Deteriorating quality of Ph D theses in India

With reference to the comments by Gurpreet Singh[1] on the quality of Ph D theses in India, we would like to add a few points to bring out the reasons and circumstances responsible for the same.

The first point that comes to our mind is the role of UGC/CSIR. Being apex bodies, they are responsible for the quality of research. It is strange that there are no rules and regulations to check the rewriting work going on in the name of research in most Indian universities. In order that our researches compete with international ones, it would be worthwhile if the UGC/CSIR makes 'one foreign examiner of repute', a rule for thesis evaluation. This would bring to an end various influences, privileges and prejudices in case of Indian examiners.

Secondly, one would like to probe into the role of the guide or research supervisor. The present UGC norms make any person with a general qualification of lecturership, eligible for guiding a research scholar. One would wonder whether having a Master's degree or even a Ph D degree is all that is needed to be a guide. Majority of the guides do not have any significant publications to their credit. Many guides/supervisors do not have any idea regarding work plan and depend mainly upon previous work. Moreover, when a student enters the field of research, he hardly knows anything about the topic or how the work is to progress, and thus is fully dependent on the guide.

Next, it is unfair to compare the work of a student from a university laboratory which is generally deprived of funds with that of a student from a well-furnished, state-of-the-art CSIR/DST/DBT or similar laboratories or institutions. But even in university laboratories there are specks of good researches amidst heaps of poor-quality ones. The examiners rarely go by the quality of theses and are rather highly influenced by friendly relations with the guide, which is also a give-and-take relationship.

It can be concluded that a quality check for thesis submission should soon come into action. Students should be considered on the basis of their research quality since, many a time, ordinary students prove to be much better researchers than NET/GATE/SLET-qualified students. The same was also noted by Srivastava[2]. It is high time that UGC/CSIR introspects to find out the reasons that have led to deterioration in the quality of Ph Ds in India. Otherwise, getting a Ph D degree would be cheaper and easier than getting a B Sc degree.

1. Singh, G., *Curr. Sci.*, 2003, **84**, 1497–1498.
2. Srivastava, G. K., *Curr. Sci.*, 2003, **84**, 616.

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MEMS initiative in India

Micro-Electro-Mechanical System or MEMS in short. Does one need to know more about it? Well, according to projections, what the transistor did to the latter part of the 20th century, MEMS has the potential for the 21st century. Some applications where MEMS has left its signature and is enabling new discoveries include, silicon-based pressure sensors for measuring exhaust emissions, fuel, tyre and hydraulics in the automotive industry; polymerase chain reaction (PCR) microsystems for DNA amplification and identification, biochips for identifying hazardous gases in the environment, the electronic nose, with an inbuilt array of electronic chemical sensors as well as a pattern-recognition system, capable of recognizing simple to complex odours or an electronic tongue for sensing different tastes.

MEMS includes mechanical and electrical elements that convert one form of energy into another, operating by transduction. The transducer is a device that is actuated by energy of one form and supplies energy of another form. Transducers encompass both sensors and actuators. MEMS devices are made of extremely small parts or microchips. This miniature device comprises mechanical elements, actuators and electronics on a common silicon substrate, fabricated using microsystems technology (MST). MEMS is an aggregation of parts, between which there exists a relationship, such as a microsensor (miniature device that converts a nonelectrical quantity, for example, pressure, temperature, gas concentration or magnetic phenomenon, into an electrical signal and has at least one physical dimension at the submillimetre level); and an actuator (converts an electrical signal into a non-electrical quantity). The purpose of MEMS is to directly interact with the physical environment. Another type of device is the Micro-Opto-Electro-Mechanical System (MOEMS) that overcomes challenges posed by MEMS and demonstrates required optical performance. MOEMS devices offer higher bandwidth, lower cost, smaller size and an easier integration than similar optical devices in the macro world.

MEMS devices have to be integrated, that is, they are fabricated on the same substrate as the electronics controlling them, while taking care of compatibility issues concerning the fabrication method such as micromachining and the electronics. By integration on a microchip, the sensors collect information from their