Garima V. Bhatia

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OBJECTIVE

To make a significant contribution to the organization by applying acquired analytical skills and knowledge, while making parallel personal career growth by continually growing and acquiring new skills.

EDUCATION

Doctor of Philosophy in Industrial and Systems Engineering | 2016 –2021

The University of Alabama in Huntsville

- GPA: 4.0
- Research Emphasis:
  - Mathematical Theory for Establishing Organizational Architectures for Systems Engineers
    - Systems Engineer Roles and Tasks
    - Set Theory, Relations, Functions
  - Model-Based Systems Engineering (MBSE)
  - Value modeling

Master of Science in Aerospace Engineering | 2014 - 2016

Iowa State University of Science and Technology, Ames, IA

- GPA: 3.85
- Research Emphasis:
  - Value-Based Design (VBD)
  - Game Theory
  - Multidisciplinary Design Optimization (MDO)
  - Systems Engineering

Bachelor of Technology in Aerospace Engineering | 2010-2014

Indira Gandhi National Open University (Full-time on-campus program)

PROFESSIONAL EXPERIENCE

***Senior Systems Engineer,* Ford Motor Company | Jan 2020 – Present**

- Systems engineering lead for suspension, brakes, and wheels and tires for the electric/ICE F-150 pickup trucks
- Apply descriptive modeling to develop design failure mode effects analysis (DFMEA) for keys systems
- Develop a vehicle functional architecture in conjunction with software teams, with a focus on input government regulations and customer-facing feature requirements
- Identify gaps in current designs and processes and focusing on improvements using a systems engineering approach, including design and process optimization
- Interface with various disciplinary teams to ensure holistic systems development
- Lead two projects focused on establishing end-to-end traceability between existent, currently disconnected systems engineering artifacts, including customer needs, use cases, requirements, and test cases in a SysML environment
- Developed strategy for shift from document-centric to model-centric culture in the organization
- Lead modeling effort in the organization, modeling strategies, and mentoring new hires and interns

***Member,* INCOSE Technical Leadership Institute Cohort 9 | June 2023 – June 2025**

***BOD,* INCOSE Michigan Chapter | Jan 2022 – Present (VP – 2022, President – 2023, Events Committee Chair – 2024)**

- Responsible for organizing chapter-related events, improving engagement, and promoting systems engineering within the Michigan community by promoting cross-functional interactions.

***Graduate Research Assistant,* The University of Alabama in Huntsville | Aug 2016 – April 2021**

- Research focused on studying roles of systems engineers in organizations and their impact on system performance
- Developed a mathematical framework for establishing organizational architecture for systems engineers
- Supported NASA's value of MBSE project to determine the value of MBSE in the SE community by performing approach attribute analyses and creating value models
- Worked on the joint NASA-Brazil Scintillation Prediction Observations Research Task (SPORT) project to support the systems engineering effort and modeling for a 6U CubeSat in SysML to study equatorial plasma bubbles
- Represented value models in SysML using NASA's NEA Scout small satellite example and optimized using MDO

***Graduate Research Assistant,* Iowa State University of Science and Technology | Nov 2014 – May 2016**

- Research focused on the design and acquisition of Large-Scale Complex Engineered Systems using Game Theory in the context of VBD

- Worked as a research assistant in the Multidisciplinary Optimization and Design Engineering Laboratory (MODEL)
- Designed a high-level aircraft model comprised of two subsystem levels in MATLAB, that captured aero-structural interactions
- Improvised requirements-driven approach in traditional systems engineering using VBD and MDO

***Graduate Teaching Assistant,* Iowa State University of Science and Technology | Sept 2014 – May 2016**

- Teaching assistant for AER E 378 (Fluid Mechanics), AER E 160 (Aerospace Engineering problems with Computer Applications Laboratory), and AER E 161 (Numerical, Graphical and Laboratory techniques for Aerospace Engineering)
- Covered the help desk in the Department of Aerospace Engineering for the subjects of Statics, Dynamics and Strength of Materials.

***Tutor at the Athletics Department,* Iowa State University of Science and Technology | Aug 2014 – Sept 2014**

- Tutored athletes on Mathematics, Statics and Dynamics, and Strength of Materials

***Aerospace Design Intern,* National Aerospace Laboratories, Bengaluru, India | Mar 2014 – Apr 2014**

- Assisted in the design of a two-seater Microlight Aircraft in the C-CADD division
- Executed in-depth analysis on design of airfoils and flap systems, focusing on the breakdown of requirements

***Aircraft Maintenance Intern,* Air India, Mumbai, India | Jun 2013 – Jul 2013**

- Performed airframe and mechanics maintenance on the Boeing – 747 aircraft
- Gained hands-on experience with aircraft systems and various maintenance practices
- Learned about documentation and aircraft certification

***Engineering Inter,* Gemsons Precision Engineering Pvt. Ltd. Mumbai, India | Jun 2012 – Jul 2012**

- Studied operational principles of machines such as Vertical Milling, Horizontal Milling, CNCs, Wire Cutting and Laser Etching
- Analyzed quality management and packing procedures
- Trained in Auto-CAD and CNC coding

PUBLICATIONS AND PRESENTATIONS

- Bhatia, G., Kannan, H., and Mesmer, B. "A Mathematical Framework Addressing the Roles and Lifecycle Activities for Establishing Organizational Architectures for Systems Engineers". Revision in progress, 2024.
- Bhatia, G., Wirthlin, J., & Wu, Q. (2024). A Structured Approach to the Development of a Logical Architecture for the Automotive Industry (No. 2024-01-2048). SAE Technical Paper.
- Campo, K., Teper, T., Eaton, C., Shipman, A., Bhatia, G., Mesmer, B. "Model-Based Systems Engineering: Evaluating the perceived benefits and drawbacks, positive and negative aspects, metrics, and evidence through literature". Wiley Systems Engineering, September 2022.
- Bhatia, G., & Mesmer, B. (2022). Identification of Elements and Element Relationships for Organizational Architectures for Systems Engineers. In *Recent Trends and Advances in Model Based Systems Engineering* (pp. 631-641). Springer, Cham.
- Weger, K., Leder, S., Eaton, C., Bhatia, G., & Mesmer, B. (2022, September). Illustrating Preferences in Multi-stakeholder System Development Projects through Vignettes. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 66, No. 1, pp. 1772-1776). Sage CA: Los Angeles, CA: SAGE Publications.
- Campo, K., Teper, T., Eaton, C., M.S., Shipman, A., B.S., Bhatia, G., PhD., & Mesmer, B., PhD. (2021). *Evaluating The Perceived Value Of Mbse Through Evidence In Literature*. Huntsville: American Society for Engineering Management (ASEM).
- Kannan, H., Bhatia, G. V., Mesmer, B. L., & Jantzen, B. (2019). "Theoretical Foundations for Preference Representation in Systems Engineering". Systems, 7(4), 55.
- Bhatia, G., and Mesmer, B. "A Research Path for Exploring Mathematical Approaches to Determine Optimal Organizational Structures for Systems Engineers." In *IAC of the American Society for Engineering Management,* 2019.
- Bhatia, G., & Mesmer, B. (2019). Trends in Occurrences of Systems Engineering Topics in Literature. *Systems*, *7*(2), 28.
- Bhatia, G., and Mesmer, B. "Preliminary Analysis of Value Contributed by Systems Engineers to Organizations." In *2019 AIAA Aerospace Sciences Meeting*, San Diego, CA, 2019.
- Bhatia, G., Mesmer, B., & Weger, K. (2018). Mathematical Representation of Stakeholder Preferences for the SPORT Small Satellite Project. In *2018 AIAA Aerospace Sciences Meeting* (p. 0708).
- Bhatia, G., Dyas, J., Clerkin, J., & Mesmer, B. (2017). "Stakeholder Preference Solicitation with a focus on Surveys and Value Models." In *IAC of the American Society for Engineering Management,* 2017.
- Bhatia, G., & Mesmer, B. (2017). Integrating Model-Based Systems Engineering and Value-Based Design with an NEA Scout Small Satellite Example. In *AIAA SPACE and Astronautics Forum and Exposition* (p. 5234).
- Bhatia, G. V. (2016). A game theory approach to negotiations in defense acquisitions in the context of value-driven design: an aircraft system case study.
- Bhatia, G. V., Kannan, H., & Bloebaum, C. L. (2016). A Game Theory Approach to Bargaining Over Attributes of Complex Systems in the Context of Value-Driven Design. In *54th AIAA Aerospace Sciences Meeting* (p. 0972).
- Bhatia, G.V, "Variable Specific Impulse Magnetoplasma Rocket", *Vol.2 - Issue 9 (September - 2013), International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, www.ijert.org.*

TECHNICAL PROJECTS

Modeling NASA's NEA Asteroid Small Satellite using SysML in Cameo Enterprise Architecture, Spring 2017

- Created structural and behavioral diagrams for CubeSat in SysML
- Integrated Matlab and SysML successfully to perform optimization of CubeSat mission

Design of an Automatic Soap Dispenser using SysML in Cameo Enterprise Architecture, Fall 2016

- Created a model that included all 9 types of SysML diagrams in Cameo

Comparison of traditional Systems Engineering approach with Value-Based Design using an Aircraft example, Fall 2015

- Compared single objective optimization, multi-objective optimization, and Value-Based Design approaches using an aircraft example
- Used Genetic Algorithm (GA) for multidisciplinary optimization of aircraft
- Used Utility Theory to examine the effect of different alternatives on rank ordering

Maximization of total profit for a commercial company designing a military weapon system, Fall 2015

- Used Genetic Algorithm (GA) to maximize the total profit for a company

Minimization of fuel weight of Airbus A320, Spring 2015

- Optimized the Airbus A320 for fuel weight considering a simple mission profile using MDO
- Formulated the optimization problem and solved using fmincon (multiple algorithms) and GA
- Visualized the design space and reduced the fuel weight by 24000 lbs

Finite Element Analysis of a bracket under thermal and mechanical loading using Abaqus, Spring 2015

- Modeled and analyzed an L-shaped bracket subjected to thermal and mechanical loading
- Studied the model to determine appropriate boundary conditions
- Analyzed the effects of mesh sizing and varying loads

Behavior of Composite Materials under Fatigue, Fall 2014

- Studied different modes of fatigue failure in Fiber Reinforced Plastics (FRPs)
- Studied the properties of composite fatigue and the associated S-N curves
- Analyzed and compared fatigue in Carbon Fiber Reinforced Plastics (CFRPs) and Glass Reinforced Plastics (GRPs)

SKILLS

- SysML (MagicDraw/Cameo Enterprise Architect)
- MATLAB
- Value modeling
- Minitab
- SPSS
- Finite Element Analysis using COMSOL and Abaqus
- Part Design in CATIA V5
- SolidWorks
- MS Office

RELEVANT COURSES

- Model-Based Systems Engineering (ISE 539, ISE 639)
- Advanced Game Theory – (ISE 739)
- Large-Scale Complex Engineered Systems (AER E 568X)
- Optimization Methods for Complex Design (ME 525)
- Decision Analysis (ISE 734)
- Engineering Systems (ISE 627)
- Game Theory – Special topics
- Introduction to MDO (AER E 563X)
- Metaheuristic Optimization (AER E 544X)

CERTIFICATIONS

- INCOSE ASEP (ASEP Certificate)
- OCSMP Model User (OCSMP MU Certificate)
- OCSMP Model Builder – Fundamental (OCSMP MBF Certificate)
- Women Rising (2023)
- ModelCenter Explore
- ModelCenter Integrate (MCI Certificate)
- ModelCenter MBSE

AWARDS

- Recipient of the *"Amelia Earhart Fellowship"* for the academic year 2018-19.
- Awarded *"Outstanding Graduate Student"* in the Department of Industrial & Systems Engineering at the University of Alabama in Huntsville for the academic year 2017-18.
- Recipient of the RAM Training Summit Student Scholarship for the years 2017 and 2018.
- Graduate Dean's Merit List holder at UAH from 2016 to 2021.
