Department of Electronics and Communication Engineering

Micro-Electro-Mechanical-Systems (MEMS)

MEMS is a process technology used to create timing integrated devices or systems that combine mechanical and electrical components. They are fabricated using integrated circuits(IC) batch processing techniques and can range in size from a few micrometers to millimeters. MEMS technology exploits the existing microelectronics infrastructure to create complex machines on a micrometer scale. Extensive applications for these devices exist in both commercial and industrial systems. Well-known components such as integrated silicon pressure sensors, accelerometers, and motion detectors have found use for several years in automotive and industrial applications. It is common knowledge that MEMS are made of tiny electromechanical components, but some engineers do not appreciate the fact that almost all MEMS devices involve multiple areas of physics—multiphysics. At a minimum, MEMS devices involve at least the electrical and mechanical sciences. It is also common that the electronic and mechanic elements are coupled through thermal or electrochemical effects, thereby adding a third or fourth physical phenomenon to the system.

Advantages of MEMS

- Entire systems can be miniaturized
- Reduced manufacturing cost due to mass production
- High reliability, precision and functionality of systems
- Large number of MEMS devices fit into a small area
- Low power consumption
- Portability

MEMS LAB Inauguration

nauguration of MEMS LAB was conducted on **26.11.2016** by the well know personalities **Padmavibhushana Dr. vasudev K aatre** (Former DG-DRDO & scientific advisor, Defence Ministry of India) ,**Dr. Prakash D Mangalgiri** (Group director ADA Bangalore), **Dr. M Mohan Alva**(chairmen), **Sri Vivek Alva**(managing trustee), **Dr. Peter Fernandies**(principal), **Dr. D V Manjunatha**(HOD, E&CE Dept.) &**Dr. Praveen J** (Dean academics),
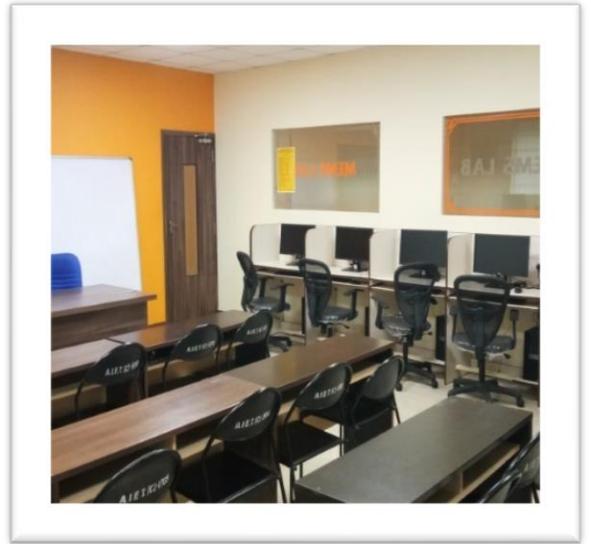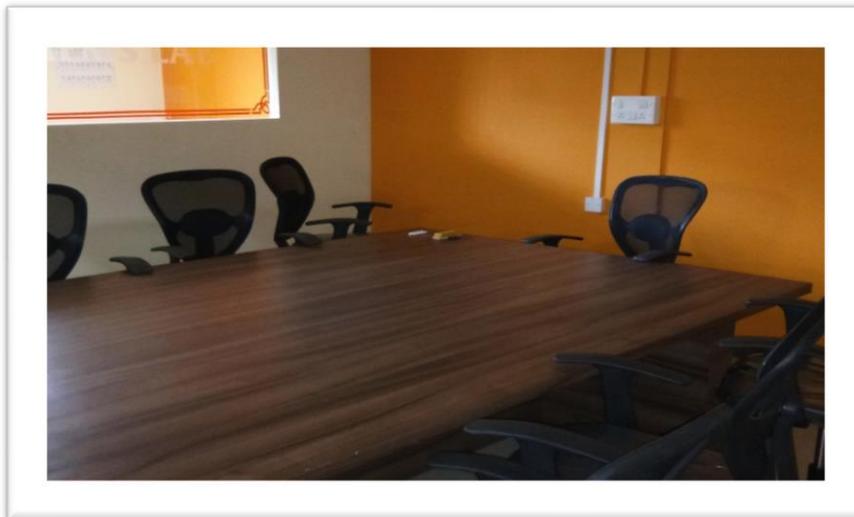
Mems Inauguration

Mems Inauguration by Dr. M Mohan Alva and Dignitaries

Mems Simulation Lab And Board Room

Mems Simulation Lab


MEMS Lab Board Room

VTU Research Centre R&D LAB

MEMS LAB has the following features

Systems	: 20 numbers DELL
AC	: 4 numbers
RAM	: 16GB
HDD	: 1TB
Operating systems	: windows 10 pro
Application Software	: Comsol 5.2 / 5.0/ 4.3 &Coventorware
Processor	: intel ® cote ™ i5-6500 CPU 3.2GHz
Board room	: 1
Hod room	: 1
Lab room	: 1
Reserved lab room	: 2
Battery section	: 1

Project undergone in MEMS Research & Development Lab from the date of inauguration:
Projects dine in the year of 2016-17
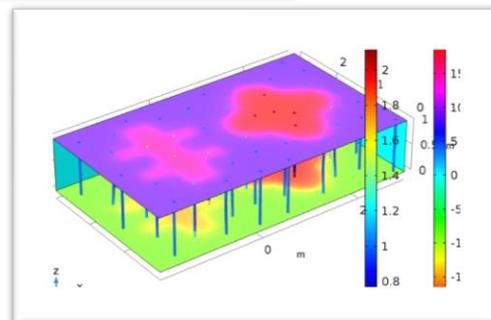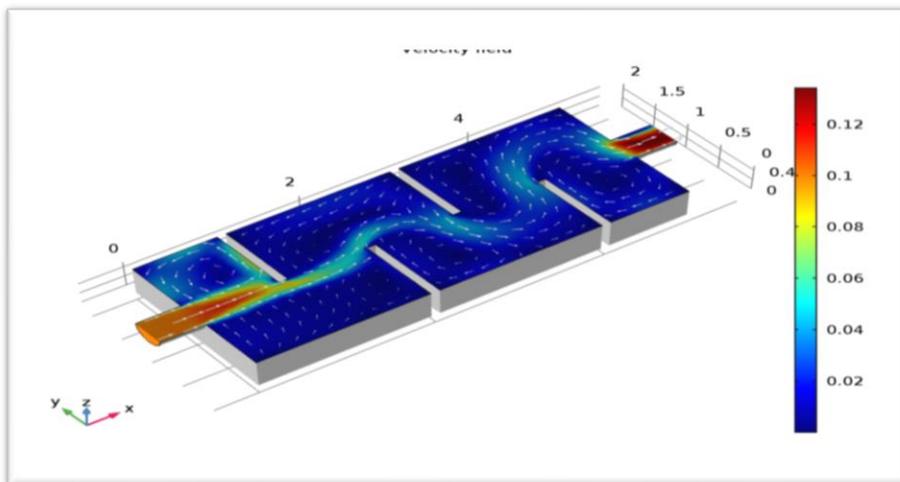### 1. Simulation of Branch Line Coupler using MEMS
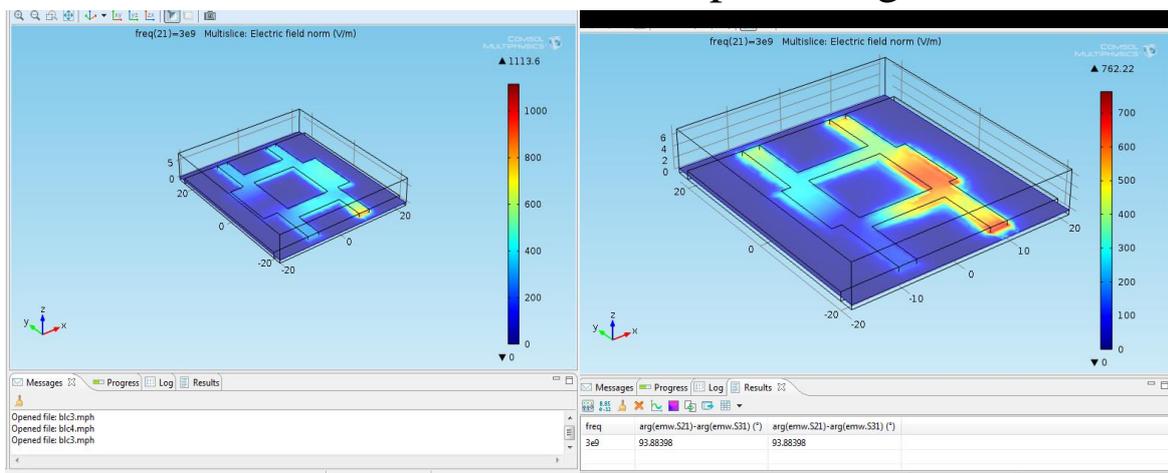
2. Simulation of Coaxial Cable for different impedance using MEMS ComsolMultiphysics.
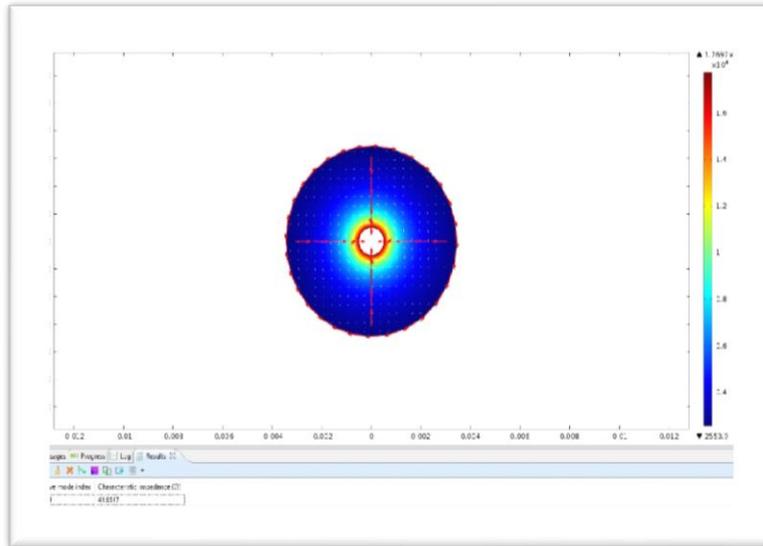
Simulation of Electric sensors for water purification using MEMS ComsolMultiphysics.

Student own executed project

Projects done in the year of 2017-18

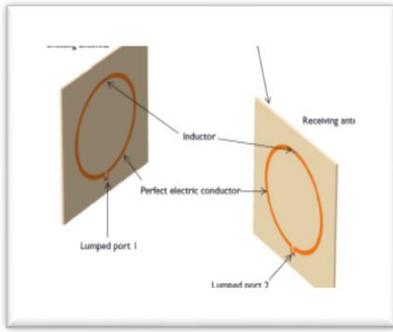3. Simulation of Wireless Power Transfer using circular loop antennas

Figure1: Model set up to compute the coupling effect between two circular loop antennas based on the receiving antenna orientation.

Figure2: Plot of E-field norm and power flow at z = 0 while the receiving antenna is rotating from 0 to 90 degrees with a step of 22.5 degrees.
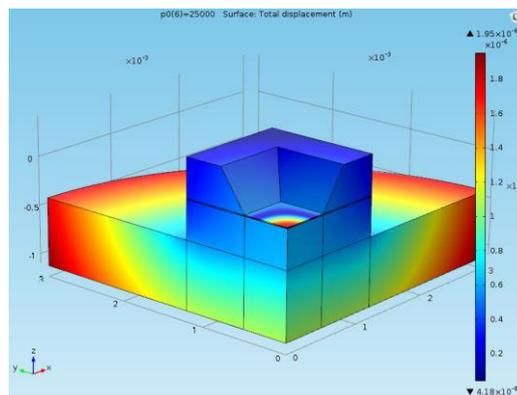
4. Simulation of Microgripper using MEMS Comsol
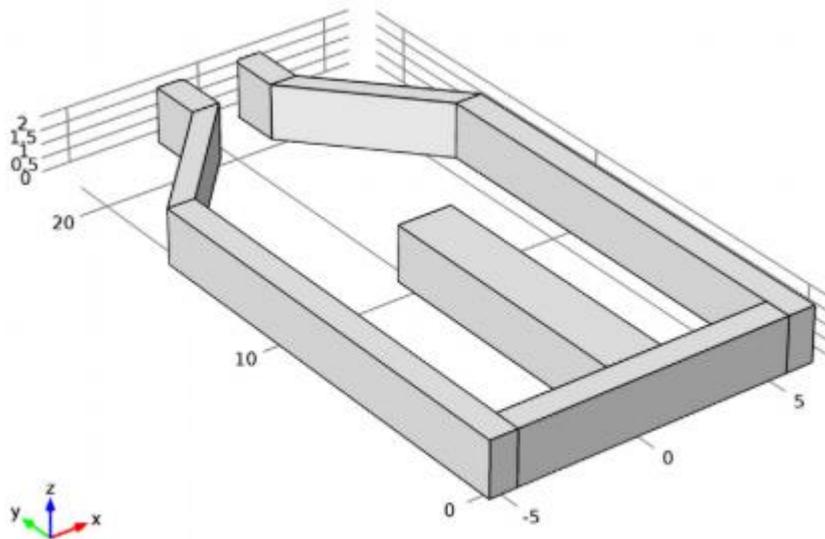
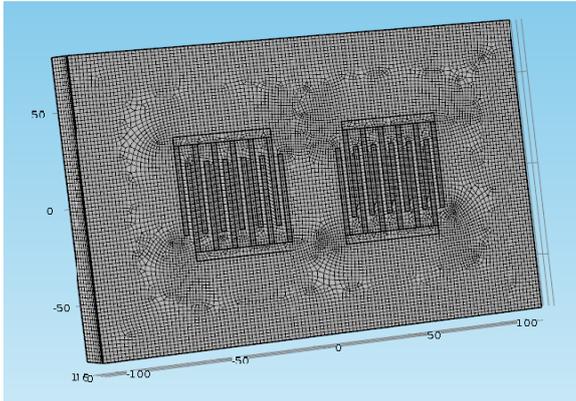Microgripper geometry. The part in the middle represents the piezoelectric actuator.

5. Design and Simulation of MEMS Capacitive Pressure Sensor for High Sensitivity Applications
Guided by: Mr. Sushanth Anil Lobo

Model of thermal stress analysis

6. Design and Simulation of MEMS **SURFACE ACOUSTIC WAVE SENSOR**

Meshed Structure of SAW Sensor