Karthik Reddy Bujuru

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Summary:

A highly motivated engineer seeking challenging role in mechanical engineering to effectively utilize my technical skills, 3 years of industry experience, educational background and strong organizational skills for producing safe and reliable mechanical systems.

Certifications:

- **Certified Lean Six Sigma Green Belt,** Institute of Industrial Engineers (IIE)
- **Certified Solid Works Associate (CSWA),** Dassault Systemes
- **Fundamentals of Engineering exam (FE)** to be given in **October 2012**

Skills:

- Solid works
- Ansys
- PRO-E
- Abaqus
- MathCad
- Auto-Cad
- Rapid Prototyping technique
- Injection molding
- Minitab
- Statistical Process Control
- Lean Principles
- GD&T
- Design of Experiments
- CAM
- Java, C, C++
- Microsoft Office Word, Excel

Education:

University of Colorado Boulder (Aug 2010- May 2012)
MS in Mechanical Engineering **GPA: 3.3**

Osmania University (Sep 2006 – May 2010)
B.E. in Mechanical Engineering **GPA: 3.8**

Research Experience:

Graduate Research Assistant, Aug 2010 – Present
Electrochemical Energy Laboratory (ECL), Mechanical Engineering Dept., CU boulder

- Developed novel Li-ion battery systems under esteemed guidance of Dr. Sehee Lee.
- Worked to address the low safety, energy and power density issues faced by state of art Li-ion batteries.
- Performed experiments and firmly understood the functionality and applicability of novel cathode materials.
- Prepared project status reports and delivered bi-weekly presentations to the group and the sponsors.
- Paper on “thermo-electrochemical activation of solid electrolyte” subject was submitted to Electrochemical Society Journal.

Academic Projects

2D crack propagation in thin plates **Spring 2012**

- Conducted fracture mechanics simulations on 2D thin plate steel models to determine stress concentration factors (K) and energy release rate(G)
- Quarter and half FEA models with symmetric and anti-symmetric boundary conditions are simulated and results are compared.
- Utilized Griffith’s and Irvin’s models on linear elastic fracture mechanics (LEFM) to compare analytical and simulation results.
- Conducted extensive studies on 3D crack propagation simulation capabilities of Ansys 13.

Thermoelasticity and Thermal Buckling of Thin Films **Spring 2012**

- Studied various laws governing the generalized theory of thermoelasticity and **developed simplified linearized** theory using thin film considerations
- Using **Abaqus**, simulated models of thin films with different boundary conditions for determining critical mean temperature distribution for **thermal buckling**.
- The experimental and simulated results agree well with an **error range of 0-1%**
- Determined the correlation between the critical buckling temperature and various geometric parameters of thin films.

HVAC Design **Spring 2011**

- Designed a HVAC hot water heating system for Drake Well museum building located in Pennsylvania.
- Calculated cooling and heating loads of HVAC system in different seasons; designed duct layout using auto-cad.
- Designed boiler, a constant speed supply pump, an Air Handling Unit (AHU), Fan powered mixing boxes, Expansion Tank and an Air Eliminator
- Prepared mechanical schedule files for various components of the system.

Design of Finite Element Analysis in Matlab **Fall 2010**

- The idea of the project was to fully understand the functionality of commercial FEA software such as Ansys and Abaqus.
- Developed a matlab script file that acts as FEA software like Ansys to solve 1D truss problem with at most 100 nodes.
- With the aid of manual and the user interface, the user of the matlab code was able to input no. of nodes, material properties etc. in the form of input file.
- User specified nodes' stresses, strains and displacements are returned in the output file.

Nano-indentation simulation on thin films **Fall 2010**

- Conducted nano-indentation simulations on films of thickness 50nm, 100nm and 200 nm using diamond indenter.
- Utilized complex **contact wizard** of Ansys and used **TARGE169, CONTA171** as element types for film and indenter respectively.
- The act of simulating indentation of film (loading) and the withdrawal of indenter (unloading) were performed using multiple LS files.
- Time history post processor tool was used to plot Force Indentation curves.
- Von-mises contours were utilized to determine the stress distribution at the end of loading and unloading.

Sand Casting Analysis using Ansys **Fall 2010**

- Determined the solidification time of the desired sand cast object made of steel using Ansys thermal analysis.
- Average solidification time is found to be 20 min based on various sand mould thicknesses.
- Simulation results agreed well with Chvorinov's rule of determining solidification times

All-terrain Vehicle, BAJA SAE India, May 2009- Feb 2010

- Lead a group of 10 members to design, fabricate all-terrain vehicle and participate in **SAE India's national racing competition**
- Solid modelling and structural integrity analysis of the roll-cage, chassis were done using solid works and Ansys resp.
- Performed design analysis by conducting **static and dynamic load simulations** such as static loading; front, rear and side impact loading; roll-over case etc.
- Supporting rod of chassis fractured during 20^{th} Lap of the race and we stood at 57^{th} position in the competition.

Engineering Experience:

Engineering Co-op, Advanced Systems Labs, DRDL India (Aug 2008 – Jan 2010)
Failure prediction of Materials using Acoustic emissions non-destructive technique

- Developed an online monitoring system for evaluating **structural integrity of rocket motor casing** using acoustic emissions testing and artificial neural networks utilizing **Matlab**.
- Predicted the failure stress of the material in terms of burst pressures using acoustic emission data and error back propagation neural networks
- Failure Loads have been predicted at as low as 50% of load with a **prediction error of 4%.**

Mechanical Design Intern, Hindustan Tools Limited (April 2009- July 2009)

- Worked with a team of 6 to develop conceptual design of **hydraulic die cushion** for mechanical press using **PRO-E**.
- Conducted stress-strain analysis in **ANSYS**.
- Performed engineering design calculation based on stress-strain analysis and implemented **GD&T**
- Developed a code to automate the manufacturing process using **CNC** machines.
- Performed process planning, scheduling and tooling for manufacturing.

Manufacturing Engineering Intern, Maruthi Suzuki India ltd. (April 2008- July 2008)

- Helped a senior manufacturing Engineer to identify, eliminate the non-value added processes and decreased the process time of engine cylinder blocks.
- Reduced the process variation using statistical process control with the aid of **Minitab**
- Developed better Material Handling techniques to create continuous flow and pull systems.
- Monitored plant lay-out, process planning and assembly line to identify and implement a particular arrangement of work cells which reduced the **conveyance time by 10 sec**.
- Reduced the inventory level by reducing batch sizes, linking operations and minimizing process variations using **lean six sigma principles**.

Graduate Level Coursework

- Finite Element Analysis
- Mechanical behaviour of materials
- Continuum Mechanics
- Micro electro mechanical systems (MEMS)
- Material structures and chemistry
- Methods of Engineering analysis
- HVAC Design
- Air Pollution Control Equipment Design
- Environmental Law

Related BSc. Coursework

- Heat Transfer
- Fluid Dynamics
- Refrigeration and Air Conditioning
- Thermal Turbo Machines
- Mechanics of Materials
- Design of Machine Elements
- Tool Design
- Thermodynamics
- Hydraulic Machinery and Systems

Professional Memberships

College Representative, Society of Automobile Engineers (SAE) (Aug 2008- Aug 2010**)**
Member, Institute of Industrial Engineers (IIE) (Jan 2012- Present)
Member, Society of Manufacturing Engineers (SME) (Jan 2012 – Present)