**ANIRUDH GOPALA**

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**EDUCATION**

* **Kettering University,** Flint, MI **Oct 2018 - Present**
* Masters in Automotive Systems Engineering

Subjects include – Intro to automotive powertrain, Vehicle Dynamics, Adv Hybrid Electric Vehicles, Vehicle Crash Dynamics, Occupant Safety, Digital Control Systems.

Part of the SAE Clean Snowmobile Team (Engine calibration and controls). Main goal of this competition is to modify a stock snowmobile to lower sound and emission levels. Current snowmobile uses a three-cylinder 900cc turbocharged gasoline internal combustion engine which must be tuned for minimum emissions, fuel economy. range, acceleration and noise.

Stock runs were performed using a waterbrake dynamometer and real time data (emissions and performance) was monitored using M1Tune.

Current stock ECU has been replaced with a MoTeC M150 and changes have been made to the fuel map and ignition tables towards a leaner setup, while exhaust levels are monitored through a portable HORIBA automotive emissions analyzer (MEXA 584-L)

* **Graduate Research Assistant- Kettering University, Flint. MI**

**Under the guidance of Dr. Bassem Ramadan**

Working on thesis titled “Automotive Aerodynamics”, it is a CFD approach to predicting and evaluating the aerodynamic behaviour and design of road vehicles.

Pre-process/prepare CAD parts for CFD (in Design-modeller and SpaceClaim), developing an efficient and robust surface and volume meshing strategy for the smooth simulation process for vehicles. (Tetrahedral, Hex core and poly-hex core)

Determining proper solver settings for the simulation to be as close to the real-world conditions i.e. proper boundary conditions, appropriate viscosity boundary layer discretization, etc. (All simulations done in ANSYS Fluent)

In depth study of mathematical modelling of Turbulence and Wall Functions for correct prediction of the viscous boundary layer for correct prediction of separation of turbulent flows. (Mainly focussing on k-e and SST k-w models)

Current work includes testing out different turbulence models and estimating drag, lift and flow features on a “bluff body” and validation with experimental data. Bluff bodies include the DrivAer and AeroSUV model with detailed underbody and engine bay flows, simulations on various configurations of the GTU (Generic Truck Utility) model to be released by Ford in various configurations.

Good experience with running simulations on Windows workstations and Linux HPC (KUHPC)

* Current GPA- 3.83/4
* **PES University**, Bangalore, India **Aug 2014-May 2018**
* B.Tech in Mechanical Engineering (GPA- 8.23/10)

**WORK EXPERIENCE**

* **Internship**
* **L&T Knowledge Center, Gujrat**, India  **June- July 2015**
* **Technological Services.**
* Worked on competitive benchmarking of two vehicles for a Japanese client. (name undisclosed due to NDA)
* **BOSCH,** Bangalore, India **June- July 2017**
* **Production line**
* Brief introduction to an actual production line mostly concentrating on hard part grinding. Mainly focused on “Overview of hard stage manufacturing process of multi cylinder fuel injection pump.
* **BOSCH,** Bangalore, India **May-July 2018**
* **BOSCH TCI (Technical Center India)**
* Worked on the Vehicle Dyno in emission testing of BS4 and BS6 vehicles. Worked with software such as INCA and PUMA which were used to monitor levels of various emission gases and suitable changes were made in the engine variables to obtain suitable levels of emission.

**RELEVANT SKILLS**

* **SOFTWARE**
* Siemens NX, ANSYS Fluent, Pointwise, ABAQUS, SolidWorks, MATLAB, CNC Train, Simulink, MoTec M1 Tune and Build
* **PROJECTS**
* **Final year B.Tech project**
* **Cornering analysis of an off-road tire**

Project involved the modelling and analysis of an off-road tire. Various analysis was carried out such as – Static loading, computing tire forces for varying slip angel, modal analysis and frequency response.

* **Academic Projects**
* **Electronic Throttle control**

Built a Simulink model of a Throttle by wire system consisting of a Potentiometer, Engine control unit, motor and a PID controller. Both the angle and direction of the motor could be controlled depending on the requirements given by the input pedal signal.

* **Effect on HIC36 and chest acceleration of a 3-yr old HIII ATF due to different methods of child seat installation**

Two simulations of a child seat were run in Working Model where a 3-inch slack was added in the seatbelt and the values of HIC36 and chest acceleration were compared.

* **Mini-Sled impact project**

Mathematically estimate the pre and post impact velocities of the bullet and target sleds in a mini sled impact test.

* **Analysing the handling dynamics of 2013 BMW 328i Xdrive**

Built vehicle model in CarSim from scratch, consisting of suspension hardpoints, corner weights, spring and tire stiffness based on experimental results. Tire model was used to capture tire forces.

This model was simulated for acceleration, braking, lane change, step steer and constant radius cornering manoeuvres to analyse its performance.

CarSim simulation results were compared with hand calculations and manufacturer specifications.

* **Analysis of Argonne Nation Lab Test data (Hybrid Electric Vehicles)**

The main purpose of this project was to apply the principles and techniques learnt during the course to analyse test data collected for a 2016 Chevrolet Bolt. Using previous projects from this course, an A-B-C curve was created to evaluate tractive effort.

An additional model was also made to determine energy consumption for driving cycles.

* **Wind tunnel testing of a scaled model of a Ford Mustang**

Aim was to determine the drag and lift coefficients of a 1:24 scaled model of a Ford Mustang in windows up and down configurations.

* **PACE (Partners for Advancement of Collaborative Engineering Education)**
* Worked on the PACE Global Collaborative Project which was aimed to develop a portable electric powered assisted vehicle that addreses the first mile and last situation and also assists public transportaion and personal transportation.
* This was a two year project where we collaborated with colleges from other countries to work towards the problem statement.
* As a core team member also helped teach design softwares to juniors.

**AWARDS & HONORS – (ACADEMIC & SCHOLASTIC)**

* Kettering University Graduate Tuition Scholarship **2018**
* Won first place in Siemens NX competition organized by PACE on 24th and 25th of Jan **2017**