

Sumit R. Zanje

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GRADUATE, DESIGN ENGINEERING (MECHANICAL), INDIA

Education

Birla Institute of Technology and Science, Pilani, Rajasthan, 333 031- India
Master of Engineering, Design Engineering, Jul' 15 - Jul' 17
CGPA: 8.74/10

K.G.C.E Karjat- University of Mumbai, Maharashtra, 410 201- India
Bachelor of Engineering, Mechanical Engineering, Jul' 10 - Jul' 14
Agg. Percentage: 74.30% (First Class with Distinction)

JSM College Alibag- Maharashtra Board, Maharashtra, 402 201- India
Higher Secondary, Science & Technology, Jul' 09 - Jul' 10
Percentage: 86.30%

KES A.V. High School Alibag- Maharashtra Board, Maharashtra, 402 201- India
High School, Jul' 07 - Jul' 08
Percentage: 89.83%

RESEARCH INTERESTS

Computational Fluid Dynamics (CFD), Engineering Product Design, Machine Design, Computer Aided Design (CAD), Finite Element Analysis, Engineering Mathematics.

PUBLICATIONS AND PRESENTATIONS

Sumit R. Zanje, Ishant Jain, Sandeep Dhar, "Design and Analysis of Novel Antifouling Device (AFD) by FEM" to appear in *International Conference on Advances in Thermal Systems, Materials and Design Engineering* (ATSMDE2017), Mumbai, India.

Poster presentation on "Optimization and Analysis of Modular Cantilever using Finite Element Method" in *Comsol Conference 2018*, Bangalore, India. ([Link](#)) 10th Aug' 18

AWARDS & ACHIEVEMENTS

Awarded with the *Raychem Inventor-Bronze* award for 1st invention filed for the grant with application number 201721037686.
Worked on the Invention and patent of product Anti-Fouling Device (AFD) while working at "Raychem RPG Innovation Centre- Gujarat, India"- June 17-till date.

RESEARCH PROJECTS

Design and Computational Analysis of Railway Overhead Equipments (OHE)
Project Manager: Dr. Sudhakar Reddy and Mr. Ishant Jain Jan' 18 - Present

- Devising novel concept for "Modular Cantilever" to support both the overhead power transmission lines i.e. catenary and contact cables, capable of swirling along the track as well as adjustable in transverse direction and "Automatic Tensioning Device" to regulate tension in the OHE conductors.
- Implementing "Theory of Inventive Problem Solving" ([TRIZ](#)) to find all the ways of solving a problem, to find new concepts and the routes for developing new product.
- Exploring various methodologies to optimize the conceptualized design such as topology, shape, and parameter optimization techniques to improve overall design and structural strength.

Design and Computational Analysis of Anti-fouling Device (AFD)
Project Manager : Dr. Sudhakar Reddy and Mr. Ishant Jain Jun' 17 - Present

- Developed understanding for different anti-fouling techniques with drawbacks and limitations to devise a novel concept with zero energy consumption.
- Invented robust design of anti-fouling device composed of durable set of components forming chain structure. Device utilizes sea wave energy and ocean current force to set continuously into reciprocating and revolving motion to clean the offshore constructions by rubbing action.
- Formulated simulation methodology to analyze the design using COMSOL Multiphysics.
- *Filed patent and presented paper on design and analysis methodology at International conference.*

Modeling the Transient and Steady-State Flow Over a Stationary and Inline Oscillating Circular cylinder

Supervisors : Prof. Dr. Amol Marathe

Feb' 16 - May' 17

- Developed computational model for flow past stationary and in-line oscillating cylinder at $Re = 10,000$ using Reynolds averaged Navier-Stokes (RANS) based turbulence model in OpenFOAM.
- MATLAB code developed for the numerical model of transient flow past circular stationary cylinder using computational data and results verified using the [paper](#) by Ali H. Nayfeh (2005).
- Formulated reduced order model using parametrically forced van der Pol oscillator to model lift coefficient of the in-line oscillating cylinder.
- Method of Multiple Scale (MMS) was implemented using MATLAB to reliably predict the steady state lift coefficient of in-line oscillating circular cylinder.
- [Dissertation Report](#)

Computational and Numerical Study of Flow Past Bluff Bodies

Supervisor : Prof. Dr. Amol Marathe

Jan' 16 - Jul' 16

- Explored the theories regarding CFD along with explanations about [OpenFOAM](#) and its solvers.
- Developed understanding about effect of change in profile on vortex shedding patterns and other phenomena such as resonance, lock-in using FVM based simulation technique and validated with literature values.

ACADEMIC PROJECTS

Parameter Optimization of Electrochemical Polishing of 304L Stainless steel by Gray Relational Analysis

Supervisor : Prof. Dr. V. J. Pillewan

Jul' 13 - May' 14

- Analyzed the impact of electro-polishing on surface finish and material removal rate on 304L stainless steel using Design of Engineering (DOE).
- Formulated electrolyte using AR grade chemicals- Orthophosphoric acid (60%), sulphuric acid (20%) and distilled water (20%) and performed experiments to measure the response under various combinations of three factors (temperature, current density and time of electrolysis).
- Optimized the process parameters using Taguchi full factorial matrix in Minitab to get the optimum process parameters and the significance of each factor on the response.

COURSE PROJECTS

CFD Simulation of Boiling Flows Using the Volume-of-Fluid Method (ME Course Project)

Course : Computational Fluid Dynamics | Supervisor : Prof. Dr. Shyam Sundar

Aug' 16 - Dec' 16

- Studied fundamentals, need and applications of volume of fluid method using formal techniques.
- Implemented phase change model into open source package OpenFOAM and validated with [paper](#).
- Implemented interface capturing formulation in nucleate boiling application using *interFOAM* VOF solver.
- [Report](#)

Computational Design and Modeling of Composite Bèzier Surfaces.

Course : Computer Aided Design | Supervisor : Prof. Dr. Sandeep dhar

Jan' 15 - Apr' 15

- Studied surface and solid modeling techniques using different algorithms.
- Implemented Subdivision and Degree Elevation Method to produce a sequence of so-called control polygons which converges to the underlying curve.
- Developed MATLAB code to generate 3D objects using composite surfaces.

TEACHING
EXPERIENCE

BITS Pilani- Teaching Fellow

Course : Computer Numerical Control

Dec' 15 - May' 17

- Taught and facilitated practical sessions for first year undergraduate students with average batch of 8 students per session.
- Planned, implemented, and evaluated session exams.

BITS Pilani- Teaching Fellow

Course : Product Design- Work Integrated Learning Programmes (WILP) *Dec' 16 - May' 17*

- Graded term question papers for the class of more than 120 students.

BITS Pilani- Teaching Fellow

Course : Metrology workshop

May' 16 - May' 17

- Evaluated practical sessions and cleared doubts to ensure students learned at full potential.

POSITION OF
RESPONSIBILITY

Private Tutor, Rajasthan, 333 031- India

National Service Scheme,

Dec' 16 - May' 17

Tutored 5 students from class 5 to 9 in science and maths at Pilani village, Rajasthan, India

MESA-PESA Student Association Coordinator, Maharashtra, 410 201- India

Undergraduate College- University of Mumbai

Oct' 12 - May' 14

MAJOR
COURSES

Finite Element Analysis, Advance Engineering Mathematics, Computational Fluid Dynamics, Product Design, Engineering Mechanics, Machine Drawing, Strength of Material, Theory of Machines, Fluid Mechanics, Heat and Mass Transfer, Machine Design, Mechanical Vibration, Mechatronics, Operations Research, CAD/CAM/CIM, Computer Programming.

COMPUTER
SKILLS

Softwares: COMSOL Multiphysics, Solidworks, ANSYS, Autodesk Inventor, AutoCAD, Open-FOAM, FreeFEM++

Certification: Advanced COMSOL Multiphysics Training, Solidworks

Tools: MATLAB, Maple, Minitab, ParaView, Gnuplot, L^AT_EX, MS Office.

Languages: C, C++

LANGUAGES

English, German (Beginner), Hindi, Marathi