

MicroElectroMechanical Systems

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Kaylen Haley

Biomedical Engineering, University of Rhode Island
Kingston, RI 02881

MicroElectroMechanical Systems, more commonly known as MEMS, are integrated circuit structures that can sense, control and actuate on the micro scale. When dealing with the micro scale, forces like weight and inertia tends to decrease while frictional and electrostatic forces grow larger.

In the medical world, MEMS have numerous applications. A few uses for these systems researchers are currently testing are blood pressure sensors, auditory and visual prostheses, muscle stimulators, glucose monitors and bladder monitors/stimulators. They are also being used in pacemakers as accelerometers, and drug and pressure sensors.

Disposable blood pressure sensors are used quite often and around 17 million are sold each year. These ten-dollar devices are connected to an IV line and monitor the blood pressure of a patient with the help of a MEMS Transducer. The transducer senses the blood pressure through a silicon-based dielectric gel between a sensor and saline solution. This gel, which is a nontoxic polymer, isolates the sensor and circuit from the solution and protects the patient from currents that would travel up the IV line.

Integrated Sensing Systems Inc., (ISSYS) has created a pressure sensing device so small, that it can fit in the eye of a needle. Being .25mm wide, this device can be used to measure the

internal pressure of organs or wounds or even measure the pressure drop across an obstructed artery or implanted heart valve. It could function as an intracranial monitor, a transvalvular catheter, or an angiographic catheter just to name a few. Its biocompatibility has been excellent mainly due to the fact that it is made out of born doped single silicon instead of standard single crystal silicon.



In the future, it is expected that the gap between man and machine will grow smaller and many people will have some type of implant in their body. US Army Medical Research is currently working on ideas of creating portable sensors. You may one day see a paramedic arrive at the scene of an accident and attach some kind of device to a patient to get multiple readings - temperature, blood pressure, serum glucose level, etc. almost instantly.