Fellow (Instructor) — Fall 2012–Fall 2014
- ◦ Course content developer — Summer 2010–Fall 2014
- ◦ Graduate Teaching Assistant — Fall 2008–Spring 2012

Minority Engineering Program (MEP)
- ◦ Tutor at the MEP Tutorial Center — Fall 2014–Spring 2015
- ◦ Instructor and course content developer (Academic Boot Camp) — Summer 2014

School of Aeronautics and Astronautics
- ◦ Graduate Research Assistant and Teaching Assistant — 2007–2008

• **University of Jordan**
Department of Mechatronics Engineering
- ◦ Facilitator and design content instructor — Fall 2016–Spring 2017
- ◦ Coach for mechatronics systems design — Fall 2016–Spring 2017

• **Amman Design Week**
Management Team
◦ Organizer and volunteer August–September 2016
In its inaugural year, Amman Design Week was a pioneering platform that harnessed creativity, revived the conversation about design, and instilled a spirit of collaboration and exchange. I was glad to organize and participate in this unique opportunity.

• **Center for the Study of the Built Environment (CSBE) in Amman, Jordan**
Design Study Team (volunteer)
◦ Facilitator for participatory design sessions and activities Fall 2016–Spring 2017

• **Ras Laffan LNG Expansion Onshore Project, Qatar**
Junior Mechanical Engineer 2004–2005
Company: Consolidated Contractors International Company
Piping Site Engineer at Al Khaleej Gas Project, Phase-1 (AKG-1)
Tasks included: Ensuring safe and efficient working environment; ensuring construction is carried out in accordance with the specifications as well as the agreed upon priorities and procedures; requesting spools and field erection material as per schedule; liaising with the contractor to resolve technical problems on site; coordinating with other sections and disciplines on site.

• **University of Erlangen-Nürnberg, Germany**
Practical training at Lehrstuhl für Konstruktionstechnik Summer 2003
(Chair of Engineering Design)
Tasks included: CAD modeling with Pro/Engineer; working on a C++ code for interface between Pro/Engineer and a Microsoft Access database; working on an algorithm for finding weighting factors for multi-criteria evaluation; and performing tribological tests on rolling/sliding surfaces.

Competitive grants

Research grants totaling about $54,500. While I appear as a co-PI on most of the grants below, my contributions were the initiating of all the proposals as well as being instrumental in their writings, as described below.

• Adams, R. (PI), **Ali, H. (co-PI)**. 2012 School of Engineering Education Industrial Advisory Council (E2IAC) grant for studying expertise in industry, 8/1/2013 - 7/31/2014—$45,992

This grant was awarded after I prepared a formal written research proposal that was submitted to the E2IAC members for review. This proposal included a detailed description of the area to be researched and how this area would positively impact Harnessing Engineering Expertise in industry. The proposal included descriptions of the actions that would be taken as part of the research, including timelines, deliverables, and budget estimates. Presentations to the Council were limited to 15 minutes in duration.

• **Ali, H**. Summer 2013 Summer Research Grant, The Graduate School, Purdue University—$2,987

• **Ali, H**. The College of Engineering Graduate Education Office: 2012 Grant to participate in the Applied Management Program—$600

• Adams, R. (PI), **Ali, H. (co-PI)**. 2010-2011 Library Scholars Grant Program to fund research on the Apollo Lunar Module—$4,959

Submitted–Not funded
• **Ali, H.** CIC/Smithsonian Institution Fellowship—$30,000

Invited talks

• ”Conceptualizing faculty adaptability in enacting curricular change,” at the ASEE Graduate Seminar Exchange Program, Engineering and Science Education at Clemson University, 9 April 2021.

Poster presentations

5. **Ali, H.** (presenter) Design studies–Transforming Ideas to Innovation. Poster session presented at: Open House Poster Session; School of Engineering Education; Purdue University; Fall 2013; West Lafayette, IN.

4. **Ali, H.** (presenter); Adams, R. Harnessing technical expertise–Work in progress: "Big picture" thinkers in industry: Who are they? Poster session presented at: Open House Poster Session; School of Engineering Education; Purdue University; Fall 2012; West Lafayette, IN.

3. **Ali, H.** (presenter); Adams, R. Apollo Lunar Module: A complex, novel design evolving over time and across perspectives. Poster session presented at: Engineering Education Industrial Advisory Council Visit Program; Purdue University; Spring 2012; West Lafayette, IN.

2. **Ali, H.** (presenter) Update: Work in progress: Development of systems thinking in space projects–Insight to better predict cost and schedule. Poster session presented at: New Directions in Engineering Education Research Poster Colloquium; Purdue University; Spring 2011; West Lafayette, IN.

1. **Ali, H.** (presenter) Development of systems thinking in space projects–Insight to better predict cost and schedule. Poster session presented at: New Directions in Engineering Education Research Poster Colloquium; Purdue University; Fall 2010; West Lafayette, IN.

Courses taught

... at Embry-Riddle Aeronautical University as Assistant Professor of Aerospace Engineering

EGR 200: Computer-aided Conceptual Design of Aerospace Systems (Fall 2021–Spring 2022)
Catalog course description: Application and use of a high-end computer-aided design (CAD) tool for graphical communication of conceptual engineering designs. Includes definition of standards and conventions for generating part and assembly drawings as well as introductory methods for creating and documenting conceptual aerospace systems design. Application of rapid prototyping methods for constructing and integrating aerospace models as well as conceptual aircraft design.)

EGR 101: Introduction to Engineering (Fall 2021)
Catalog course description: This course is an introduction to the interdisciplinary aspects of the engineering of aerospace systems. It is a project-based course, demonstrating how the engineering profession is a multidisciplinary field. Students are involved in an array of conceptual exercises, simple design activities, and projects dealing with engineering in aerospace-related areas.

... at Arizona State University as Faculty Associate

EGR 202: Use-inspired Design II (Spring 2018–Summer 2018)
Catalog course description: In this course we will be extending what we learned in previous EGR classes and applying that towards a project-based design experience. In this class you will gain hands-on experience running an engineering design project through the steps of user identification, need-finding, ideation, analytical modeling, prototyping, iteration, testing and evaluation. You will apply these tools towards a real-world design challenge through a semester-long project. (In Spring 2018 I was a Gradaute Teaching Associate.)

EGR 102: Foundations of Engineering Design II (Summer 2018)
Catalog course description: Development and experimental verification of engineering models, engineering design, data acquisition, critical analysis of data, introduction to CADD, engineering communications.

... at Purdue University as Future Faculty Fellow—Instructor

ENGR 131: Transforming Ideas to Innovation I (Fall 2012, Spring 2014)
Catalog course description: A partnership between Schools and Programs within the College of Engineering, introduces students to the engineering professions using multidisciplinary, societally relevant content. Developing engineering approaches to systems, generating and exploring creative ideas, and use of quantitative methods to support design decisions. Explicit model-development activities (engineering eliciting activities, EEAs) engage students in innovative thinking across the engineering disciplines at Purdue. Experiencing the process of design and analysis in engineering including how to work effectively in teams. Developing skills in project management, engineering fundamentals, oral and graphical communication, logical thinking, and modern engineering tools (e.g., Excel and MATLAB).

Required tasks:
• Teaching one section of the First-Year Engineering course; • Course material development; • Maintaining course management software (Blackboard); • Holding office hours; • Grading; • Mentoring a Graduate TA and 5 Undergraduate TAs; • Attending meetings with the Instructional Team.

... at Purdue University as Graduate Teaching Assistant

ENGR 131: Transforming Ideas to Innovation I (Fall 2010, Spring 2013)

ENGR 195(II): Ideas to Innovation II (Spring 2010)
Catalog course description: Same as ENGR 131.

ENGR 126: Engineering Problem Solving and Computer Tools (Fall 2008-Fall 2009)
Catalog course description: Introduction to the solving of open-ended engineering problems and the use and of computer software, computer communications, spreadsheets, and MATLAB. Explicit model-development activities are utilized, and students are expected to develop skill at working in teams. This is emphasized both in laboratories and on projects.

AAE 590K: System-of-systems Modeling and Analysis (Spring 2008)
Catalog course description: Introduction to features of system-of-systems problems; problem definition tools; role of complexity; network topology analysis and agent-based simulation models; architecture analysis; metrics for multi-stakeholder problems; semester team projects allow students to exercise and critique such methods for analyzing system-of-systems problems. Some background in probability and statistics (e.g. random variables, probability density and distributions, sampling methods) is expected.

Required tasks:

- This is a graduate level course that was offered to both on-campus and off-campus (professional, distance-learning) students simultaneously. In addition to grading and maintaining course webpage (Blackboard), I was facilitating on-line discussion threads, especially between on-campus and off-campus students, as well as administering conference calls with distance-learning, professional students.

AAE 251: Introduction To Aerospace Design (Spring 2007 and Spring 2013)
Catalog course description: The role of design in aerospace engineering. Introduction to aerodynamics, performance, propulsion, structures, stability and control, and weights. Layout and general arrangement of aerospace vehicles. Design concept generation and selection. Computational methods for design. Trade studies and graphical optimization. Conceptual design exercise involving aircraft, spacecraft, or both. Technical presentations and communication for aerospace engineering.

Required tasks:

- This is an undergraduate level course in the School of Aeronautics and Astronautics. In Spring 2007, I was grading homeworks and exams.

- In Spring 2013, I drew on my experience in Engineering Education as a doctoral candidate, as well as my experience in the First-Year Engineering program, to become a Facilitator for this course, where the flipped classroom approach was utilized for the first time in this course.

... at Purdue University Minority Engineering Program (MEP) as Instructor at the Academic Boot Camp (ABC)

MATLAB Instructor (Summer 2014)
Catalog course description: A 5-week simulation of the first semester of freshman engineering, designed to prepare incoming freshmen for the rigorous challenges of academic performance and retention rates.

Required tasks:
• Develop course content and material (including syllabus, homeworks, quizzes, in-class activities, and exams) and grading criteria for the math course in alignment with the course topics taught in MATLAB; • Instruct Academic Boot Camp participants in MATLAB; • Grade exams, quizzes, and homework for the Academic Boot Camp MATLAB Course; • Attend scheduled meetings/seminars/workshops pertaining to all camps; • Monitor student progress; • Suggest and implement plan of action for students who are not performing well; • Reinforce neurocognitive methods of information retention using Guaranteed 4.0 techniques; • Report student progress to MEP staff; • Engage incoming college freshman students in engineering course content; • Work between students and faculty to ensure compliance to agenda items; • Provide leadership and a positive role model for participants; • Uphold the high standards of Purdue University in character, conversation, and appearance; • Perform the Summer Engineering Workshop duties assigned in a timely and efficient manner; • Attend training and team meetings as scheduled.

... at Purdue University Minority Engineering Program (MEP) as Tutor with the Tutorial Center

Tutor (Fall 2014–Spring 2015)
Academic success coach (Spring 2015)
Tutorial center description: The objective of the MEP Tutorial Center is to improve the overall GPA and retention rate of students from historically underrepresented groups. I am expected to be committed to and make a contribution to that goal. Also I am committed to generate an environment of inclusion and cooperation in my relationship with students and staff members.

Main course tutor for:
• AAE 301—Signal and Systems for Aero Engr
• ME 200—Thermodynamics I
• ME 300—Thermodynamics II

... at the University of Jordan Mehcatronics Department as Facilitator, Design Coach and Instructor

0908531 Mechatronics System Design (Fall 2016–Spring 2017)

Catalog course description: The course aims to introduce the candidate to the design process of mechatronics systems, actuator types, sizing and selection, measurement systems and transducers selection, control system algorithms and selection of physical controllers, and case studies of various mechatronics systems. The course provides the students with general overview of mechatronic systems, their main components and the approach to the design process. An important aim of the course is to allow the student to integrate his/her knowledge of measurements systems, control, electronics, programming and mechanics into designing comprehensive mechatronic systems. The practical assignments and the project work prepare the student for the final year graduation project, by enhancing planning and teamwork skills as well as practical project work and building of prototypes.

In Fall 2016, I attended as a facilitator, and used my time to overcome challenges of misalignment of content-pedagogy-assessment in this senior, multidisciplinary design course. I used my expertise in engineering education research to improve the experience of this course. In Spring 2017, I built on my work in the Fall to enhance the design project experience, created a rubric and used it as a means to enhance the alignment of content-assessment-pedagogy in the course. In addition, I coached design team in the following projects:

- Project Satellite dish controller
- Project Elevator logic and speed control system
- Project Six degrees of freedom moving platform (senior design project)
- Project Environmentally-friendly, efficient hybrid car engine (senior design project)

0908200 Introduction to Engineering (Fall 2016–Spring 2017)

In Fall 2016, I designed, planned and delivered a design workshop that was composed of four sessions and spanned two weeks. I walked students through a design cycle on the following major topics: needfinding, persona building and storytelling, concept generation and concept selection. In the end, participants, mainly students from different engineering disciplines, designed for a need which they identified within the college on-campus. In addition to this workshop, I facilitated discussions in one section on Introduction to Engineering with the major instructor throughout this semester. In Spring 2017, I taught a section of this course, and worked with faculty members to transfer my experience with a similar course at Purdue.

- "I liked the way you make the student think about problem in life."
- "It's so fun and creative. I liked that we worked in groups and making fun stories and talking about problems we face everyday."
- "What I liked mostly about this activity is that we developed on each others idea. Therefore, we came up with stronger ideas and more creative ones."
- "I liked that it gave us the opportunity to communicate and share our thoughts."
- "This was different from traditional lectures. It was fun and entertaining." [Translated from Arabic.]

Significant experience in engineering research projects

• Purdue University, W. Lafayette, IN Spring 2010
Project: **Remote Sensing System Design Project**
Role: Project Manager
Description: The objective of this course project is to predict ocean roughness and soil moisture from antenna and receiver to be mounted on board the International Space Station by means of designing a Global Navigation Satellite System Experiment. The project marked a change by conducting the first vertically integrated project between graduate and undergraduate students in their senior design project. My role in addition to managing the project was to coach senior undergraduates in the design process.

• Purdue University, W. Lafayette, IN Spring 2006
Project: **H_2/O_2 Multi-element Injector Heat Flux Measurement Experiment**
Role: Project Manager
Description: The objective of this project is to develop a model rocket combustor that can be used in experiments that will provide validation data for heat transfer predictions for advanced hydrogen-fueled engines. My role in addition to managing the technical project was to introduce sound professional management practices and tools to the technical project.

• Purdue University, W. Lafayette, IN Fall 2010
Project: **Purdue CubeSat**
Role: Project Engineer
Description: The objective of this project is to design, build, test and launch a CubeSat. My tasks focus on the communication system of the satellite. I worked for one semester on this project.

• Purdue University, W. Lafayette, IN Summer 2008
Project: **NASA's future Lunar Surface Access Module (LSAM) in the Constellation Program**
Role: Research Assistant
Description: Independent study.

• Purdue University, W. Lafayette, IN Spring 2008
Project: **Studying communication systems architecture for lunar surface operations in the Constellation Program**
Role: Research Assistant
Description: Research was funded by NASA's Jet Propulsion Laboratory (JPL).

Memberships

• **American Society for Engineering Education (ASEE).** Student member (2010–current)

• **American Institute of Aeronautics and Astronautics (AIAA).** Student member (2005-2013)

• **American Society of Mechanical Engineers (ASME).** Student member (2005-2013)

• **Institute of Electrical and Electronics Engineers (IEEE).** Student member (2005-2013)

• **Society of Automotive Engineers (SAE).** Student member (2005-2013)

• Member of **Purdue Pilots Club** Flight student (2010-2011)

• Member of **Purdue Karate Club** (2010-2015)

• Member of **ASU Karate Club** (2019-2020)

Software skills

Programming/Graphics/Specialized:
- MATLAB
- Python
- HTML, CSS
- Mathematica
- Certified LabVIEW Associate Developer 2012 (CLAD from National Instruments–NI)
- Arduino (Open-source electronic prototyping platform)
- CATIA
- Pro/ENGINEER
- Ontic (common Lisp; implemented reasoning system)
- Satellite/Systems Took Kit (STK–Analytical Graphics)
- Planet (Daily satellite imagery and insights)
- XFoil

Surveys/Statistical analysis/Data visulalization:
- R (statistical package)
- SPSS
- Qualtrics

Publishing/Document production:
- Adobe InDesign; Illustrator; Photoshop; Dreamweaver
- Microsoft SharePoint
- Wordpress
- LaTeX

Additional information

- **Languages:**
  - Arabic: Mother tongue
  - English: Excellent written and spoken (2008 TOEFL score: 115/120 iBT)

- **Pilot student:**
  - Ground training received: 8.2 hours
  - Flight training (dual flight piloting): 17.9 hours

- **Holds a Technician Amateur Radio License**—Call sign: KC9TFW

- **Purdue Karate Club:**
  - Treasurer (Summer 2011–Summer 2014)
  - Fund raising chair (Fall 2014–Spring 2015)

Synergistic activities and professional service

• **Co-chairing** the *Competencies for Industry 4.0 and Learning Factories* track for the 2022 ASME IMECE conference with Dr. Anabela Carvalho Alves (University of Minho, Portugal), in preparation for the upcoming conference next year.

• **Reviewer** for ASEE, ASME, FIE and PME-NA 41.

• **Member of the Curriculum Committee** at the Aerospace Engineering Department, Embry-Riddle Aeronautical University, Prescott Campus.

• Working with Dr. Matthew Haslam (Dept. Chair and Associate Prof. Humanities and Communications) to **integrate technical and visual communication with computer-aided design courses** as part of the ERAU's *Writing Matters* Initiative.

• Working with the **Undergraduate Research Institute (URI)** at ERAU to find better ways to integrate undergraduate research into the engineering curriculum throughout the students' experience.

• Participant in the **The 2022 KEEN National Conference (FEB 2 - 4, 2022)** to deepen understanding of how entrepreneurial mindset can help me and students identify opportunities, challenge convention to solve problems, and create long-lasting value.

• **Chair of the Engineering Committee** of the *Graduate and Professional Students Association (GPSA)* at ASU
  ◦ Chair, Summer 2020–Current
  ◦ Assembly Member (Legislative Branch), Fall 2019–Current
  ◦ Wellness Committee Member, Fall 2019–Current

Representing the Schools of Engineering At-large. In this position, I represent the voice of graduate and professional students to promote success, inclusion, and vitality among the diverse communities I represent and serve. I seek to foster and empower the next generation of academic and professional leaders through professional development, advocacy, and service opportunities. Student organization annual overall budget is over $1M.

• **Changemaker Challenge Grant Coordinator** with the *Changemaker Central @ ASU*
  ◦ Grant Coordinator, Fall 2019–Current

Serving in the Entrepreneurship and Innovation pillar. Judging applications and coordinating the offering of funds of $20k each semester to support students' ideas.
  ◦ Entrepreneurship / Innovation Committee Member, Fall 2019–Current

Advancing the mission of the committee to catalyze, promote and sustain change. Assisting in creating an online platform that facilitates peer-to-peer networking for students interested in entrepreneurship and innovation.

• **Facilitator** as part of the team on "Storytelling as a way to engage in additive innovation and inspire ourselves and others." The session was part of the ASU Polytechnic NSF RED initiative on *developing a culture where faculty embrace risk taking through additive innovation.* The session took place during the RED PI Meeting in July 2018, Washington, DC.

• **Actively participated in** initiating the Interaction Design Team within *The Decision Theater* at Arizona State University, Tempe.

• **Facilitator** for the Spring 2013 course, AAE 251: Introduction to Aerospace Design, where the flipped classroom approach was utilized for the first time in that course. This was part of the Purdue IMPACT program to redesign of foundational courses by using research findings on sound student-centered teaching and learning.

• **Completed a** *Re-imagining Your Curricula* **workshop conducted by Olin College of Engineering** for Purdue faculty highlighting the College's successes. The workshop took place at Purdue College of Technology, August 29-30, 2013. I applied many of the techniques introduced in my following teaching assignment (Spring 2014) in a students project to "Imagine the Purdue Memorial Union a 100 Years from Now." Please see **Publicity** section below.

• **Invited to** *Penn State designXchange* **workshop, 15-17 January 2015.** The workshop involved interactions between participants about Design. I transferred some of the activities I learned to design modules that I used later in my teaching.

• **Attended a** *Human-centered Design* **talk conducted by Designer Sahar Madanat**. The talk took place during Amman Design Week, September 1-9, 2016. I was able to connect with the establishment of Designer Madanat, being the first of this kind in the country, and know more about the opportunities and challenges of human-centered design in the industry of Jordan.

• **Actively participated** in the following workshops related to design education in Jordan during Amman Design Week, September 1-9, 2016:

- *Design forum: Open discussion on design education and practice in Jordan*
- *Defining the design problem*

The sessions resulted in a published report to the Ministry of Higher Education about the status of design education in Jordan. In addition, I followed up with an interview with organizer and moderator Dr. Essam Abu Awad, President and founding member of the Middle East Design Educators Association, also the Dean of the Faculty of Art and Design in the Applied Science University in Jordan. We started a research study proposal to map design education in Jordan, where I am making a special case for design in the engineering curricula.

• **Facilitated participatory design sessions and activities with the Center for the Study of the Built Environment (CSBE) in Amman, Jordan, Fall 2016**. As part of a funded project from US-AID, the project aims to redesign the educational environment in public schools in Jordan through engaging elementary schools students as critical stakeholders in the design process. I was able to connect with **CSBE Associate Director, Architect Lara Zureikat** after participating in her active, hands-on workshop on *Participatory Design Methods: Creating Better Built Environments* during Amman Design Week.

• **Received mentorship through a new technique *Mastermind Circle: Speed Mentorship* by world-class Designer Paul Hughes.** Mr. Hughes provided feedback and guidance on my previous activities and future goals related to design education. The personal session took place after a day-long workshop delivered by Mr. Hughes on *Adaptive Strategies* and another session on the *Circle of Innovation*, which focused on the importance of Design in education, government and industry. The sessions took place during Amman Design Week.

• **Active member in the workshops of Teaching Undergraduates for Learning Investment Program (TULIP).** Topics are related to best teaching practices, as well as future faculty development. (Fall 2012–Spring 2015)

• **Consulted in a Teaching Assistants professional development project** with an embedded research goal. The project included a small group of participants (3 people). All activities were audio and video recorded. The purpose of this project was to understand TAs' approaches to developing project-based activities and solving engineering problems. Professional development, testing and using of a course project that will be given to freshman students starting in Fall 2010 was achieved along with development of components of Fall project materials. This consultation workshop improved the project activities and enhanced faculty members understanding of TA's beliefs about teaching and learning.

• **Submitted a proposal to re-design the Graduate Office Space** to the Graduate Program Chair in the School of Engineering Education (Summer 2012, with Julia Thompson). The proposal was accepted (Fall 2013), and the Space was re-designed accordingly.

• **Participated in teaching children** of Lafayette/W. Lafayette area making crafts, West Lafayette Public Library, 2007.

Mentoring

As part of my teaching assignments, I was mentoring graduate student colleagues as well as undergraduate students:
• Ms. Dang Gia Hoa Nguyen (Fall 2021): Undergraduate student, Astronautics, ERAU
• Mr. Nathan Wisniewski (Fall 2021): Undergraduate student, Aerospace Engineering, ERAU
• Mr. Nikhil Butani (Fall 2021): Undergraduate student, Astronautics, ERAU
• Ms. Kimiya Ghobadi (Fall 2021): Undergraduate student, Propulsion, ERAU
• Mr. Patrick Lee (Fall 2021): Undergraduate student, Robotics, ERAU
• Ms. Bhavini Singh (Fall 2014): Graduate Student in the School of Aeronautics and Astronautics, Purdue University
• Ms. Mounia Belmouss (Spring 2014): Graduate Student in the School of Aeronautics and Astronautics, Purdue University
• Mr. Paul Branham (Fall 2012): formerly in Nuclear Engineering, then Graduate Student in Engineering Education, Purdue University
• Several undergraduate students: *Each semester* I taught, I had the privilege of working with great 4 undergraduate students in each section (in-class) and 1 undergraduate student (grader; outside class).

Publicity

• **In the news (Spring 2014):** Students in my section of ENGR 131: Transforming Ideas to Innovation had to *imagine what the Purdue Memorial Union would be like 100 years from now:* **Click here**

• **In the news (Spring 2014):** Reflecting on my experience in teaching during a session of Teaching Undergraduates for Learning Investment Program (TULIP): News article–Click here

• **YouTube Video—What is Engineering Education (Fall 2010):** Produced a YouTube video with a team in a class at Purdue University about the history and philosophy of engineering education. The video clip tries to answer the question What is Engineering Education?" **Click here**