# Swapnil More

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## EDUCATION

**Ph.D.**
**Nanoelectromechanical Systems**
**IISc Bangalore** Aug 2022
CGPA: 7/10

**M.Tech Nanotechnology**
**IISc Bangalore** June 2016
CGPA: 6.4/8

**BE Mechanical**
**University of Pune** June 2012
Grade: 69%

**Diploma Mechanical**
**Government Polytechnic Pune** June 2012
Grade: 86%

## CERTIFICATION

Machine Learning
(Stanford Online)

## SKILLS

**Nanotechnology**
E-beam Lithography, RIE, DRIE, SEM, AFM, Electrical Characterization of FETs

**Data Science**
Hypothesis testing, Model fitting, Machine Learning

**Programming**
Python, JavaScript, MATLAB, LabVIEW, Mathematica

**Web Development**
HTML, CSS, D3Js, React, Django, Flask.

**Mechanical Eng.**
Solid Mechanics, Machine Design, Nonlinear dynamics

**Design Tools**
CATIA, AutoCAD, COMSOL

## PROFILE

I am an interdisciplinary engineer with a keen interest in Data Science and Machine Learning. I have core expertise in Mechanical Engineering and Nanotechnology. I love solving problems that push the limits of my knowledge and skills.

## CURRENT ROLE

**Research Scholar**
**NEMS Lab, Centre for Nano Science and Engineering, IISc Bangalore. (Aug 2015 – Present)**
**Project:** Nonlinear dynamics and strain engineering of 2D nanoelectromechanical systems (NEMS).

- Design and implement NEMS fabrication.
- Set up scientific experiments to actuate and detect resonance in NEMS using Signal Generators, Lock-In amplifiers, Spectrum Analyzers; design experiments for specific testing; designing PCB and RF circuits for custom needs.
- Analyzing experimental data to extract system behavior; Modeling nonlinear behavior of NEMS using statistical regression techniques.
- Writing application software for instrument control, data acquisition, and data analysis (Python, JavaScript, MATLAB).

## PAST EXPERIENCE

**Senior Project Assistant**
**IIT Bombay. (July 2013 – Nov 2013)**

- Logistics and administrative support to the project.

**Graduate Engineer Trainee (Sales & Dealer Development)**
**Mahindra Navistar Automotive Ltd. (Aug 2012 – Jan 2013)**

- Conducting market surveys to understand customer requirements in the LCV segment; Organizing meetings between customers and financial service providers for boosting product sales; Developing sales executive's skills by designing product manuals and sales checklists.

## PUBLICATIONS

- Strain engineering of graphene nano-resonator, J. Micromech. Microeng. 31 045015, 2021
- Ultra-sensitive charge detection and latch memory using MoS2-nanoresonator-based bifurcation amplifiers, Appl. Phys. Lett. 118, 053105 (2021)
- Fabrication of 2D NEMS on Flexible Substrates for Strain Engineering in Sensing Applications, IWPSD 2017. Springer Proceedings in Physics, vol 215. Springer, Cham

# Projects Finished

## Nanotechnology

**Skills Learned**

**Fabrication of NEMS / 2D FETs on flexible PET substrate for strain engineering.**
Study of electronic properties and gas sensing behavior of mono, bi, tri-layer MoS2 under application of uniaxial strain.
Design 4-point bending machine to strain NEMS device.

E-beam Lithography, RIE, DRIE, SEM, AFM, characterization of FETs, Machine design

**Design of PCB with vacuum cavity** for actuation and detection of resonance in 2D NEMS / FETs fabricated on thin Silicon Diaphragm which can be deformed by applying air pressure for strain tuning of the NEMS

PCB Design (Eagle), Vacuum system design

## Computer Engineering

**Web app for Scientific Experiments**
Python library for instrument control using PyVisa and VXI11
Flask server for remote control of scientific experiments
Dashboard to monitor the experiment results

IoT; Python: NumPy, Pandas, Flask, REST API design; JavaScript, D3.js, Chart.js

**ChatLab:** A smart chatbot that simulates basic quantum circuits and solves nonlinear differential equations on the fly.

Qiskit

**Modelling Nonlinear Dynamics of NEMS with tunable nonlinearities.**
Numerical integration scheme to solve for the temporal response of the nonlinear dynamical system. The simulations allowed evaluating the behavior of a highly nonlinear system in multi-parameter space.

SciPy, Numerical Methods

**Microscope Automation**
Arduino controlled X-Y stage for a microscope to scan the test surface under microscope, process and analyze scan images for desired features, and return the X-Y coordinates of detected features on the test surface

Computer Vision, MATLAB

**Ethereum DAPPS:** A simple payments app and its extension to rent out IoTs on Ganache test net.

Blockchain

## Mechanical Engineering

**Development of TE mode cell** for measurement of electromagnetic emissions and testing radiation immunity of integrated circuits.

Testing DUTs for electromagnetic compatibility

**Design of a six-speed reduction gearbox** for tool room lathe of 406 x 762 mm capacity.
Design of a single plate clutch for automotive application.

CAD, Machine Design

**Pneumatic automation** using a programmable logic controller (PLC).

Pneumatic Actuator Design, PLC