MUKUNDA MADHAVA NATH

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WORK EXPERIENCE

Samsung R&D Institute Bangalore Technical Lead (Mechanical Design Analyst)
Advanced Technology Lab, CTO, Bangalore, India December 2017 - Present

- Working with cross function design and analysis teams across sites on the next generation systems. Use simulation and experimental techniques to analyse structural weaknesses in a design while working towards improving current modeling methodology.
- Performing structural simulation/analysis at a component and system level.
- Characterization of new materials. Design the experiments to characterize these materials and their material modeling.
- Identify advancements in simulation technology and its incorporation into current process.
- Working with mechanical design, manufacturing, materials engineering teams and external vendors.
- Using research outlook to identify new problems in the domain.
- Simulating manufacturing processes.
- Python/TCL scripting for automation of processes and improving efficiency

General Motors Technical Centre India Senior Engineer - Safety CAE
Safety Crashworthiness & Pedestrian Protection CAE, Bangalore, India August 2013 - November 2017

- Nonlinear explicit dynamics simulations intensive of contact and material nonlinearity in LS-DYNA.
- Structural and occupant simulation for full and sled vehicle models.
- Correlation of CAE model to physical test results.
- Development of counter measures to meet performance target values.
- Automation through scripting to increase efficiency
- Professional working efficiency and capability in LS-DYNA, Primer, and Hyperworks Packages.

Indian Institute of Science Bangalore Project Assistant
Computational Nano-Engineering Group, M2D2 Lab, under Dr. G. K. Ananthasuresh August 2010 - June 2011

- Benchmarking of an FEA package developed in IISc (HyFEM) to commercial packages.
- Finite element simulation of micro compliant mechanisms.

Central Mechanical Engineering Research Institute Durgapur Summer Intern
Engineering Design Group, under Mr. Subrata Kumar Mondal June, 2009 - July, 2009

- Finite element analysis of an engine mount of Sonalika tractor developed at CMERI.

Indian Institute of Technology Guwahati Summer Intern
Rural Technical Action Group - NE, under Dr. Sashindra K. Kakoty May, 2008 - July, 2008

- Improvement of a modified bicycle for load carrying applications.

EDUCATION

Master of Design (MDes), Product Design and Engineering, 6.4/8.0 July 2011 - July 2013
Centre for Product Design and Manufacturing(CPDM). **Indian Institute of Science (IISc) Bangalore**, India
Thesis - Design, Fabrication, and Testing of a Novel and Cost-Effective Soil Moisture Sensor Meter for Farming Applications in India.
Advisor - Dr. G. K. Ananthasuresh, Professor, Dept of Mechanical Engineering, IISc Bangalore

Bachelor of Technology(BTech), Mechanical Engineering, 8.29/10.00 July 2006 - June 2010
Department of Mechanical Engineering. **National Institute of Technology (NIT) Silchar**, India.
Thesis - Design and analysis of thermal actuators for MEMS applications.
Advisor - Dr. P. K. Patowari, Associate Professor, Dept of Mechanical Engineering, NIT Silchar.

PUBLICATIONS/PATENTS

1. **Mukunda Madhava Nath**, Ami Sampat, G. K. Ananthasuresh. **Design of a Cost-effective Soil Moisture Sensor for Indian Farming Community**. *Manuscript under preparation.*
2. **Mukunda Madhava Nath**, Lalit Singhal, Dibakar Sen. **A Single DOF Steerable Hexapod Walking Vehicle**. *Manuscript under preparation.*
3. **Mukunda Madhava Nath**, Nitin Gupta, Dibakar Sen. **Design of an Ergonomic Bicycle Seat**. In proceedings of *International Ergonomics Conference - Humanizing Work and Work Environment*, December 2014, IIT Guwahati, Assam, India.
4. Dibakar Sen, **Mukunda Madhava Nath**, Nitin Gupta. **A bicycle seat assembly**. *Indian patent application 2105/CHE/2013.* Patent pending.
5. P. K. Patowari, **M. M. Nath**, A. S. Bharali, J. Gogoi, C. K. Singh. **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.
6. P. K. Patowari, **M. M. Nath**, A. S. Bharali, J. Gogoi, C. K. Singh. **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.

COURSEWORK

Finite Element Analysis for Materials Engineers, Advanced Micro-Nano Systems, Mechanism Design, Computer Aided Design, Creative Engineering Design.

PROJECTS

Design for manufacturing and full scale prototyping of a hexapod mechanical walking vehicle.
Guided by Dr. Dibakar Sen May 2012 - Present
This project is an exploration of the capability of mechanical components for complex actuation and control. The trajectory of human foot is similar to the alphabet D, rotated anticlockwise 90 degrees. A similar coupler curve can be found in the Hoeken's linkage. An optimized mechanism (in terms of number of links and coupler curve) is designed as a functioning leg and six of them is connected to a rectangular frame with a tripod gait. A single rotating motion is connected to the links through chain drives to control all the legs in a particular gait. The vehicle can be steered using a mechanism that facilitates differential stride for opposing legs.

Design, Fabrication, and Testing of a Novel and Cost-Effective Soil Moisture Sensor Meter for Farming Applications in India..
Guided by Dr. G. K. Ananthasuresh Aug 2012 - June 2014

This is the dissertation project for the degree of MDes from CPDM, IISc in a team of two. The final prototype is appreciated by many ground users, agricultural scientists and funding agencies alike.
We designed and prototyped a soil moisture sensor using a absorbent (Sodium Polyacrylate) which expands by absorbing water from the soil and provide an input force to a compliant mechanism. The compliant mechanism, in turn, gives an output in terms of displacement in another point that is correlated to an analog scale.

Design of an ergonomic bicycle seat.
Guided by Dr. Dibakar Sen Aug 2011 - Dec 2011

This project aims to design an ergonomic bicycle seat that solves three mutually dependent problems: perineum pressure, suspension design and perceived instability in no-nosed seats.
Two U-shaped rods paralled rods are used to provide stiffness and spring effect to the seat structure. A cushion with anthropometric dimension and suffcient height is provided at the rear end i.e. towards the U-arms for seating. A frontal damper in the valley of the U-shape takes care of vibration mitigation.

Design and prototyping of a link for snake like hyper-redundant endoscopy device.
Guided by Dr. B. Gurumoorthy and Dr.Asitava Ghosal Aug 2012 - Dec 2012

This project is aimed at designing a snake like robot to be used for endoscopy and actuated by shape memory

alloy (SMA) wires. The final design incorporated links connected by a ball joint in the form of contacting surfaces and relatively actuated by SMA wires.

Design and analysis of two arm thermal actuators for MEMS applications.
Guided by Dr. P. K. Patowari Aug 2009 - June 2010

This is the dissertation project for undergraduate program in Mechanical Engineering from National Institute of Technology Silchar.
This project considers three models of two arm monometallic horizontal thermal actuator for design and analysis. Analysis for the deflection, stress developed, temperature attained by the actuator is carried out by applying different voltages. Three materials, namely Silicon, Poly-Silicon and Titanium, are considered for analysis. This project aims at finding the suitability of the materials and configuration of thermal actuators for their applications with respect to applied voltage.

SOFTWARE SKILLS

Simulation Packages: LS DYNA, Ansys, Comsol, ROS, MSC Adams.
FEA Pre-Processing & CAD: Hypermesh, Primer, LS Prepost, NX Unigraphics, Solidworks.
Programming: Python, Shell, MATLAB, C++.
Presentation/Documentation: MS Office, LaTeX, Beamer.

SCORES

IELTS (appeared 14th January, 2017) Score - 8.00 (Listening -8.00 Reading - 9.00 Writing - 7.00 Speaking - 7.00)
GRE (appeared 28th October, 2014) Score - 325 (Verbal-165, Quant-160), AWA - 3.5
TOEFL (appeared 9th November, 2014) Score - 110 (Reading 29, Listening 28, Speaking 23, Writing 30)
GATE, Paper in Mechanical Engineering (2011) - Scored above 99 percentile

HONORS/ACHIEVEMENTS

- Design for Six Sigma (DFSS) *BlackBelt*, General Motors University
- Graduate Scholarship from MHRD, Government of India for pursuing masters' degree.
- Certificate of Proficience from the Government of Assam for securing state rank of 24 and 32 in high school board examinations.

PERSONAL DETAILS

Male. Indian Citizen. *DoB* - 31st December, 1988

Communication Address: C/O - Dibakar Sen, CPDM, IISc Bangalore, Bangalore, Karnataka, India - 560012
Permanent Address: C/O - Chandra Kanta Nath, Vill - Dakshin Chuburi, PO/PS - Sipajhar, Dist - Darrang, Assam, India - 784145

REFERENCES

- **Dr. Dibakar Sen**, Professor, Center for Product Design and Manufacturing and Department of Mechanical Engineering, Indian Institute of Science Bangalore, India.
  dibakar@cpdm.iisc.ernet.in, +91-80-2293-3230/3137
- **Dr. G. K. Ananthasuresh**, Professor, Department of Mechanical Engineering, Indian Institute of Science Bangalore, India.
  suresh@mecheng.iisc.ernet.in, +91-80-2293-2334/3363
- **Dr. B Gurumoorthy**, Professor, Department of Mechanical Engineering and Chairman of the Centre for Product Design and Manufacturing, Indian Institute of Science Bangalore, India.
  bgm@cpdm.iisc.ernet.in, +91-80-2293-2304
- **Dr. P. K. Patowari**, Associate Professor, Department of Mechanical Engineering, National Institute of Technology Silchar, India.
  ppatowari@yahoo.co.in, +91-94-3552-3391