Structural analysis and its application to perform optimisation is fast expanding its horizons with new methods used to precisely represent the geometry using splines and to perform analysis to determine the energy stored by the structure. Newer criteria have been identified to check for the safety of the structure. I am interested to continue on my research work in the area of the structural analysis with optimisation. The use of optimisation to determine the layout of the steel within the reinforced concrete domain is one of the significant application of optimisation. The distribution of material at the ultimate elastic limit is the result of the topology optimisation. The forces carried by the structure at this optimal point of convergence is of practical significance. For example, to determine the prestressing force in a bridge pier will help the Engineer to know the magnitude of the tensile forces at the elastic limit. The application of optimisation to determine the optimal water pipe line network for a city is also one of the best examples in Civil Engineering.

I have worked for several years as a teaching faculty at my home place in Hyderabad, India teaching both Undergraduate and Graduate students in Civil Engineering. I have taught several subjects as Strength of Materials I & II, Structural Analysis I & II, Advance Structural Analysis, Numerical Methods in Structural Engineering, Finite Element analysis. Conducted laboratory for Undergraduate and Graduate students in Strength of Materials Laboratory, Finite Element Analysis Laboratory. I have worked in the area of Topology Optimisation of continuum structures. I have worked on finite element analysis to analyse continuum structures. I have published a few papers in the topology optimisation of continuum structures.

My intent to pursue my further study and research work in the field of computational mechanics is never ending. I see there is no possibility of any funding. I have a strong intent to continue my research work and explore further areas of study. I cannot live without research work simply taking classwork and grading is not what I want to do. Life without exploring new avenues and challenges is a stand still. I would like to put my thoughts to work on new ideas is all I want to do.

I have started studying on advamced structural analysis and structural optimisation in my first semester at IIT in the year 1998. Did not understand much at that time but it was something interesting and challenging. The problems were too lengthy to solve by hand and there is lot of mathematical work required for each problem to determine the area of steel required. There is lot of focus on mathematics in my education since my high school. Mathematics is an integral part of many subjects in some form and required to analyse and solve the problems. The subject of Structural Optimisation is quite interesting in the sense it is used in several fields of study. In reinforced concrete member, to determine the amount of steel satisfying the strength and serviceability conditions, to lower the cost of the steel required. In a two dimensional plate carrying in-plane loading, the plate is modelled using linear splines and the optimal distribution of material in the design domain is determined.

I have worked with several people in India and outside India in the field of Structural Engineering and also from allied fields. I have seen people and students who are extremely talented and proven successful. I am not one of their kind but I am definitely hard working individual. I have been working on optimisation of different types of structures for several years now. Inverse buckling formulation to perform topology optimisation of continuum structures and determine the deformed profile at

optimal state of convergence. The buckling criteria is used to check for statbility criteria to determine the buckling load factor. The buckling load factor can give us an information on how much load the structure can carry before the buckling occurs. The inverse of the buckling load is taken as the objective function and the deformed profile is determined at convergence. Cubic basis splines have been used to model the geometry of the structure and perform analysis to determine the nodal displacements at each node. The results of the nodal displacements were compared with the results obtained from finite element analysis using six node linear strain triangular elements.

Structural mechanics, solid mechanics and materials division of Structural Engineering is the place I would like to work. I would like to do my work on computational analysis of structures, model the structures and determine the deflections and stresses. I will work on new methods to perform optimisation of continuum structures. I can continue my present work into non-linear analysis to determine the optimal distribution of material within the design domain.

Computational analysis of structures is one area where I can use finite element analysis and I can do basic coding in ForTran, C, MatLab. I have worked on gradient methods and meta-heurisitic based methods to perform the analysis. I have used the conventional method such as first order sensitivity analysis using optimality criteria to perform optimisation of structures. Non-gradient based heurisitic methods to perform optimisation of structures using genetic algorithms, firefly algorithm are few methods which I have used to conduct my research work. I would like to pursue my research work in the area of reliablity based stochastic analysis of structures and perform non-linear topology optimisation to determine the optimal layout of material.

About my background, I am born in a middle class family. My father is a state government employee and mother is a house wife. Monthly salary is the only source of income to live and I come from a modest background and education to prosper is the only way for me to live. I did my undergraduate in Civil Engineering at Hyderabad, India in the year 1994-98. I then continued to study my graduate study with Masters in Structural Enginerng at IIT Bombay in the year 1998-00. I pursued my graduate studies with Masters in Business Administration from Johns Hopkins University, Baltimore, MD in the year 2004-06.

The applications of structural optimisation has to reach the day to day life of an individual. Not many people have any know-how in this area of study. I came across a few who say Topology optimisation is just theoretical study. The study of optimisation should be encouraged in the regular class work of Undergraduate and Graduate study. The application of optimisation to Civil Engineering should be the part of the course work. The modelling of different materials in a concrete mix to determine the material properties of the combined mix is one area where optimisation can be used. The use of machine learning algorithms, deep learning algorithms is showing a new way to the field of optimisation and structural optimisation as well.

I would want to start a computational analysis laboratory along with the course work for Undergraduate and Graduate students in Engineering. Conduct research related to computational analysis in Engineering. The area of Structural Optimisation which is largely dependent on the using of computers to perform the analysis is one of the

prime areas of Engineering where in the knowledge and insight into Civil Engineering, Mathematics and Computers are coming together. The idea to develop the computational analysis as a specialisation in Engineering which is across the disciplines of Engineering and which serves as an interdisciplinary.