

BALAJI SELVARAJOU

Education

Department of Mechanical Engineering, National Institute of Technology Tiruchirappalli, India
(July 2008-May2012) (**Bachelor of Technology, undergraduate**)

- **CGPA: 8.75/10**
- **Department Rank: 8th** overall in a class of **96**

Petit Seminaire Higher Secondary School, Pondicherry, India (1994-2008)

- 97.83%, Higher Secondary Examination, 2008
- 93.63%, Secondary Examination, 2006

Research experience

Dept. of Applied Mechanics, Indian Institute of Technology, Madras

Project title: Nonlinear Analysis of Discrete Structures-Trusses, Beams and Frames

Duration: May 15-July15, 2011

Designation: Research Fellow

Supervisor: Dr. Sivakumar M Srinivasan, Professor, Dept. of Applied Mechanics

Work summary:

- Used Updated Lagrangian formulation for the mathematical modelling of large scale deformation in structural members. The mathematical modelling used in the paper "*Incrementally small-deformation theory for nonlinear analysis of structural frames*" was used.
- Developed a MATLAB code to find the deflection of structural members, incorporating geometric non-linearity, thus making it suitable for evaluating large scale deflection. The code can take the initial geometry and loading of the structural member as input and calculate the deformation in steps, the stiffness kept updated in each step.
- The increase in stiffness of the structure due to the accumulation of internal stresses during the course of deformation is taken into account by a separate factor -geometric stiffness.
- Validated the code developed using problems found in literature and found the solutions to be in close agreement to the solutions in literature. The code can be used in the modelling of shape memory alloys and materials of very high flexibility such as clothes and hair.

Dept. of Applied Mechanics, Indian Institute of Technology, Madras

Project title: Estimating turbulent layer wall pressure spectra from CFD RANS solutions

Duration: Dec 2010

Supervisor: Dr.Vengadesan, Assistant Professor, Dept. of Applied Mechanics

Work summary:

- Developed a MATLAB code that takes the velocity field as input from a flow simulation and determines the surface pressure auto spectra and cross spectra based on the formulation given in the paper "*Estimating turbulent layer wall pressure spectra from CFD RANS solutions*".
- The sample problem given in the above paper was taken to validate the code. The given flow was simulated and the output acquired from the code was found to be in good concordance with the results obtained in the paper.

Dept. of Mechanical Engineering, NIT Tiruchirappalli, India

Project Title: Foldable frame conceptualization and prototype building

Duration: May 17-July 10, 2009

Supervisor: Dr. K.Paneerselvam, Associate Professor, Dept. of Mechanical Engineering

Work summary:

- Designed a foldable frame, having a compression spring providing the driving force to produce a snapping action during its closing and opening.
- Conceptualized a mechanism that requires effort only to initiate the opening/closing of the frame, the spring force producing a quick snapping action.
- Equations were framed to estimate the spring compression and the moment on each of the members of the frame based on the geometry of the members and position of the frame
- 3D modelling was done in AUTODESK Inventor, the necessary constraints incorporated and the resulting forces and moments determined. The design was optimized and a prototype was built.
- The prototype can be used could be used as a stand for mosquito net and other domestic applications.

Department of Mechanical Engineering, NIT Tiruchirappalli, India

Project Title: Design and analysis of a compliant Gripper

Duration: Currently on going

Supervisor: Dr. T.Ramesh, Associate Professor, Dept. of Mechanical Engineering

Work summary:

- Design of compliant mechanism to be used in robotic arms as a gripper with geometric advantage
- Analysis of the mechanism done using ANSYS and the optimization of the design done based on the results of the analysis.

Fellowships:

- Selected as a summer research fellow in the **Dept. of Applied Mechanics, Indian Institute of Technology, Madras** in 2011
- Selected as a summer research fellow in the **Central Mechanical Engineering Research Institute (CMERI), Durgapur, India** in 2011

Computer Skills:

- **Analysis & simulation tools: MATLAB, Simulink, ANSYS, Scilab**
- **Design & animation tools: AUTODESK AutoCAD& Inventor, ProE**
- **Programming languages: C, C++, BASIC**
- **Operating Systems: Windows, Linux**

Positions of responsibility:

- Was the Overall Co-Ordinator of Synergy(The National Level Inter-Collegiate Technical Symposium of the dept. of Mechanical Engineering, NIT-Trichy)
- Was part of Festember (The National Level Inter-Collegiate Cultural Festival of NIT-Trichy) in the following capabilities:
 - o Manager of Organizing committee-disciplinary committee during Festember'10.
 - o Deputy Manager of Organizing committee-disciplinary committee during Festember'09.
- Was part of Pragyan (The International Techno-Management Festival of NIT-Trichy) in the following capabilities:
 - o Manager of Organizing committee-venue management during Pragyan'10.
 - o Deputy Manager of Organizing committee-inventory during Pragyan'09.

Co/Extra-curricular Activities:

- Organised and won several technical quiz competitions in school and college
- Staged several plays and dramas in college.
- Member of Apekshaa club, a humanitarian service club of NIT Trichy.
- Founding member of GRATIAS, a NGO doing humanitarian service in Pondicherry

Awards/Scholarships:

- Awarded Best science student of the year award for the year 2008 by the Dept. of Education, Govt. of Pondicherry.
- Awarded certificate of appreciation for securing third place in the state of Pondicherry in the higher secondary examinations held in March 2008