

MUKUNDA MADHAVA NATH

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SUMMARY

Experienced (~10 years) simulation/application engineer with competencies in nonlinear implicit/explicit FEA, process automation, and product design demonstrated through publications and patents in automotive, consumer electronics, & polymer manufacturing industry. Skilled in plasticity/ hyperelasticity material modeling, design of experiments (DoE), and structural optimization.

EXPERIENCE

SABIC Technology Centre Bangalore (STCB), IN

Senior Scientist - Predictive Engineering & Design, Global Application Technology

Predictive Engineering & Design

Jul'2022 - Present

- Develop methods for test-data analysis, material-model parameterization, verification and validation of polymers using advanced material models in plasticity, hyperslasticity, viscoelasticity, and damage evolution in LS-Dyna, Abaqus, and Radioss.
- Responsible for application design and structural performance (static, vibration, and crash) for light-weighting, down-gaging, part-integration, and design-flexibility with SABIC polymers using simulation tools for automotive, electrification, pipe, and various emerging segments in multiple regions.

Samsung R&D Institute Bangalore (SRIB), IN

Chief Engineer - Mechanical Simulation

Advanced Technology Lab

Dec'2017 - Jun'2022

- Developed nonlinear implicit simulation methodology by validating capabilities and limitations of solver (OptiStruct/LS-Dyna) and improving modeling practices to reduce computation time.
- Developed guidelines for material characterization of elastomers using hyperelastic and viscoelastic models for large deformation nonlinear implicit simulations such as foldable display bending. Automated mobile bending (nonlinear implicit) and drop (explicit dynamics) simulation setup in HyperMesh.
- Responsible for mechanical design, simulation, and structural optimization activities for Galaxy M & A series smartphones and Galaxy Fold & Flip series display assembly. Three patents approved for filings in India/US.

General Motors Technical Centre India (GMTCI), IN

Senior Engineer - Safety CAE (Pedestrian Protection)

Engineer - Safety CAE (Safety Crashworthiness & Pedestrian Protection)

Vehicle Engineering

Oct'2016 - Nov'2017

Aug'2013 - Oct'2016

- Promoted mid-year to Senior Engineer position and awarded by VP for exemplary execution of a project (1000+ simulations) and for creating active hood modeling guideline, reduced modeling effort from ~8 hours to 1 hour. Reduced ~2 weeks worth of effort in projects running for ~8-10 weeks.
- Improved safety star ratings of Chevrolet Camaro and Cadillac ATS/CTS by developing production-ready counter-measures for NCAP regulations.
- Responsible for end-to-end evaluation of crashworthiness and pedestrian protection ratings for full vehicle models. Experienced in setting up and debugging explicit dynamics simulations and correlating them to test results.

Indian Institute of Science Bangalore, IN

Project Assistant, under Prof. G. K. Ananthasuresh

M2D2 Lab, Dept. of Mechanical Engg

Aug'2010 - Jun'2011

- Benchmarked an FEA package developed at IISc (HyFEM) to commercial packages - Abaqus, Ansys, and Comsol Multiphysics for structural and vibration problems. Developed scripts for converting input files between different packages.

EDUCATION

Indian Institute of Science Bangalore, MDes - Product Design and Engineering 2011-13
Design, Fabrication, and Testing of a Novel and Cost-Effective Soil Moisture Sensor(Prof. G K Ananthasuresh)

National Institute of Technology Silchar, BTech - Mechanical Engineering 2006-10
Design and Analysis of Thermal Actuators for MEMS Applications(Prof. P K Patowari)

PATENTS

1. **Method and wearable device for managing contact pressure for physiological applications.**
Application IN202241069138 filed November 2022, patent pending in Indian Patent Office.
2. **Foldable electronic device and method for determining health of display assembly.**
Application US20230184534 filed February 2023, patent pending in USA Patent Office.
Application WO2023106888 filed December 2022, patent pending in World Intellectual Property Organization (WIPO).
Application IN202141057460 filed December 2021, patent pending in India Patent Office.
3. **An electronic device and mesh type digitizer.**
Application IN202141041331 filed September 2021, patent pending in Indian Patent Office.
4. **A seat assembly for a cycle (Granted Patent No. 382332).**
Application 2105/CHE/2013 filed May 2013, Granted November 2021, by Indian Patent Office.

PUBLICATIONS

1. **Modeling the Mechanical Performance of Bendable Display Under Cyclic Loading.** In proceedings of *2019 IEEE International Flexible Electronics Technology Conference (IEEE IFETC 2019)*, August 2019, Vancouver, Canada. doi: 10.1109/ifetc46817.2019.9073716
2. **Characterization of a Flexible Device Using a 3-Point Rolling Test.** In proceedings of *2018 IEEE International Flexible Electronics Technology Conference (IEEE IFETC 2018)*, August 2018, Ottawa, Canada. doi: 10.1109/ifetc.2018.8583958
3. **Design of an Ergonomic Bicycle Seat.** In proceedings of *International Ergonomics Conference - Humanizing Work and Work Environment*, December 2014, IIT Guwahati, Assam, India.
4. **Comparative Study of Different Micro-Thermal Actuators for Micro-Electro-Mechanical-System Application.** *Journal of Advanced Manufacturing Systems (JAMS)*, Volume 11, Issue 1(2012) pp. 17-26, January 1, 2012. doi: 10.1142/S0219686712500023
5. **Comparative Study of Different Micro-Thermal Actuators for MEMS Application.** In Proceedings of the *3rd International and 24th All India Manufacturing Technology, Design and Research (AIMTDR) Conference*, December 2010, Visakhapatnam, India.
6. **Analysis of a Monometallic Two Arm Horizontal Thermal Actuator for MEMS.** In Proceedings of the *2nd International Conference on Mechanical and Electronics Engineering (ICMEE)*, August 2010, Japan. doi: 10.1109/icmee.2010.5558570

COMPETENCIES

- *Application Engineering:*
Automotive Crash Simulation, EV Battery Module Design, Mobile Device Structural Integrity Evaluation, Plastic Component Design
- *Simulation Tools:*
LS-DYNA, Abaqus, OptiStruct, LS-OPT, HyperMesh, LS-PrePost
- *Programming & Automation:*
Python, Bash, Excel VBA, MATLAB

OTHERS

- Technical Committee Member of NCMDAO 2023, IIT Guwahati, December 2023.
- Samsung Citizen Award by MD, SRIB, May 2019.
- Letter of Appreciation by VP, GMTCI, September 2016.
- BlackBelt & GreenBelt in Design for Six Sigma (DFSS), General Motors University, May 2015.