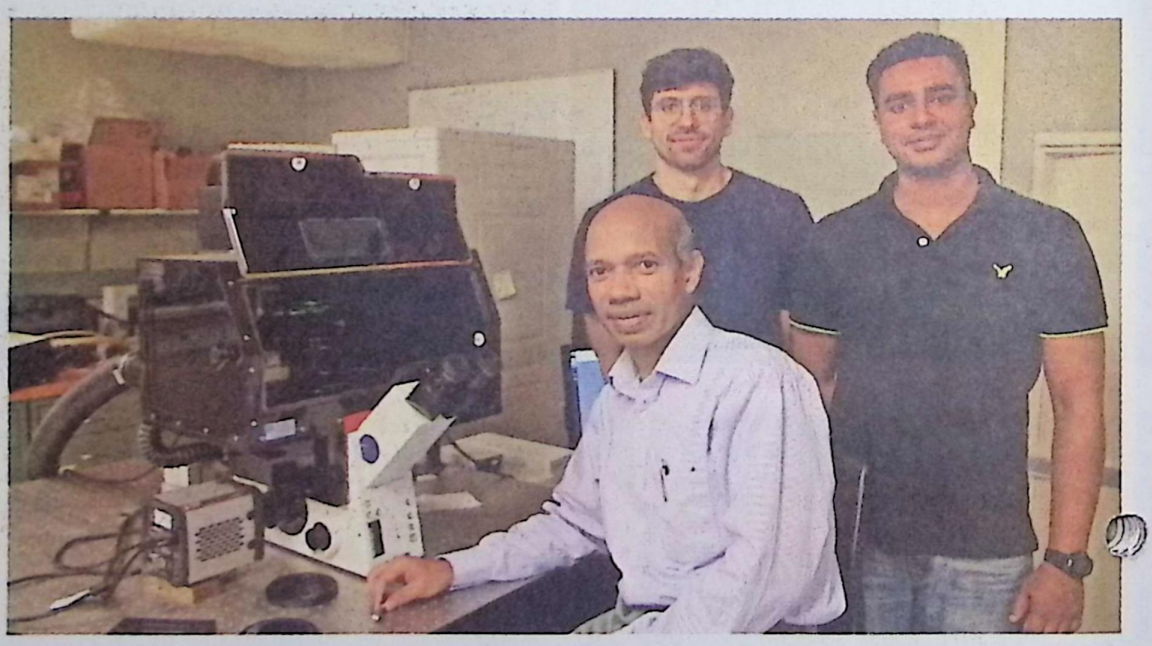
A Living Machine

This may sound like a far-fetched Sci-fi story

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Not all engineers are busy trying to design wearable tech like the new Apple Watch or Jawbone Up. Some are intent on making living machines.

A team of engineers led by M Taher Saif, Gutgsell Professor of Mechanical Science and Engineering at the University of Illinois at Urbana-Champaign, US, have created a class of tiny hybrid robots–part machine, part heart cells–that can swim like sperm. The research may someday lead to the development of devices that could travel within the body, targeting disease areas and delivering medication.



The research on the biobot swimmer can be carried out in Bangladesh, says Dr M Taher Saif.

The biological robot or biobot is a mechanism where engineering precision meets the exquisite power of life. "It is the smallest autonomous robot with living cells that can swim in a directed way," Dr Saif says on email. "It does not need any external power or guidance such as magnetic or electric fields."

Dr Saif was the principal investigator of the project which is part of a National Science Foundation Center, named EBICS (Emergent Behavior of Integrated Cellular Systems). The centre was jointly formed by Massachusetts Institute of Technology, University of Illinois at Urbana-Champaign and Georgia Institute of Technology.

Not visible by the naked eye, the biobot, also called the swimmer, is living because it is powered by live heart cells. It is also engineered because the living cells are on a thin flexible wire which is manufactured. The wire is about 1/10th the diameter of human hair and 2 mm long. The end of the wire has a thicker region which is called the head. This part is rigid. The cells are on the flexible part of the wire close to the head. "The cells are extracted from a rat heart and are randomly plated on the wire."

The cells self-align and synchronise to beat together, sending a wave down the tail that propels the biobot forward.

With living machines like the biobot, humans now will have the capabilities to manipulate cells and their functionalities. Professor Saif says, "In simple terms, the idea is to take stem cells, differentiate them to the cells of your choice, bring them in contact with engineered structures, and let the cells interact with these structures and themselves."