Editorial

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The ongoing race for the nomination of the presidential candidate of the US Democratic Party has brought two important issues to the fore: gender and race. The front-runners for the nomination are Hillary Clinton, who would be the first woman candidate, and Barack Obama, who would be the first person of African–American descent. Whoever wins the final nomination, the process already represents a significant victory in our efforts to overcome our in-built biases.

Both these biases have been widespread in the scientific community, and have recently come out in the open due to indiscreet remarks by top scientists. In January 2005, the president of Harvard University, Lawrence Summers, sparked a furore when he said that innate differences between men and women might be one reason why fewer women succeed in science and math careers. He was forced to resign from his position within a year. This kind of gender bias is evidenced by the fact that only 34 women have been awarded the Nobel Prize since 1901, and only 2 in Physics – Marie Curie and Maria Goeppert-Mayer (both of whom have been featured in past issues of *Resonance*). The list of women who have been ignored by the Nobel Committee includes illustrious figures such as Jocelyn Bell who discovered pulsars.

Another under-appreciated woman scientist is Rosalind Franklin, whose name should be as famous as that of Watson and Crick for the discovery of the double-helical structure of DNA. Franklin did painstaking studies of X-ray diffraction from DNA crystals, and discovered that the sugar-phosphate backbone of DNA lies on the outside of the molecule, not the inside as was previously thought. She even discovered the double-helical structure of DNA and only missed the part on base pairing between the two strands, which is of course the secret of heredity. It is well acknowledged that Watson and Crick could not have come up with their successful model without access to Rosalind's data (given to them without her knowledge).

Which brings me to the issue of race bias. The same Watson, in an interview given a few months ago, implied that race determines intelligence by saying that he was "*inherently gloomy about the prospect of Africa*" because "*all our social policies are based on the fact that their intelligence is the same as ours – whereas all the testing says not really*". He said that there was a natural desire that all human beings should be equal but "*people who have to deal with black employees find this not true*". What a remark from a person of his stature; it is no

wonder that he has been forced to resign from the board of the Cold Spring Harbor Laboratory, with which he had been associated for six decades.

I started this piece by referring to the US election process because, historically, the US has always been a champion for such causes. Take, for example, the abolition of slavery in 1865, giving women the right to vote in 1920, or the black civil rights movement of the 1960's. Indeed the self-criticism built into the American system ensures that defects in the system get corrected as society evolves, note how Summers and Watson have had to resign from their pre-eminent positions because of their statements. Another example closer to science is the enrolment of girl students in 'technical' colleges. When the Massachusetts Institute of Technology (MIT) found that the ratio of girls to boys in their undergraduate Engineering courses was too low, they went on an aggressive publicity campaign to remove biases about women in engineering. Using high-profile women from the Engineering faculty, such as Mildred Dresselhaus, they soon increased their women enrolment so that by 1990 girls represented 38% of the undergraduate class. Which goes to show that the original small ratio was only due to bias and not any innate difference in ability between boys and girls.

Another example is how, before the Second World War broke out, the US was the haven for Jewish scientists fleeing Nazi Germany. Perhaps the most famous name in this connection is that of Einstein, who emigrated to the US and never forgave the Germans for what they did to the Jews. Indeed, Germany was the center of gravity of Physics around the turn of the last century, but this shifted to the US after the war partly due to the exodus of top scientists from Europe. This is best exemplified by the featured scientist in this issue of *Resonance*, Max Planck, who ushered in a paradigm shift in our thinking with his famous law presented at the German Physical Society meeting in 1900. For the first time, our classical notion of continuous energies was replaced by the idea of discrete 'quanta'. In due course, this led to the formulation of a new quantum mechanics to replace the old classical mechanics. Paying homage to Planck at a memorial service meeting, Einstein expresses the hope (on behalf of the American National Academy of Sciences) that "*free research, for the sake of pure knowledge, may remain unhampered and unimpaired*".

Let us hope that we too can rise above our petty biases and tap into the immense potential of the people of India, irrespective of race, gender, or religion.