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Harvard professor's research recognised by international community

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(6th August), Cambridge, England & New York, USA

An interview with Professor Howard Stone, winner of the Batchelor Prize for Fluid Mechanics

Professor Howard Stone, Vicky Joseph Professor of Engineering and Applied Mathematics at Harvard University (http://www.seas.harvard.edu/fluidsgroup/home.htm) is the winner of the inaugural Batchelor Prize for Fluid Mechanics. The prize was awarded after an international panel of experts considered nominations, over 130, received from researchers worldwide. This prestigious prize, sponsored by the *Journal of Fluid Mechanics,* is an exciting one for the fluid mechanics community. It will be awarded every 4 years at the International Congress of Theoretical and Applied Mechanics to recognise the achievements of an active scientist who has made significant research contributions to fluid mechanics over the previous decade. We decided to find out more about the Prize's winner and his reaction to winning the award.

How does it feel to be the inaugural winner of the Batchelor Prize in Fluid Mechanics?

As you can imagine, this award was a big surprise to me and it is indeed humbling. Fluid mechanics is a research field that crosses many disciplines (engineering, physics, and mathematics are the main ones) and engages many creative and smart researchers. There are many equally deserving individuals in our field.

Stone entered university with the idea of studying history and political science, but was moved to switch to chemical engineering partly by an inspirational chemistry class from Professor Dino Tinti in his first year at UC Davis and partly because his father was also an engineer. He then proceeded to a PhD at the California Institute of Technology, followed by a postdoctoral position at the University of Cambridge before joining the mechanics group at Harvard. Throughout his career, Stone has 'also benefitted enormously from many opportunities for national and international collaborations.'

I have been lucky in this regard and I have long felt that I have the most wonderful research group, full of energy, ideas and initiative that has continually taught me new topics and exposed me to new ideas in fluid mechanics, material science and applied mathematics.

What is it that interests you about fluid mechanics?

I find fluid mechanics problems that intersect the various scientific disciplines most interesting. Also, in this regard I tend to look for similarities rather than differences when studying new problems, since so many of the basic principles for fluid mechanics, colloid science, and physical chemistry intersect when new applications and new systems are studied.

What I believe is that fluid mechanics is a beautiful, intellectually stimulating and engaging subject, while at the same time bridging to practical topics of significant interest in industry (both large and small) and other disciplines. Fluid systems occur almost everywhere and are essential features of all types of processes, natural as well as industrial and manufacturing.

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What do you feel is the most important research you have conducted?

My research has identified fundamental questions, often at the interface of engineering, physics, chemistry and biology, and so other researchers have found some value in our ideas, just as, reciprocally, we have found great value in ideas and publications from other research groups (past and present).

The subject of "interfaces" appears regularly when I think about my work in fluid mechanics. In the areas of microfluidics, my group (working with Unilever Research) published new results on drop formation using microfluidic methods. We have followed this up with studies involving colloidal material and red blood cells. Some of my research has led to a few patents that have been utilized by companies, which indicates some value to our work and general approach. In some cases I have collaborated with companies on topics they believe they need to understand better.

What about teaching?

It seems very important to me to support teaching and education in the basic principles of fluid mechanics while instilling in this teaching the many wonderful ways fluid mechanics enters every day problems, natural phenomena, physiology, industrial applications, etc. Fluid mechanics reaches into, and draws from, many disciplines. I have benefitted from being able to spend time learning about these disciplines and collaborating with researchers from many fields and countries.

What advice would you give to assist young researchers just starting out in the field?

I suppose the one aspect of fluid mechanics that I find continually useful is having learned the fundamentals behind the Navier-Stokes equations (not surprisingly, there is no better way to do this than to teach one or more courses). I will be the first to admit that I am still learning about fluid mechanics since the many physical and mathematical topics that it encompasses are enormous. I encourage young researchers to attend lots of seminars from a variety of fields; research interests can broaden if you provide some of the intellectual "fluid" needed for that to happen, and over the years one never quite knows where interesting ideas will come from. As Pasteur reminds us "Chance favors the prepared mind." Research remains exciting and invigorating and that is often because of great colleagues that provide a stimulating environment. So, do spend at least a little time helping to improve your local environment and intellectual community – such inputs provide long term value.

Professor Howard Stone's lecture on 25th August during the International Congress of Theoretical and Applied Mechanics, in Adelaide, will draw on some of his award winning research. The text will be freely available via the *Journal of Fluid Mechanics* at http://journals.cambridge.org/flm

For further information regarding *The Batchelor Prize* please go to:

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