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Summary

- **Lecturer at University of Alabama in Huntsville.**
- **Eight years** of experience in teaching university undergraduate and graduate courses.
- Over **9 years** of research experience at **Center for Materials and Structures**, University of Nevada, Las Vegas.
- Over **2.5 years** of industrial experience at the **Defense Research and Development Organization**, Ministry of Defense, India.
- **Co-Principal Investigator** for three research grants.
- **Trained and supervised** undergraduate and graduate research assistants at University of Nevada, Las Vegas.
- **Train and coordinate** doctoral and masters teaching assistants at University of Alabama in Huntsville.
- **Authored over 30** peer-reviewed international journal and conference technical papers.
- Member of various **honored** and professional societies.
- **Advisor** of the historic and prestigious engineering honor society **Tau Beta Pi** for the last five years.

Education

Ph.D. in Mechanical Engineering, **GPA: 3.92**
University of Nevada, Las Vegas (UNLV), Las Vegas, NV Aug 2010
Dissertation Title: Optimal Design of Vehicle with Internal Space Frame Structure Subjected to High Impact Load
Advisors: Dr. Mohamed B. Trabia & Dr. Brendan J. O'Toole

M.S. in Mechanical Engineering, **GPA: 3.87**
University of Nevada, Las Vegas (UNLV), Las Vegas, NV Aug 2006
Thesis Title: Material Characterization and Parametric Studies of Explosion Proof Vessel
Advisors: Dr. Mohamed B. Trabia & Dr. Brendan J. O'Toole

B.E. (Bachelor of Engineering) in Mechanical Engineering, **Distinction**
Bangalore University, Bangalore, India Dec 2001
Project Title: Computer Aided Process Design and Manufacture of a Jet Engine Component Using CNC Machine
Advisors: Dr. B.K. Subhash & Dr. K. Satish

Research Interests

- Solid Mechanics (Computational & Experimental)
 - Material Characterization (emphasis on Composite/Bio/Hybrid Materials)
 - Machine Design
 - Finite Element Analysis
 - Engineering Optimization.
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Honors & Awards

- Listed in **Who's Who in America** 2011, 65th Edition (2011).
- Recipient of the 2008 **Summer Session Scholarship** of **\$2000** from the UNLV Graduate College (2008).
- **Best Essay Award** by the American Society of Mechanical Engineers (ASME) Nevada professional chapter for an essay titled, *Solar Energy: King in Waiting* (2008).
- **Won poster awards** for the composite bridge and wing competitions held by the Society for the Advancement of Material and Process Engineering (SAMPE) (2007-2010).
- **Outstanding academic achievement** award from Honors convocation in UNLV (2006).
- **Outstanding paper award** at the 51st International SAMPE Symposium & Exhibition (2006).
- Awarded **third place** for a paper in the 2006 American Institute of Aeronautics and Astronautics (AIAA) student conference (2006).
- Member of **Phi Kappa Phi**, honor society (2006).
- Member of the UNLV ASME Human Powered Vehicle Competition (HPVC) design team that won the **first place** in design and race (2005).
- Awarded **second place** for a paper in the 2005 AIAA student conference (2005).
- Member of **Tau Beta Pi**, the historic and prestigious engineering honor society (2005).

Professional Activities

- **Safety Inspector** at the UAH Science Fair (2014, 2015).
- **Judged** Haleyville High School student's science projects for the **Alabama Future Technology Initiative** sponsored by UAH (2014).
- **Judge** at the **FIRST LEGO League** (FLL) robotics competition in which middle school students from around the world design, build and compete in a robotics challenge (2014).
- **Judge** at the **FIRST Robotics Competition** (FRC) in which high school students from all around the world design, build and compete in a robotics competition (2012, 2013).
- **Reviewer** of technical papers for ASME International Mechanical Engineering Congress and Exposition (2010-present).
- **Session Chair** at 2009 International Conference on Composites/Nano Engineering, and 2012 ASME Verification and Validation Conference (2009, 2012).

- Conducted workshops on composites and mechanical engineering for local Las Vegas high school students (2005-2010).
- **Robot Inspector** at the **FIRST Robotics competition** (2008-2011).
- Mentored a local Las Vegas high school for the **FIRST Robotics Competition**. Reached the 2007 Las Vegas regional semi-finals, 53 international schools competed (2007). Won the silver medal (runner-up) at the 2008 San Diego regional, 51 international schools competed (2008).
- Part of a team, which in conjunction with the **Make a Wish Foundation**, built a wrestling bed for a terminally ill child (2007).
- Member of the **Balloon Satellite Program** team that set a then **world record** for the altitude height (97,000 feet) of a LEGO NXT balloon (2007).
- Received letter of appreciation from UNLV for work towards **Minority Engineering Program** students (2006).

Software and Machine Skills

- **Machines/Instruments:** 2-Stage Gas Gun, Material Test System (MTS), United SSTM-1 universal testing machine, Instron Dynatup 8250 drop weight impact tower, Thermoset Composites Autoclave, HAAS CNC Milling machine, Tineus Olson universal testing machine, etc.
- **Design (3D modeling):** SolidWorks, Solid Edge, Pro/ENGINEER (Creo) and AutoCAD
- **Analysis (Finite Element):** ANSYS, Altair HyperWorks, MSC Adams, and LSTC LS-DYNA
- **Programming and Data Acquisition:** MATLAB, PTC Mathcad, LabVIEW and Fortran

Teaching Experience

1.] Lecturer

Aug 2013 – present

Department of Mechanical & Aerospace Engineering, University of Alabama in Huntsville

i) **Course Coordinator**

- In charge of core undergraduate courses; Kinematics & Dynamics of Machines, Mechanics of Materials, and Materials & Manufacturing Processes.
- Responsible for planning these three courses curriculum, policies, lectures, assignments, exams and quizzes.
- Teach or guide the instructors teaching these three courses.

ii) **Laboratory Coordinator**

- In charge of two teaching laboratories; Kinematics & Dynamics of Machines laboratory, and Mechanics of Materials laboratory.
- Train, guide and supervise the graduate teaching assistants for these two laboratories.
- Design the experiments and prepare the laboratory manuals.
- Maintain the laboratory apparatus and testing machines.

iii) Teaching

- Freshman Year Experience for Engineers (Spring 2016): Introduce freshman students to engineering.
- Introduction to Computational Tools (Fall 2013 & 2015, Summer 2015): A freshman class introducing the students to the latest engineering graphics, 3D modeling & programming software.
- Kinematic & Dynamics of Machines (Fall 2013-2015, Spring 2014-2016): Junior/senior students learn how to design and analyze mechanical mechanisms.
- Mechanics of Materials (Spring 2014, Fall 2014): A junior/senior class to evaluate stresses and deformations in structures subjected to various static loads.
- Materials & Manufacturing process (Fall 2013-2015, Spring 2015 & 2016, Summer 2014): Senior students are introduced to various types of engineering materials, their properties, and the processes used to manufacture products from these materials.
- Mechanics & Design of Machine Elements (Summer 2014, 2015): Senior students learn advanced mechanics concepts, and apply that knowledge to design and analyze common machine parts.

iv) Administrative

- Member of the undergraduate committee, which works on the policies of the undergraduate studies in the department (Fall 2013-present).
- Member of the UAH College of Engineering special committee for determining the content and structure of a new freshman engineering class known as Computing for Engineers (Spring 2015-present).
- Chief Advisor of the historic and prestigious engineering honor society Tau Beta Pi UAH student chapter (Spring 2014-present).
- Chair of the department special committee in charge of changing the course structure of Kinematics & Dynamics of Machines (Spring 2015-present).
- Chair of department special committee tasked to renovate (redo) the Kinematics & Dynamics of Machines laboratory (Summer 2014).
- Assist the department in various outreach and administration activities.

2.] Postdoctoral Scholar

Oct 2010 – Aug 2013

Department of Mechanical Engineering, University of Nevada, Las Vegas

i) Design Techniques in Mechanical Engineering (Spring 2013, Fall 2011)

- This course is an applied finite element (FE) class which incorporates the basic concepts and methods of FE applied to structural and thermal problems coupled with predicting the analytical results using commercial FE software like ANSYS and Altair HyperWorks.
- Created this course as UNLV lacked a FE course for the undergraduate students and also, in the present age of engineering technology, the knowledge of FE concepts/program is a very important tool for an engineer.
- Taught this course to graduate and senior level undergraduate students.
- A very popular course as seen from the three-fold increase in the student strength the second time the course was offered.

ii) Materials Mechanics (Spring 2013, Spring 2011)

- In this course students study the response of isotropic elastic solids to load, stress and strain, elasticity, torsion, bending, deflection of beams and column failure.
- Taught this course to senior/junior level undergraduate students.

iii) Fluid Dynamics (Spring 2013)

- This course introduces students to fluid properties, statics and dynamics. Also, students learn the integral and differential approach of fluid motion, and apply the concept to flow in pipes, external flows and turbomachinery.
- Taught this course to senior level undergraduate students.

iv) Energy and Variational Methods in Applied Mechanics (Fall 2012)

- Students learn the governing equations of solid mechanics, energy and variational principles, variational methods of approximation, theory of elasticity, material laws, work and energy, beam theory and finite element method.
- Taught this course to graduate students.

v) Applied Dynamic Finite Element Analysis (Spring 2012)

- This course gives an overview of the dynamic computational analysis, modeling techniques, contact algorithms, nonlinear analysis, implicit vs explicit time integration, Eulerian vs Lagrangian analysis, and learn FE software LS-DYNA.
- Taught this course to graduate students.

vi) Introduction to Composite Materials (Spring 2012)

- This course introduces students to the theory and mechanics of fiber reinforced composite materials, concept of laminates, the different fabrication procedures, and hands on fabrication of composite components.
- Taught this course to graduate and senior level undergraduate students.

vii) Mechanical Engineering Design (Fall 2010)

- Students learn the design procedure for simple mechanical components such as power screws, threaded fasteners, gears, and roller bearings when they are subjected to static and fatigue loads.
- Taught this course to senior level undergraduate students.

3.] Teaching Assistant

Aug 2003 – Jun 2005 & Aug 2006 – May 2007

Department of Mechanical Engineering, University of Nevada, Las Vegas

i) Materials Mechanics Laboratory (Spring 2007, Fall 2006)

- Students get hands on experience in characterizing mechanical properties of materials, and get to use common material testing machines, and data acquisition instruments/devices.
- Taught this laboratory course to senior/junior level undergraduate students.

ii) 3D Modeling with Pro/Engineer (Spring 2005)

- Students get introduced to three-dimensional modeling and assemblies of mechanical systems, and to produce their two-dimensional engineering drawings using Pro/Engineer software.
- Designed the syllabus and taught this course to sophomore/freshman level students.

iii) Introduction to AutoCAD (Fall 2004)

- Students learn to draw two-dimensional engineering drawings using AutoCAD software, and to create three-dimensional models of simple mechanical components.
- Designed the syllabus and taught this course to sophomore/freshman level undergraduate students.

iv) Introduction to Engineering Design Laboratory (Fall 2003, Spring 2004, Summer 2004, Summer 2005)

- Introduces students to the techniques of basic engineering design process by building, optimizing, and programming an autonomous robot for specific tasks by using the LEGO MINDSTORMS NXT toolkit.
- Taught this course to freshman level undergraduate students.

Research Experience

1.] **Postdoctoral Scholar**

Oct 2010 – Aug 2013

Center for Materials and Structures (CMS), University of Nevada, Las Vegas

i) **Finite Element Modeling of Gas Gun Experiments and Diagnostics**

(Project sponsored by National Security Technologies, Las Vegas, NV)

- **Experiment:** Design and conduct high velocity experiments in a 2-stage gas gun by impacting a target plate and measuring the velocity and large deformations on back face of the plate by using photonic Doppler velocimetry (PDV) and high speed cameras.
- **Finite Element Analysis:** Use multiple explicit computational methods to accurately simulate the experiment results.

ii) **Investigation of the Shock Mitigation Properties in an Armored Vehicle**

(Project sponsored by Hyundai Rotem Company, South Korea)

- **Finite Element Analysis:** Conduct simulation studies on an armored vehicle with internal space frame structure, by subjecting it to mine blast and projectile impact loads. A simplified pure beam elements model was created to conduct optimization studies and improve the shock mitigation in the vehicle.
- **Optimization:** The shock mitigation layer in the space frame structure of the vehicle was optimized to reduce peak accelerations at critical locations. This was achieved by coupling the simplified FE model of the vehicle to the optimization code written in MATLAB.

- **Experimental:** A lab-scale test fixture, of the vehicle armor and internal space frame, was designed and tested for high velocity impact in a 2-stage gas gun to measure the shock mitigating properties of the armor and the shock mitigating layer in the space frame joints. Also, the composite armor and shock mitigation materials were characterized at quasi-static and dynamic strain rates.

iii) Blast Containment Vessel

(Project sponsored by U.S. Army RDECOM, Picatinny Arsenal, NJ)

- **Design:** Build a light weight transportable blast containment vessel for repeated usage.
- **Experiment:** Conducted material characteristic studies for the vessel. Fabricated and tested open ended vessels for several blast loads.
- **Finite Element Analysis:** Created a FE model of the vessel to predict the experimental results, and to optimize the design.

iv) Analysis of Composite Fishing Rod

(Project sponsored by Colt Rod Company, Las Vegas, NV)

- **Finite Element Analysis:** Conducted computational studies of the composite fishing rod for structural integrity and natural frequencies.
- **Experimental:** Did vibrational and static experiments on the fishing rod.

2.] Research Assistant

Aug 2003 - Sep 2010

Center for Materials and Structures (CMS), University of Nevada, Las Vegas

i) Optimal Design of Military Vehicles with Internal Space Frame Structure

(Ph.D. Dissertation Project sponsored by Army Research Laboratory, Aberdeen, MD)

- **Experimental:** Conducted modal analysis & shock mitigation experiments on a lab scale space frame structure comprising of bolted joints.
- **Finite Element Analysis:** Created a finite element (FE) model of military vehicle & the lab scale space frame structure. Conducted modal & shock mitigation analysis on the FE models. Tuned the FE model to match the results obtained from experiments.
- **Optimization:** Optimized the mass & shock (due to projectile impact) in the military vehicle while maintaining its structural integrity. Created an optimization code in MATLAB for performing the aforementioned function.

ii) Material Characterization and Parametric Studies of the Explosion-Proof Vessel

(M.S. Thesis Project sponsored by Sandia National Laboratory, Albuquerque, NM)

- **Material Characterization:** Conducted experiments to establish the properties of the materials (basalt-plastic composite, polymer-foam, steel wire mesh, stainless steel, etc) used in the manufacture of the explosion-proof vessel.
- **Finite Element Analysis:** Determined an efficient analysis procedure by performing computational simulations on the explosion-proof vessel models subjected to internal blast loading.

- **Optimization:** Postulated and validated an optimization technique for the reduction of peak strains in the FE model of the explosion-proof by coupling MATLAB with the explicit simulation code LS-DYNA.

iii) Reconfigurable Tooling System

(Project sponsored by 2Phase Technologies, San Jose, CA)

- **Description:** Characterization of the molding material for a reconfigurable tooling system (RTS).
- **Design:** Formulated experiments to characterize the 2phase material. Involved in designing the testing fixtures.
- **Experimental:** Conducted quasi-static tests at room and high temperature for the tooling material.

iv) Unmanned Aerial Vehicle

- **Experimental:** Tested the composite engine ducts of a light weight Unmanned Aerial Vehicle for structural strength in both static and dynamic loading.
- **Finite Element Analysis:** Created a simulation model of the UAV engine ducts and predicted the experimental results within a reasonable accuracy.

3.] Senior Works Engineer

Jan 2002 - Aug 2003

Defense Research and Development Organization (D.R.D.O.), India

- DRDO is a R&D organization under the Ministry of Defense, India, and is indigenously designing and manufacturing a **Light Combat Aircraft (LCA)**.
- Did **engineering drafting** of the LCA engine components, both manually and computer aided (AutoCAD), by following the **ISO 9001** drawing standards.
- Involved in the **design and modeling** (using Pro/Engineer) of the compressor parts of the LCA jet engine, such as the bullet nose, compressor casing, discs, blades, etc.

4.] Engineering Intern

May 2000 - Jun 2001

Defense Research and Development Organization (D.R.D.O.), India

- For undergraduate senior design project worked on the computer aided process design of a **5th Stage High Pressure Compressor Disc** of the LCA jet engine.
- Converted the manual process design of the compressor disc to computer aided.
- **Computer aided design (CAD)** reduced the number of cutting tools used, hence the cost, in manufacturing the compressor disc.
- The **part program** to machine the compressor disc using CNC machine was generated from the CAD software AutoCAD.

Peer-Reviewed Technical Papers

Journal Publications

- **Thota J**, Trabia MB, O'Toole BJ (2015) *Computational prediction of low impact shock propagation in a lab-scale space bolted frame structure*. International Journal of Computational Methods and Experimental Measurements 3 (2): 139-149.
- **Thota J**, O'Toole BJ, Trabia MB (2011) *Optimization of shocks within a military vehicle space frame*. Structural and Multidisciplinary Optimization 44 (6): 847-861.
- **Thota J**, Trabia MB, O'Toole BJ (2009) *Optimization of a light-weight composite blast containment vessel*. ASME Journal of Pressure Vessel Technology 131 (3): 0312091-0312099.
- **Thota J**, Clark K, O'Toole BJ (2009) *Quasistatic and vibration response of prototype composite ducts for aircraft components*. World Journal of Engineering 6: 1025-1026.
- Nelson SM, O'Toole BJ, **Thota J** (2009) *Mechanical characterization of a porous state-change material for water soluble tooling*. World Journal of Engineering 6: 737-738.
- O'Toole BJ, Rahman S, Malpica J, **Thota J**, Raagas S (2008) *High temperature properties of a state-change material*. SAMPE Journal 44 (1): 42-52
- Trabia MB, O'Toole BJ, **Thota J**, Matta KK (2008) *Finite element modeling of a light-weight composite blast containment vessel*. ASME Journal of Pressure Vessel Technology 130 (1): 0112051-0112057.
- O'Toole BJ, Trabia MB, **Thota J**, Wilcox T, Nakelswamy KK (2006) *Structural response of blast loaded composite containment vessels*. SAMPE Journal 42 (4): 6-13

Conference Proceedings

- **Thota J**, Trabia MB, O'Toole BJ, Lee CH, Park HL, Kim HB, Koo MH, Lee KH (2013) *Optimization of the shock mitigation layer in the space frame joints of an armored vehicle*. ASME International Design Engineering Technical Conference, Portland, OR.
- Trabia MB, O'Toole BJ, **Thota J**, Jennings R, Somasundaram D, Roy S (2013) *Computational simulation and experimental study of plastic deformation in A36 steel during high velocity impact*. ASME Verification and Validation Conference, Las Vegas, NV.
- **Thota J**, Saadeh M, Trabia MB, O'Toole BJ, Lee CH, Woo KJ, Park HL, Lee KW, Koo MH, Lee KH (2012) *Material characterization of rubberized aramid for shock mitigation*. ASME International Mechanical Engineering Congress and Exposition, Houston, TX.
- **Thota J**, Trabia MB, O'Toole BJ (2012) *Finite element validation of low impact response on a lab-scale frame structure*. ASME Verification and Validation Conference, Las Vegas, NV.
- Nelson SM, O'Toole BJ, **Thota J** (2012) *Analytical Methods for Blast Loaded Composite Structures*. ASME Verification and Validation Conference, Las Vegas, NV.
- **Thota J**, Trabia MB, O'Toole BJ (2011) *Simulation of shock response in a lab-scale space frame structure using finite element analysis*. ASME International Mechanical Engineering Congress and Exposition, Denver, CO.

- **Thota J**, Clark K, Higgins T, Nelson SM, O'Toole BJ (2010) *Fabrication and analysis of prototype composite ducts for an unmanned aerial vehicle*. International SAMPE Symposium and Exhibition, Seattle, WA.
- Nelson SM, **Thota J**, O'Toole BJ (2010) *Optimization of carbon fiber/epoxy tubes loaded in bending and compression*. International SAMPE Symposium and Exhibition, Seattle, WA.
- **Thota J**, Trabia MB, O'Toole BJ (2009) *Shock optimization in a military vehicle with internal space frame*. ASME International Mechanical Engineering Congress and Exposition, Orlando, FL.
- **Thota J**, Clark K, O'Toole BJ (2009) *Quasistatic and vibration response of prototype composite ducts for aircraft components*. 17th International Conference on Composites/Nano Engineering, Honolulu, HI.
- Nelson SM, O'Toole BJ, **Thota J** (2009) *Mechanical characterization of a porous state-change material for water soluble tooling*. 17th International Conference on Composites/Nano Engineering, Honolulu, HI.
- **Thota J**, Trabia MB, O'Toole BJ (2009) *Shock optimization in a military vehicle space frame*. 10th US National Congress on Computational Mechanics, Columbus, OH.
- Nelson SM, O'Toole BJ, **Thota J** (2009) *Uniaxial compression and creep behavior of a porous state-change material at ambient and elevated temperatures*. International SAMPE Symposium and Exhibition, Baltimore, MD.
- **Thota J**, Trabia MB, O'Toole BJ (2008) *Optimization of a military vehicle space frame subject to high impact loading*. ASME International Mechanical Engineering Congress and Exposition, Boston, MA.
- Nelson SM, O'Toole BJ, **Thota J**, (2008) *Characterization of a unidirectional carbon fiber/epoxy composite for prototype design*. International SAMPE Symposium and Exhibition, Long Beach, CA.
- **Thota J**, Ayyaswamy AK, Trabia MB, O'Toole BJ (2007) *Optimization of a light-weight blast containment vessel structural response*. ASME International Mechanical Engineering Congress and Exposition, Seattle, WA.
- **Thota J**, O'Toole BJ, Trabia MB, Sakaray U (2007) *Optimization of a vehicle space frame under ballistic impact loading*. ASME IDETC: 33rd Design Automation Conference, Las Vegas, NV.
- **Thota J**, O'Toole BJ, Trabia MB (2007) *Analysis and optimization of a composite blast containment vessel*. 17th U.S. Army Symposium on Solid Mechanics, Baltimore, MD.
- O'Toole BJ, Rahman S, Malpica J, **Thota J**, Raagas S (2007) *High temperature properties of a state-change material*. International SAMPE Symposium and Exhibition, Baltimore, MD.
- O'Toole BJ, Rahman S, Malpica J, **Thota J**, Raagas S (2007) *Effect of microsphere and binder properties on state-change material performance*. International SAMPE Symposium and Exhibition, Baltimore, MD.
- **Thota J**, Trabia MB, O'Toole BJ, Sridharala S (2006) *Optimization of a light-weight composite explosion-proof vessel*. 77th Shock & Vibration Symposium, Monterey, CA.
- Sakaray U, O'Toole BJ, **Thota J** (2006) *Numerical techniques in the simulation of energy absorbing materials in blast loaded structures*. 38th SAMPE International Technical Conference, Dallas, TX.

- Sridharala S, **Thota J**, Sakaray U, O'Toole BJ (2006) *Design and fabrication of a composite roller skate chassis*. 38th SAMPE International Technical Conference, Dallas, TX.
 - O'Toole BJ, Trabia MB, **Thota J**, Wilcox T, Nakelswamy KK (2006) *Structural response of blast loaded composite containment vessels*. International SAMPE Symposium and Exhibition, Long Beach, CA. **Outstanding Paper Award**.
 - **Thota J**, Sridharala S (2006) *Optimization of a light-weight composite explosion-proof vessel for air transport*. AIAA Region VI Student Conference, Irvine, CA. **Awarded Third Prize**.
 - Trabia MB, O'Toole BJ, **Thota J**, Matta KK (2005) *Modeling of a light-weight composite blast-containment vessel*. ASME IMECE: Applied Mechanics Division, Orlando, FL.
 - Sridharala S, **Thota J** (2005) *Mesh density optimization to reduce computational time for a circuit board in a missile*. AIAA Region VI Student Conference, San Louis Obispo, CA. **Awarded Second Prize**.
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Organizational Experience

- Advisor of the Tau Beta Pi, Alabama Delta chapter (2014-present).
- Advisor of the UAH SAE chapter (2013-present).
- Advisor of the Tau Beta Pi, Nevada Beta chapter (2010-2014).
- Webmaster and Editor of ASME Nevada professional chapter (2010-2011).
- President of the UNLV SAMPE student chapter (2008-2010).
- President of Tau Beta Pi, Nevada Beta chapter (2010).
- Treasurer of the Tau Beta Pi, Nevada Beta chapter (2009).
- Secretary of the Tau Beta Pi, Nevada Beta chapter (2008).
- Vice-President of the UNLV SAMPE student chapter (2007).
- Secretary of the UNLV SAMPE student chapter (2006).
- Vice-President of the UNLV AIAA student chapter (2005).
- President of the UNLV India Students Association (2005).
- Member of ASME, SAE, AIAA, SAMPE, and ANS (American Nuclear Society).