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AMEN

The Association of Mechanical Engineers

NEWSLETTER

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Being defeated is often a temporary condition.
Giving up is what makes it permanent.

PLACEMENTS '06

As another batch goes through the placement process, let us have a look at how the job scenario has been so far.

The placement process started on the 21st of December this time. The process has moved forward with great speed. In just over a month's time the statistics for the number of students placed in the department is as follows: B.Tech-45/55(81.8%), Dual- 7/13(53%) and M.Tech – 42/56(73%), against an overall placement of about 70%, 65% and 60% in the above mentioned programs, respectively. The average salary for the B.Tech students has been around 5-5.1 lacs p.a. and about 4 lacs p.a. for the M.Techs. ITC, HLL, TATA Steel, IOCL, BPCL, GE, TVS Motors, Tata Motors, Fluent, Godrej, PWC and Lehman Brothers have been the major recruiters for the ME Department so far.

A number of multi-national companies made their debut. British Telecom, Capital One and the finance companies- Lehman Brothers and Morgan Stanley were among the companies that visited the campus for the first time.

Better placements and participation of larger number of recruiters can be attributed to the expansion of the business activities of various MNC's in India.

FROM THE DEPARTMENT

The department is organizing a national workshop on "**Fuel Cells: Power device of the Future"**, on the 3rd and 4th of February. The workshop will involve lectures on the state of the art of fuel cells, modeling and simulation, material considerations and thermal and species management.

INTERVIEW

Dr. **Hod Lipson**, Assistant Professor at Cornell University's School of Mechanical & Aerospace Engineering, was in campus a few days back. The AME team caught up with him. Following are some important things he shared with us.

AME: Any advice for the students when applying for the masters program at your University.
HL: Almost everything is there on our website. But I would like to advice students to think from our point of view. When we look at applications we try to find out the genuine candidates...Students make one application and mail it to all the professors. We end up getting a lot of SPAM. But only those which are meant specifically for me catch my attention…..As far the procedure of selection is considered , we shortlist , say 60 out of 600 applications, based on the GRE score, GPA and Rank etc. …Then we try to look for people who can do research. We consider your performance in the relevant courses. If you have a publication in your name it helps in putting you ahead….If you do some work it is better to bring it to a meaningful conclusion, for example, in the form of a research paper. But the most important thing is sending targeted mails…..You should also talk to your faculty. They have gone through all this and will be able to guide you properly.

AME: And that applies to internships as well?
HL: Yes it is the same while applying for an internship. For us the risk is lesser as the arrangement is only for a couple of months.

AME: Tell us something about your field of research.
HL: I work in the field of robotics and evolutionary computation. Industrial robotics, that is, robots performing repetitive tasks in structured environments is quite common. My group is working on evolutionary robotics, where the robots are capable of doing unpredictable tasks. Basically what we are trying to implement is machine learning- the robot learns. We take a lot of inspiration from biology like we have learned a lot from the mechanistic ways in biology and evolution in animals.

DID YOU KNOW?

In 1897, Austrian businessman, Emil Jellinek, travelled from his home in Nice, France to purchase a car from the Daimler factory in Cannstatt, Germany. On his return to the French Riviera, his sporting Daimler Phoenix caused such a sensation that he decided to enter it into a local touring competition, under the name of "Mercedes" after his 9 year old daughter. Realizing the business potential for the new car, he not only placed an order for 36 more, but also secured the franchise for selling them in several countries. **Gottlieb Daimler** also agreed to have them sold under the name of "Mercedes."

MECHANICAL WONDER

Perhaps no calculator of any type has generated more discussion than the Curta. The Curta looks like a small metal pepper-mill or coffee grinder. It is, in fact, a precision instrument which performs calculations mechanically using no electric or electronic parts.

Mr. Herzstark secretly developed the Curta while imprisoned in a German concentration camp. Herzstark was a prisoner at Buchenwald but the camp leaders were aware of his work and encouraged it. They apparently wanted to give the invention to the Fuehrer as a victory gift at the end of the war! Herzstark was given a drawing board and worked on the design day and night. The camp was liberated in April, 1945 by the Americans. Herzstark survived as did his revolutionary concept for a miniature calculator.

'Curta' it's not a familiar word for most of us, and it is indeed fascinating to know how two numbers can be mathematically manipulated by spinning of gears and pulling of shafts.

This high precision pocket calculator can perform four mathematical operations and several other operations based on these four. This machine has a maximum diameter of 35 mm and height about 85 mm .This 230 grams tiny machine has a capacity of 8 setting digits, 6 digits in the counter, 11 digits in the result register, despite its small size. This machine can also calculate square roots, and a paper published in 2003 confirms that it can calculate cube roots also. It suggested something called a Hermann's Method to calculate square roots and cube roots, and got the correct value up to six decimal places.

This was the revolutionary machine in the history of mechanical calculators which could be operated by left hand only. Although several prototypes were made, the first production began in April, 1947. The last Curta was made in November, 1970 but they were still sold until early 1973. By then, pocket electronic calculators were selling for under $100 and a precision mechanical instrument like the Curta could no longer compete. But Curta still remains as one of the most wonderful piece of engineering design.

(*Check out curta.org for more details*)

Abhishek Kothari

THE COMPOSITES OF THE FUTURE: NANOCOMPOSITES

Materials and material development are fundamental to our very culture. The next technological frontiers will be opened not through a better understanding and application of a particular material, but rather by understanding and optimizing material combinations and their synergistic functions.

Many property enhancements are observed due to the addition of nanofillers in comparison with the traditional fillers or the polymer matrix. The kinds of nanofillers used are mainly carbon nanotubes and layers of silicates. Their availability and the methods of fabrications of nanocomposites are some vital technical issues which are drawing the attention of scientific community throughout the world. For example industrial grade nanotubes cost $1500/kg - $6500/kg which must be brought down.

Properties which have been shown to undergo substantial improvements include: Mechanical properties e.g. strength, modulus and dimensional stability, Decreased permeability to gases, water and hydrocarbons, Thermal stability and heat distortion temperature, Flame retardancy and reduced smoke emissions, Chemical resistance, Surface appearance, Electrical conductivity, Optical clarity in comparison to conventionally filled polymers. Several potential applications have been identified in the following industrial sectors: automobile (gasoline tanks, bumpers, interior and exterior panels, etc.), construction (shaped extrusions, panels), electronics and electrical (printed circuits, electric components) and food packaging.

The applications seem attractive but they demand immense research and development input as well as industrial support. These materials promise better future, they possess the characteristics to revolutionize the world but immense effort is required on our part to understand the technology as well as implement it.

Sumeet Kumar

SCOPE OF FLUID FLOW STUDY AT SMALL SCALES: (A MULTIDISCIPLINARY OUTLOOK)

-Dr. P.K.Panigrahi

IN ELECTRONICS

Some of the applications related to microelectronics are (a) micro-channel of miniature heat exchanger present in the processing electronics of MEMS and biomedical devices and (b) micro-nozzle of an inkjet printer head. The information technology is extending to almost all aspects of human life. There is a greater demand for computational power in smaller sized computers. All the MEMS and biomedical devices also require processing electronics of similar order of length scales. Therefore, the heat flux in these electronics devices has increased manifold. However, efficient heat transfer limits the proper performance of these devices. The study of fluid flow in micro channels is necessary for the successful design and development of these cooling channels. Similarly, the characterization of flow field inside the micro nozzle of an inkjet printer head determines the quality of printing.

SUMMARY

Many applications related to various areas of science and engineering which can benefit from study/measurement of small scale flow have been reviewed in this article. The growth of small scale devices for potential practical applications and the importance of fluid flow characterization tool on their performance is an important area of research. The multi-disciplinary nature of the subject and importance in both fundamental and industrial oriented research makes it even more interesting and important. Micro particle image velocimetry (μPIV) is one promising technique capable of mapping the flow field of these small scale flows. Activities in this exciting area have been initiated at IIT Kanpur. There is immense potential to carry out cutting edge research and development (rightly called large scale challenges of small scale devices) in the future.

PUZZLE

The four dots mark the corner of a square.
Draw a minimal network of lines spanning the four dots (i.e. the total length of lines joining the 4 points should be minimum). Parts of it may intersect and you can use more dots while making the network.

Shubham Goel

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