ANTO OVID G S

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EDUCATION

Bachelor of Engineering, Civil Engineering — *May 2019*
Government College of Technology, Coimbatore - Anna University. — **CGPA: 8.14/10**
(Government of Tamil Nadu merit scholarship 2015-2019).

PROFESSIONAL EXPERIENCE/INTERNSHIP

Founder-Structural designer & Project Engineer, Fresco Structures. — *Aug'18 – Present*

- Started a **(Non-Profit Organization)** with UG colleagues. Generated a revenue through design projects as hobby and used for the educational expense of social and economically backward students.
  - Designed and constructed **two residential house projects** with **BIM services**. As project engineer supervised sites, executed the projects by organizing a group of 20-25 construction workers.
- Designed residential and commercial structures for more than five clients. Projects includes **Commercial, residential buildings (3BHK), and interior works for shops in Coimbatore**.
  - Steel structural - **TEKLA BIM** Model and Cost estimation for **4-floor Gold Market building** for **Oman Client**.
  - Complete Conceptual to Structural Design & BIM Modeling of a **14000Sq.ft Seashore Resort** in **Cape Comorin**, with sustainable A**-frame & Geodesic dome cabins, Swimming pool, Gazebo, Party space and landscaping.**

Structural designer and BIM modeler intern, Swifterz creative services — *Mar'19 – Jul'19*

- Designed projects from **Architectural CAD drawings** using Staad.pro and Excel. Generated **Structural drawings** in RCDC and CAD. Built 3D models in Revit for **BIM** applications such as clash detection, quantity and cost estimations.
- Projects includes **Konni Medical College, hospital, and hostels and apartments**. Learnt NBC, IBC and US codes.
- Learnt basic **Python scripting in Dynamo** for Revit. Helped IT team to develop python based **add-ins for Revit**.

Surveying and Drafting intern.

- Assisted a Professional licensed Civil engineer by surveying **Industrial buildings** for Government approvals. *Dec'17*
- Drafted **Air conditioning duct design** using AutoCAD for Gloria jean's cafe in **Dubai mall, UAE.** *Jul'18*

TEACHING EXPERIENCE

Part time – Civil Software Trainer, Cubik CADD — *Nov'19 – Apr'21*

- Tutored, civil software – **AutoCAD, Revit, Staad pro** and design courses for students.
- Prepared exercise files, materials, doubt clearing sessions, conducting quiz and grading students for certification.

Volunteer Teaching, GCT — *2018 – 2019*

- Assisted faculty by conducting session in **Strength of materials and Surveying** for part-time UG students.
- Organized and tutored special classes and seminars on subjects and software tools to develop industrial skills for sophomores as part of CEA. Advised frosh students in civil department on trends and recent inventions.
- Led the **CEA Quiz club**, organized weekend quiz sessions and National level technical competition at **GEOFEST'19.**
- Improved juniors study skills, including note making, exam preparation and time management.

RESEARCH EXPERIENCE

Research Assistantship [1], [2], [3] Department of Civil Engineering, GCT. Mr. V. Satheeskumar. — *Aug'16 – Dec'19*

- Worked in the design of **Mitigation structure, ogee weir for seawater intrusion in Thamirabharani River, India**.
- Involved in field visit, collected data and executed **GALDIT Modeling using Arc-GIS** to select ideal location.
- Designed an **Ogee type weir** at Mukkani to reduce seawater intrusion. Constructed by the **state government.**

Competition Project - Steel Structures Design, INSDAG'18 - Car service station. — *Sep'18 – Nov'18*

- Designed a steel intensive **car service station** with a **curved space roof truss** using CAD, Staad pro, Tekla and Excel.

Research Assistantship [4], Department of Civil Engineering, GCT. *Guided by* Dr. S. Chithra.

Compressive strength modelling of high performance concrete using ANN & MRA. — *Mar'18 – Apr'18*

- Models constructed for prediction of compressive strength of HPC using **Multiple Regression Analysis** and **ANN.**
- ANN models predict more accurate than MRA due to implication of **Levenberg-Marquardt algorithm.**

Partial replacement of River sand by agricultural waste Coconut Coir pith. — *May'17 – Jun'17*

- Assisted a Master's graduate senior on his thesis with **partial replacement** of **river sand** by waste **coconut coir-pith**.
- Performed tests to determine the **strength** at 7 & 28 days. **SEM images** were used to study the morphology of hydrates.

Research Assistantship [5], Department of Civil Engineering, GCT. *Guided by* Dr. C. Meiaraj. — *Aug'16 – Sep'16*

- Collaborated in Professors' Work on **Fly ash based Geo-polymer concrete** with (**Coconut shells) CS** as aggregate**.**
- Low calcium Fly ash and **NaOH – Alkaline solution** and **Na_2Si_{03}** were used to produce the Geopolymer concrete. Increased the **impact resistance** of the concrete by using **aspect ratio 70 Steel fibers**. Utilized non-biodegradable CS.
- Geo-polymer concrete reduces **Carbon footprint** up to **80%** compared to traditional Portland-cement manufacturing.

RESEARCH (2019-2021)

- Learning **Artificial Immune System algorithm** for **Structural Health Monitoring (SHM).**
- Working on **Structural Optimization** based on **ANFIS** and **Genetic Algorithm** using **MATLAB.**

Completed Research Projects:

Generative Design based Optimization of Solar powered UAV− Hexacopter for SHM. *Oct'20 – Dec'20*

- Conventional 3D-solid Hexacopter was modeled. Performed static analysis using Fusion 360 to find FOS and stress.
- Optimized the solar assisted UAV by Generative design method. Performed static analysis for optimized frame.
- Explored the generative design output CFRP material provided optimal solution. Reduced the mass of the frame by using ABS Plastic and CFRP materials and Flight duration increased significantly.

Current Research works:

Regression Analysis for prediction of Strength properties of Eco Friendly geopolymer lightweight concrete using MATLAB and Excel. *Feb'21 – Apr'21*

- Collected data Concrete strength testing data from bachelors project on FA-Geopolymer concrete with steel fibers.
- Performed EDA of data and Linear regression analysis between strength properties.
- Used MATLAB and Excel to find least error in accuracy of predicting split tensile and flexural strength.

Comparison of ML models in MATLAB & Python for predicting concrete strength. *Mar'21 – Present*

- Completed a wide literature survey of various ML models (SVM, ANN, and TR) to predict the strength properties of the FA-Geopolymer concrete with steel fiber and Coconut shells as Coarse aggregate.

Computer vision based Autonomous UAV-SHM using vSLAM algorithm. *Apr'21 – Present*

- Performed literature review on methods of SHM (Lamb wave, Fiber optic sensors and computer vision application)
- Learning Gazebo simulator (ROS) for tracking autonomous UAV/UGV for SHM applications.

PROJECTS (2019-2021)

Finite Element Analysis using MATLAB FEM codes and ANSYS scripts *Apr'21*

- Imported the Ansys model into MATLAB Partial differential **(PDE) toolbox** for structural analysis using **FEM Code.**
- Performed static structural analysis on 1D, 2D and 3D solid elements in ANSYS using **Ansys scripts** as input.
- Compared FEA results of **Trusses, 2D Plates and 3D Solid** elements by both MATLAB FEM Code and Ansys scripts.

Structural Analysis program using Blender 3D & Python. *Mar'21*

- Developed an Analysis program for **2D Truss, frame and 3D space frame**, by **Matrix stiffness method** using **Python.**

Mathematical Programming - using Python and MATLAB.

- Coded Genetic Algorithm in ML, Particle Swarm Optimization and Firefly optimization algorithms.
- Programmed and solved Linear programming **transportation** problem and Principal Component Analysis problems.
- Implemented fourth order Range-Kutta method using Prey-Predator system as example and Least Square method.
- Programmed Numerical root finding (Secant, Newton Raphson and Bisection methods).
- Solved Numerical computation involving [Eigen vectors & value, Numerical Integration using integral and Quadgk, Ordinary Differential Equations (ODEs)

Automation in construction design using PyAutoCAD & RevitPythonShell. *Feb'21*

- Coded snippets for the design and visualization of concrete footings, beams and Columns as per IS code.
- Created python snippets using PyAutoCAD to automate beam design in AutoCAD.

Python script for Beam Analysis and Reinforcement Visualization.

- Python script for calculating and plotting Maximum **SF, BM and deflection** for simple beams using matplotlib.
- Model a 3D Concrete beam using Python script. Visualized the **rebar detailing using 3D** Scatter plot.

Explosive Finite element analysis using Abaqus. *Dec' 20*

- Air blast on concrete slab using **Johnson-Holmquist** (J-H) model and **Concrete damaged plasticity** (CDP) model.
- Explosive simulation on **(a) concrete beam** and **(b) concrete beams with rebar and Steel metal cover** using **Smooth particle hydrodynamics (SPH)** explosion method.

Impact loading (high and low) on steel and concrete beams in Abaqus *Oct' 20*

- Performed a repetitive low impact loading on the steel beam using **Johnson-cook damage model**.
- Performed a High impact loading on a Reinforced Concrete block using rigid projectile.

Reinforcing damaged column with CFRP under sequential load & Compressive loading *Sep' 20*

- Concrete column without any reinforcement was damaged (around 0.05%). **CFRP layers** were used in the damaged area to increase the strength of the column under sequential load.
- Strengthening concrete column under compression using **(a) steel bars** & **strips** and **(b) Steel bars** & **CFRP laminates.**

XFEM−Study on crack growth on Concrete beams in Abaqus. *Aug' 20*

- Modeled 2Dconcrete beam with pre-crack and studied the **P-Δ** curve and crack propagation in the beam using **Static structural** and **Dynamic Implicit-XFEM solver** methods under 3-point bending.
- Modeled 3D concrete beam with reinforcement and studied the **P-Δ** curve and crack propagation in the beam using **XFEM** method under 4-point bending.

FEA of different concrete beams under 3-point bending condition using Abaqus.

- Performed FEA of a concrete beam under bending. Strengthened the model with **(a) Concrete only**, **(b) Composite laminate**, **(c) Rebars and strips** and **(d) Metal foam**. Plotted the **P-Δ curve** and compared the damage stages.

ANSYS Honeycomb structural analysis and Shape/Topology optimization of beam: *Jul' 20*

- Performed a static structural analysis of a **composite sandwich-honeycomb** model using Ansys honeycomb modeler.
- Modeled a **steel beam** with fixed ends, performed **static analysis and optimized topology** by setting exclude region parameters. The final optimized section was validated again by performing a static FEA.

Institution Campus Drainage and Roadway design using Openroads and Infraworks. *Apr'20*

- Enhanced road design with super elevation, intersection and roundabouts. Profile optimized of road design using sight distance, earthwork and material quantifications.
- Analyzed watershed and added Culverts and drainage networks along the roads.

3D linear elastic analysis of structure using MATLAB - MASTAN2.0. *Mar'20*

- Performed 3D linear elastic structural analysis using MATLAB with inputs through MASTAN pre-processor.

3D, 4D BIM & VCD of the Tall (Etabs) structure using Revit, Primavera, Navisworks and Synchro 4D.

- Modeled the 3D-structure from Etabs in Revit. Used Primavera to create construction-scheduling data for VDC.
- Performed clash detection in Navisworks. Created tasks and animation based on scheduled task in Synchro 4D.

Generative design & parametric modeling using visual scripting. *Jan'20*

- Created parametric nature inspired architectural building using Grasshopper with BioMorpher add-on.
- Executed Structural Analysis of a parametric building using Karamba 3D plugin for Grasshopper.

Seismic Analysis study on a Tall structure using ETABS

- Performed **time history** and **response spectrum analysis** of a 15-floor building subjected to Altadena **Earthquake loading** using **Etabs** and checked for its design performance.

ACADEMIC PROJECTS (2015-2019)

Computational Analysis and design of Flyover Bridge [6]**,** *guided by* Mr. V. Satheeskumar. *Jan'19 – Apr'19*

Bachelors-Design project, Led a team of four to **design a highway flyover** over 500m to solve real life traffic congestion.

- Involved in soil test by **state government**. Recorded test data in **Borehole log sheet**. Surveyed using **Total station**.
- Designed **Geometric alignment** for **4 lane (16.2m wide)** flyover using **MX Road**. 25 piers located at 20m spacing.
- Conceptual model was designed and performed Traffic simulation analysis using Infraworks and Survey data.
- Designed **Pier, Bearing, Slab deck** and **PSC Box girder and I girders** by using software such as **LEAP Bridge concrete** and **CSI Bridge**, as per ***IRC- 5, 6, 112 and IS - 456.*** Construction of the bridge is in progress by the state.

Solar powered UAV with IoT Thermal sensors–Monitor hostel water pipelines [7]**.** *Feb'19*

Assisted a Bachelors Thesis-Design Team – **Design & IoT - Team, Multidisciplinary project – Civil/Mechanical dept.**

- Worked in the design team, modeled and designed the Quadcopter using Solidworks. Calculated flight duration.
- Coupled Raspberry pi and AMG8833 IR Thermal Camera Breakout to capture, manipulate and collect data from the image. It can be attached with the UAV and used in thermal imaging at inaccessible locations.

Learning outcome – ***Design of Drone, Solar-charging time calculations, Application of IoT-UAV in monitoring works.***

Design of RCC Circular water tank using staad.pro. *Feb'19*

Course project **– *Reinforced cement concrete design (RCC), Water supply.*** HOD-Dr. D.K. Padmini.

- Designed **an overhead circular water tank** to feed a local village population with capacity of **1000 cum** in STAAD.
- Reinforcement detailing of structural members like Column, Ring beam, Slab and Footing were drafted in CAD.

Learning outcome – ***Population forecast and design of concrete structural elements***.

Seismic analysis and design of Hospital building. ***(Mini-project)*****,** *guided by* Dr. S.P. Jeyapriya. *Dec'18*

- Designed a **G+4 Hospital** building located at seismic **zone 4** with hard soil using both **Staad pro and manual method**.
- 3D space frame with six degrees of freedom at each node. Building is analyzed using **Response Spectrum method.**

Learning outcome – ***Seismic loading, analysis and design as per IS 456, 1893 (part 1-2016); ductile detailing IS 13920:1993.***

Crack propagation analysis in Abaqus, Static analysis of cantilever beam using Ansys. *Aug'18*

Course project – ***Finite element method (FEM).*** Dr. C. Meiaraj.

- **Static and modal analysis** of steel I-section cantilever beam-using **Ansys** and checked with manual calculations.
- **Explicit dynamic analysis** and **crack propagation** in concrete rectangular beam was studied - **Abaqus xFEM**.
- Assisted a PhD scholar in **Basalt fiber reinforced concrete** modeling and analyzing using Abaqus.

Learning outcome – ***Basics and theories of FEM, Numerical modeling and basics of computational mechanics.***

Slope stability analysis of soil using Plaxis 2D & Settlement of soil under isolated footing, *Jan'18 – Feb'18*

Course project – ***Soil Mechanics & Foundation engineering.*** Dr. S.P. Jeyapriya.

- Factor of safety for finite slopes with varying angle of inclinations as 30, 45, 60 and 90 were calculated by modeling in **Plaxis 2D** and checked using **Taylor's stability number**.

Miscellaneous Projects (AR, IoT, Programming**).** | https://github.com/Barcaboy-Ovid|

- Created Python program to implement piecewise exact method to model **general dynamic loading**.
- C-program to find maximum bending moment, end slope and deflection based on loading conditions.
- **AR:** Built an android app using Vuforia for Unity. Renders 3D models when base image is detected using camera.
- **3D-Environmental Modeling:** Created environments using Revit and World Machine to link up with **unreal and unity**, with detailed lighting, sprites and 3D character physics. Modeled 3D characters using Blender and Sculptris.
- **IoT:** Programmed an Arduino Uno to play piano notes mathematically and synchronized with LEDs.

PRESENTATIONS

- Designed a model urban city as per prompt after quiz and presented "***Urban city plan"*** – *based on city of Vancouver and Barcelona* and won first prize in *ACROPOLIS* a city planning competition at **CEG, Guindy**.
- ***"Computational analysis and Generative design in AEC"*** at **MOMENTS'19,** National level symposium of **NIT-T**.

SKILLS AND TOOLS

Analysis & Design: AutoCAD, Civil 3D, RSA; Staad.pro; Csi-Etabs, Sap2000, SAFE; Tekla (Tedds, SD), Midas Gen.
Infrastructure: Infraworks; QGIS; Csi-Bridge, Leap Bridge (Conc & steel), Structural Bridge, MX-Road, RM Bridge.
Simulation: Ansys, Abaqus, OpenFOAM; Mathematica, Mathcad, Octave, Neurosolutions; Rt*; OpenSees*.
BIM 3D, 4D & Management: Revit, Navisworks, BlenderBIM; MS Office, Synchro 4D, Primavera.
Visualization [AR, VR]: Unreal (UE4), Unity 3D; Lumion, Twinmotion, LumenRT. **IoT:** Arduino, Raspberry Pi 4.
Parametric & Generative Design: Fusion 360; Dynamo, Grasshopper; PyAutoCAD, PyRevit.
Programming: C, C++, Python, MATLAB, R *, ROS*, Julia*. **Languages:** English, Tamil, Spanish*, French*.

CERTIFICATIONS & CONTINUING EDUCATION

NPTEL: RC-Road Bridge, Special Concretes, Repair of concrete structures, PSO/GA- Non-Traditional and Traditional Optimization tools, Machine Learning (ML) †, Structural dynamics †, Optimization methods in Civil Engineering*, Robotics*, Project Planning and control*, Introduction to IoT and Industry 4.0*.
Coursera: 3D printing†, AI, Deep learning and Neural Network, Mathematics for ML*, MATLAB Programming*.
EdX: Data science for Construction engineers, Pre-Calculus, Eco-design for cities and suburbs, Bridges & Vaults, Mathematical modelling, A hands on Introduction to Engineering simulations†, Forensic Engineering.
LinkedIn - Learning Paths: Algorithmic & Generative Design (Dynamo and Grasshopper); AR/VR- Unreal Engine; Construction Management; Infraworks; Synchro; Power BI; Sustainability (GBS: Energy Analysis), 3D Scanning.
Autodesk Certified Professional: AutoCAD, Revit, 3DS Max, Generative design-Fusion 360.
Internshala & Udemy: Staad.Pro, Data science & Machine Learning.

† Audited Courses * Ongoing Courses

CO–CURRICULAR ACHIEVEMENTS

- Won **1st prize** in **National level Technical Quiz** and **several other competitions** conducted **at NIT-T** and **CEG**.
- Best civil design project – 2019 among 30 teams.
- Secured **3rd place** in **civil talent search quiz** organized by **COCENA.**
- Participated in **INSPIRE,** a science internship camp by **Department of Science and Technology (DST), Delhi.**

MEMBERSHIPS/VOLUNTEERING

INSDAG (Institute for National Steel Development and Growth).
Volunteer, organized **Chennai City FC's I-League Soccer matches** at Nehru stadium- Coimbatore.
Autodesk Project Refinery beta – Feedback community.
Trained, Alma mater **U-16 soccer team** for regional matches and Member of **Hardcore Quizzers** - quiz club.

EXTRA CURRICULAR ACTIVITIES & ACHIEVEMENTS

- Led the Civil engineering team and won the Inter-arms soccer tournament – 2018.
- **GCT FC** team **Vice-captain 2017** and **Captain 2018.** Captained soccer team, won 2nd prize at AMS sports meet 2014.
- **Hobby** – 3D sculpting (Sculptris & Zbrush); **Terrain/Environment modeling** – Unreal Engine; **3D Assets** – Blender.

REFERENCES

Mentors, and Research Supervisors – Academic References (Government College of Technology, Coimbatore).

Dr. C. Meiaraj,	Dr. S. Chithra.	Mr. V. Satheeskumar.	Dr. S.P. Jeyapriya.
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